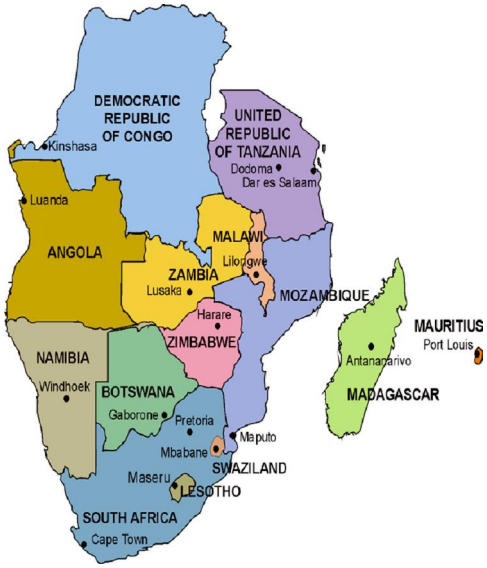
Global Water Partnership Southern Africa

IWRM SURVEY AND STATUS REPORT

Summary



PEGASYS Strategy and Development

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EXECUTIVE SUMMARY

Integrated Water Resources Management (IWRM) is widely considered as contributing to sustainable development and the achievement of the Millennium Development Goals. The targets agreed at the World Summit for Sustainable Development (WSSD) gave new momentum in promoting IWRM, particularly the WSSD Target on National IWRM/WE Planning. At the national level, IWRM provides a basis for balancing different and increasing demands on water resources.

The countries in Southern Africa are at very different stages of implementing IWRM, and have different experiences in this regard. It is, at this point, useful to take stock of the process and to examine opportunities for improved IWRM implementation in the various countries. The GWP SA, supported by the African Development Bank (through the Multi-donor Water Partnership Programme), put in place a project to examine the status of IWRM implementation in southern Africa and to develop recommendations for the way forward.

Through a synthesis of country reports, there definitely seems to be progress in the region in relation to IWRM, but that there are also a number of areas of concern. As can be expected, the policy, legislation and strategy components are ahead of implementation, while elements of environmental sustainability are monitoring are less well developed than more traditional water resources activities.

Most countries are engaging IWRM practice at the integrated hydrological level, while some still have a more traditional water resources planning focus. Only Zambia and South Africa have made real headway with engaging water as part of the broader development planning process, but this seems to be a theme that has emerging resonance with water and other sector planners throughout the Southern African Development Community (SADC), given the increasing uncertainties and pressures that will be placed on the region's water resources.

Four key messages can be derived from the assessment of IWRM implementation in the region. The first of these relates to the purpose of IWRM, the second relates to the development of IWRM programmes that are aligned to the capacity of the relevant country; the third relates to the identification of the key IWRM programmes relevant to the specific context, and to the issue of selective consultation processes. Each of these is discussed briefly below.

1) IWRM is not an end in itself, but only a means to an end. The end is the environmentally sustainable management of water resources in a manner that supports the social and economic development of the country or region. The most effective IWRM planning would be that which finds the simplest means to achieve this end, as captured in the concept of equity, efficiency and environmental sustainability.

2) Aligning IWRM programmes to capacity: One of the challenges of IWRM is that it is sometimes interpreted as requiring the implementation of all of the elements of IWRM, at the same time. However, it is very clear from the country assessments, that capacity, in terms of human, financial and institutional capacity, is a major constraint to water resources management across the region. While capacity building and training programmes are important and must continue, it will be a long-term process to reverse the capacity constraints currently present in the region. In the meantime, however, implementation capacity will continue to place limitations on what can be achieved. In order to implement sustainable and effective IWRM, it is important to align IWRM implementation plans with available capacity, rather than developing ambitious programmes which cannot be implemented effectively because of limited capacity.

3) As a follow on from the above comments, there is no blue print for IWRM that can be implemented in all contexts. IWRM, as a philosophy for water resources management, contains a number of possible

elements. It is not, however, necessary that all of these elements be put in place simultaneously. The implementation of effective IWRM is based on the identification of the key elements of IWRM that are appropriate to a particular context (including the capacity constraints as discussed above). It is important to identify the particular challenge(s) pertaining in a basin/country, and to identify the key actions required to address those challenges. It is best to begin with ensuring that the fundamentals of water resources management are in place, recognizing that other aspects can be put in place over time as and when the capacity is available. This includes the priority other sectors that water needs to engage to ensure effective IWRM, given the ecological, social and economic challenges facing the water sector. The key actions may vary considerably from one area to another. In one area, a key challenge might be increasing storage capacity through further infrastructure development. In another area, a key challenge might be understanding and managing current water use in order to ensure sustainable use of limited water resources. The actions identified in an IWRM strategy or plan should address these key challenges.

4) Within this, while consultation is a key aspect of IWRM, it is important to ensure that it remains appropriate to the needs and capacity of the country, project or programme. Just as it is important to understand what the key actions are to address the key water resource management challenges, it is important to understand the key stakeholders in any particular context. Stakeholder consultation or engagement does not require the involvement of all stakeholders in all processes. Clear identification of the purpose of the consultation/engagement, and the key stakeholders to be consulted, may enable more effective implementation of IWRM than attempts to consult too widely and too often.

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ACRONYMS[1]

ANDEA	–	National Water and Sanitation Authority
ARA	–	Regional Water Administration
BOS	–	Bureau of Statistics
CC	–	Catchment Council
CEB	–	Central Energy Board
CEEPA	–	Centre for Environmental Economics and Policy in Africa
CMA	–	Catchment Management Agency
CMS	–	Catchment Management Strategy
CNA	–	National Water Council
COP	–	Catchment Outline Plan
COW	–	Commissioner of Water
CPI	–	Consumer Price Index
CU	–	Commercial Utilities
CWA	–	Central Water Authority
CWP	–	Country Water Partnership
DNA	–	National Directorate of Water
DRWS	–	Directorate of Rural Water Supply
DWA	–	Department of Water Affairs
DWAF	–	Department of Water Affairs and Forestry
ENGRH	–	National Water Resources Management Strategy
EWR	–	Environmental Water Requirements
FAO	–	Food and Agriculture Organisation
FIPAG	–	Water Supply Investments and Assets Fund
FNDP	–	Fifth National Development Plan
GDP	–	Gross Domestic Produce
GNP	–	Gross National Product
GWP	–	Global Water Partnership
GWP SA	–	Global Water Partnership Southern Africa
HYCOS	–	Hydrological Cycle Observing System
IA	–	Irrigation Authority
IFR	–	Instream Flow Requirements
INE	–	National Statistics Institute
INSTAT	–	National Institute of Statistics
IPCC	–	Intergovernmental Panel on Climate Change
IUCN	–	International Union for the Conservation of Nature
IWRM	–	Integrated Water Resources Development
IWRM/WE	–	Integrated Water Resources Management /Water Efficiency
JIRAMA	–	National Water and Electricity Utility
LHDA	–	Lesotho Highlands Development Authority
LHWP	–	Lesotho Highlands Water Authority
MDGs	–	Millennium Development Goals
MEF	–	Mauritius Employees Federation
MEWD	–	Ministry of Energy and Water Development
MoIWD	–	Ministry of Irrigation and Water Development
MOPH	–	Minister of Public Work and Housing
MRLGHRD	–	Ministry of Regional and Local Government, Housing and Rural Development
MWAF	–	Ministry of Water Affairs and Forestry
NDS	–	National Development Strategy
NGO	–	Non-Governmental Organisation
NRA	–	Natural Resource Accounts

[1] The acronyms from Portuguese or French speaking countries have been given in expanded form in English.

NWA	–	National Water Authority
NWMP	–	National Water Master Plan
NWRS	–	National Water Resources Strategy
O&M	–	Operation and Maintenance
ODA	–	Overseas Development Assistance
OKACOM	–	Okavango River Basin Commission
ORASECOM	–	Orange-Senqu River Basin Commission
PAA	–	Angolan Country Water Partnership
PAWD	–	Partnership for African Development
PNA	–	National Water Partnership
RBA	–	River Basin Authority
RWP	–	Regional Water Policy
SADC	–	Southern African Development Community
SCC	–	Sub-catchment Council
SNA	–	System of National Accounts
SSEAW	–	System of Environmental Economic Accounting for Water
SWAp	–	Sector Wide Approach
SWSC	–	Swaziland Water Services Corporation
UN	–	United Nations
UNEP	–	United Nations Environment Programme
WASA	–	Water and Sewage Authority
WDM	–	Water Demand Management
WMA	–	Water Management Authority
WRAP	–	Water Resources Action Programme
WRM	–	Water Resources Management
WRMP	–	Water Resources Master Plan
WRU	–	Water Resources Unit
WSAG	–	Water Services Advisory Group
WSASP	–	Water Supply and Sanitation Policy
WSSD	–	World Summit on Sustainable Development
WUC	–	Water Utilities Company
WWF	–	World Wide Fund for Nature
ZINWA	–	Zimbabwe National Water Authority

1 BACKGROUND AND CONTEXT

1.1 PROJECT BACKGROUND

Integrated Water Resources Management (IWRM) is widely considered as contributing to sustainable development and the achievement of the Millennium Development Goals. The targets agreed at the World Summit for Sustainable Development (WSSD) gave new momentum in promoting IWRM, particularly the WSSD Target on National IWRM/WE Planning. At the national level, IWRM provides a basis for balancing different and increasing demands on water resources.

The countries in Southern Africa are at very different stages of implementing IWRM, and have different experiences in this regard. It is, at this point, useful to take stock of the process and to examine opportunities for improved IWRM implementation in the various countries.

Under the Water Partnership Program, the African Development Bank made provision to organize workshops in each of the five African Sub-Regions to build capacity and awareness among RMCs on the objectives and principles of Integrated Water Resources Management. This process is now being implemented in Southern Africa. Within this process, the main objective is to promote IWRM and share experiences on the elaboration and implementation of National IWRM plans in Southern African countries.

For the Southern African region, 12 countries were selected for the review, namely Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. A regional workshop was held on 16th and 17th of February 2009 to identify the most appropriate approach to the national reviews, which was followed by literature review and consultations in each country over the next 8 weeks. These national level consultations were supplemented by additional desktop research where appropriate.

This report serves to collate and synthesize the outcomes of the regional survey into a single regional report. The report was presented to a sub-regional workshop forum on the 4th and 5th May 2009, for discussion and for country input into the document. A round of written comment ensured that the country consultants were satisfied with the content of the report.

COUNTRY CONSULTANTS

The country reviews which provided the bulk of the material analysed and presented in this report were put together by a team of consultants in each of the twelve countries, as follows:

Angola: Mr Jose Neto

Botswana: Mr Oliver Chapeyama

Lesotho: Ms Palesa Morokosi and Dr Mampiti Matete

Madagascar: Ms Perlive Rahaga

Malawi: Mr Elton Laisi

Mauritius: Mr Eddy Seenyen

Mozambique: Ms Felicidade Massingue and Paiva Munguambe

Namibia: Desert Research Foundation of Namibia

South Africa: Mr Jean Boroto and Jean-Marc Mwenge Kahinda

Swaziland: Dr Manyatsi and Rex Brown and Arie Remmelzwaal

Zambia: Dr Imasiku Nyambe

Zimbabwe: Ms Tabeth Matiza-Chiuta and Dr Rudo Sanyanga

The regional report was compiled by Pegasys Strategy and Development from the work done by the country consultants, with coordination and review from Ruth Beukman and Andrew Takawira of the GWP-SA Secretariat.

1.2 GEOGRAPHIC CONTEXT

The SADC region, excluding the Democratic Republic of Congo, covers nearly 6.8 million km^2. The relative sizes of the member states varies considerably, from the very small Lesotho and Swaziland, to the much larger South Africa, Mozambique, Namibia and Angola.

The region has renewable freshwater resources of around 650 billion m^3 per annum (surface and groundwater). However, these resources are inequitably distributed between the countries, and water availability per capita varies significantly, influenced both by topography and climate. The climate is characterised by wet and dry periods with recurrent droughts and floods, which impact negatively on economic growth and human well-being. The western part is arid to semi-arid, with average annual rainfall of less than 300 mm, while the eastern parts are much wetter, with annual rainfall over 800 mm (cf Figure 2). Angola is largely humid. The SADC region can be divided into 12 major ecozones, with forests making up about a third of the land area, around 21% desert, and the rest largely savannas and grasslands. The SADC region contains some major and important wetland systems, some of which, like the Okavango swamps, have global significance.

Fifteen of the major river basins in SADC are transboundary in nature, and all of the SADC countries, except the island members, share at least one river basin with other states. There are also a number of transboundary aquifers.

The SADC region is particularly vulnerable to climate change impacts, as a result of its historically high climate variability, high levels of food insecurity and poverty, and high levels of water stress. Forecasts made by the Intergovernmental Panel on Climate Change (IPCC) (Christensen *et al.*, 2007) estimate a 20% decrease in rainfall in southern Africa with the major drop during the June to August where it could reach 30%.

According to the IPCC, it is possible that the incidences of drought will increase with a major impact particularly on pasture, cattle and water resources in marginal areas. The shortage of water, already a problem in many southern African countries, is likely to worsen, and will pose a threat to food security in countries like Mozambique. Climate change is also likely to increase desertification, bush encroachment, soil erosion, deforestation, floods and droughts. Crops yields are expected to drop. The pattern of infectious and water borne diseases may change as temperatures rise. For the island states, sea water level rises and tsunamis will impact upon the coastal areas and their infrastructure, as well as the erosion of beaches.

1.3 SOCIAL AND ECONOMIC CONTEXT

Despite being generally well endowed with natural resources, and having seen good economic growth over the past few years, the southern African region remains extremely poor and suffers from low levels of social and economic development. Around 45% of the total population survive on less than 1 US$ per day. Malnutrition averages around 36%. Largely because of HIV and AIDS, life expectancy has declined from around 50 years, to slightly less than 40 years. Infant mortality remains high at above 50 per 1000 births in most of the states.

Economic development is uneven between and within countries. The mixed levels of development can be seen in the Human Development Index which ranges widely across the various countries, and in the levels of access to basic water supply and sanitation as shown in figure 8 and 9 in Appendix A. In all the countries, the urban areas have better access to services than the rural areas and access to sanitation lags behind access to water.

By 2020, the region's population is estimated to reach around 262 million people from around 200 million in 2008. Migration, both within and between countries, is a common factor, with strong urbanisation patterns, seasonal migration between cities and rural areas, and migration between countries as a result of economic and political pressures. These migration patterns have major impacts on water availability, water services provision, and management of water-borne diseases.

Importantly, SADC Member States have recognised the importance for regional integration, with key initiatives around trade, infrastructure and natural resources management.

1.4 MAJOR ECONOMIC SECTORS, AND SOCIAL AND ECONOMIC CHANGES

Over recent years, the region has experienced relatively good economic growth, which has been negatively affected by the recent global slowdown. In 2006 the region experienced an average growth in real GDP of 6.0%, partly due to good rains having a positive effect on agriculture. There was also good growth in the mining sector which stimulated the manufacturing sector. However, manufacturing remains a small sector in all SADC countries, except South Africa and Mauritius.

In most of the SADC countries, agriculture remains a key economic sector, and provides livelihood and jobs to a large part of the population. Even in countries that are driven by mining and industry rather than by agriculture, it remains an important part of rural livelihoods, and a significant water user. The countries that are dependent on an agricultural base remain particularly vulnerable to climate variability and natural disasters.

Over the next couple of decades, demographic shifts, economic development and climate change will together place increasing pressures on water resources in the SADC region. Increasing hydrological variability and uncertainties will require appropriate and adaptive resources protection, development and management to support the integration and development imperatives of the region.

2 WATER RESOURCES SITUATION

2.1 WATER AVAILABILITY AND INFRASTRUCTURE

Surface water availability varies enormously across the region, with Angola (1320 billion m^3) the most well-endowed with surface water resources. Namibia, on the other hand, which has limited surface water resources near the major urban areas, is very dependent on groundwater, with 73% of all water used coming from groundwater. In many areas freshwater is a scarce and vulnerable resource. Most of the region's water resources are associated with basins and aquifers shared by two or more countries.

Due to poor storage infrastructure development, in most of the countries the availability of freshwater is dependent largely on rainfall. Infrastructure development (dams) is concentrated mostly in South Africa and Zimbabwe. In most of the region, rainfall is limited to a few months of the year, with the resulting (intra-year and inter-year) hydrological variability increasing the need for effective storage to ensure water availability during the dry months. Conversely, hydrological variability also results in severe flooding, particularly on the eastern coastal areas, with devastating effects on social and economic development.

Since hydropower is an important (if underdeveloped) source of energy in SADC, the management of water resources and water storage is critical in ensuring sustainable energy supply throughout the year. However, hydropower in southern Africa remains significantly underdeveloped.

Groundwater is of critical importance, particularly for providing water sources to rural communities, stock watering, and small towns. However, there is insufficient awareness and ability to implement effective management of groundwater and drought in the region despite the fact that groundwater is the source of water for more than 70 percent of the population.

2.2 WATER USE, DEMANDS AND REQUIREMENTS

Demand for water is increasing across all sectors of the economy, leading to further water scarcity, and competition and disputes over available water. The key drivers are agriculture, mining, hydropower, industry and urban development.

Water availability per capita will decline over the next ten years. By 2025 it is expected that Malawi and South Africa will be facing absolute water scarcity, and Lesotho, Mauritius and Zimbabwe will be water stressed; Angola, Botswana, Mozambique, Swaziland and Zambia are likely to experience water quality and availability problems in the dry season.

Agriculture is the biggest water user in the region. Agricultural water use represents the largest water using sector, even in countries that are not economically dominated by the agricultural sector. This usage may be expected to increase following the SADC target for increased irrigation across the region. This rise in demand can be mitigated by improved water use productivity and efficiency in some areas.

There is general policy recognition of the need for sustainable management of water resources. However, environmental requirements have not been quantified in the majority of SADC states, and not much priority is currently being given to this aspect. The protection of environmental flows is important in the protection of inland fisheries which provide a major source of protein (0.65 million tons caught in 2002). But inland fisheries

production in SADC has stagnated or declined in almost all countries over the past years because of overfishing, environmental degradation and poor management.

While the countries experiencing increasing water scarcity have all put in place, to some degree, water conservation and demand management measures, in most countries there is still considerable work to be done in this regard. Unfortunately, in many parts of the region local water supply systems to supply domestic needs and industrial production are under stress technically, financially and institutionally.

Increasing demands for agriculture, hydropower and industrial development will place increasing pressures on water resources, but more particularly will increasingly need to be met through infrastructure development, due to the spatially uneven and hydrologically variable availability of water resources in the region.

2.3 KEY WATER RESOURCES ISSUES, CONCERNS AND PRIORITIES

There are a number of factors that impact on the availability and management of water resources in the SADC region, including extreme climate variability and the impacts of climate change; population growth and migration (between and within countries); unsustainable water and land use practices; degradation of watersheds; wetlands degradation and destruction; introduction of alien species, including alien water weeds and alien aquatic species; and increased water demands due to economic development. Groundwater abstraction for agriculture, mining and domestic purposes is contributing to a decline of aquifers. Water quality in the region is threatened by siltation due to deforestation, intensive irrigation, pollution from mines, cities and industries, including leachate from landfills, and poor sanitation facilities.

While effective water governance is critical to managing these challenges, the region is facing a number of governance related challenges in all three of the pillars of good water governance, namely: i) clear policy, legislation, strategy and instruments; ii) capacitated and effective bureaucracy; and iii) engaged civil society. The next chapter explores these issues in more detail against the progress achieved.

Water reforms have progressed to different levels in the different states, but the capacity to implement new legislation remains the biggest challenge. This is compounded by institutions that have not been fully established, and lack of collaboration and communication between government structures. Insufficient funding for implementation, and political interference or lack of understanding of the water business by politicians, have also been cited as governance challenges facing the region. Poor financial and human capacity leads to poor infrastructure management, resulting in high levels of water loss.

Most countries are also operating in a context of plural legal systems, with traditional land and water systems still operating in many of the rural areas (outside commercial farming areas). However, the formal legal systems do not necessarily recognise or make space for traditional water management systems.

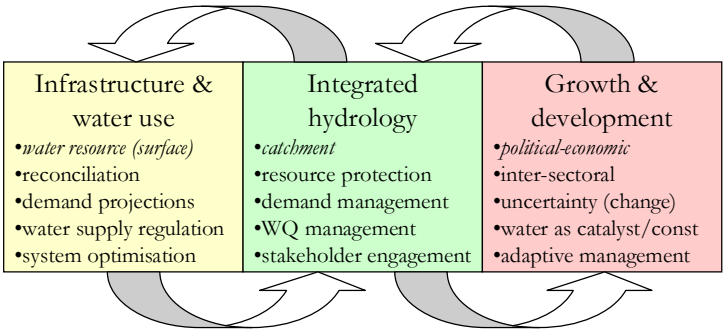
Unfortunately, data on water quality across the region is lacking, as is an analysis of the impacts on social and economic well-being. In some countries, pollution controls either do not exist or are poorly enforced. There is not enough quantitative analysis of the cumulative impacts of deteriorating water quality and increasing abstraction on surface and groundwater systems.

As is discussed later in the report, many countries have made strides in water planning, and arising from this, key priorities have been identified, related to the specific context of the individual country. These range from infrastructure development to demand management, to delivering improved water supply and sanitation. The management of international water resources is also a high priority for SADC and countries in this region.

3 ACTUAL STATE OF THE IWRM PROCESS

3.1 INTRODUCTION

Attempting to assess the state of IWRM within a region as diverse as SADC is clearly an ambitious task, but one that requires a frame of reference against which to evaluate progress. The breadth of the IWRM concept poses the greatest challenge, because it can range from traditional water resources management, through catchment management, to alignment with other sector planning processes. These may be represented as interrelated dimensions of IWRM (as indicated in the schematic below) that have emerged in global and regional discourse over the past couple of decades.



Firstly, the traditional water resources management approaches must underlie any IWRM, namely water balance and reconciliation of supply and demand, infrastructure development and operation and the regulation (licensing) of water supply.

Secondly, catchment management introduces the holistic nature of the hydrological cycle, with focus on demand management in addition to augmentation options, increasing attention to water quality from point and non-point sources and the involvement of stakeholders in decision making.

Thirdly, there is the alignment of water resources management with broader economic and sector planning processes, based on increasing understanding of the political-economy of water and its role as a catalyst or constraint on development together with the needs for adaptive management to respond to uncertainty.

The GWP IWRM Toolbox provides another important lens on IWRM by listing 13 elements of IWRM, captured under 3 headings:

- *Enabling environment*: Policy, Legislative Framework, Financing and Incentive Structures
- *Institutional Roles*: Organisational Framework, Institutional Capacity
- *Management Instruments*: Water Resources Assessment, IWRM plans, Water Use Efficiency, Social Change Instruments, Conflict Resolution, Regulatory Instruments, Economic Instruments and Information Exchange

The SADC Regional Policy and Strategy adopted nine thematic areas, which are consistent with these.

1) **Regional Cooperation in Water Resources Management**: regional integration and socio-economic development; cooperation in water resources management of shared watercourses; inter-sectoral and international cooperation; and the harmonisation of national policies and legislation
2) **Water for Development and Poverty Reduction**: water for basic human needs and for industrial requirements; water for food and energy security.
3) **Water for Environmental Sustainability**: water and the environment, water quality management, and control of alien invasive species in watercourses.
4) **Security from Water-related Disasters**: people's protection from water related disasters; disaster prediction, as well as management and mitigation.
5) **Water Resources Information and Management:** data and information acquisition and management; as well as information sharing.
6) **Water Resources Development and Management**: river basin approach; integrated planning of shared watercourses; dams and dam management; water conservation and water demand management; and alternative sources of water
7) **Regional Water Resources Institutional Framework**: institutional arrangements at regional and national levels and for shared water course institutions.
8) **Stakeholder Participation and Capacity Building**: participation and awareness creation; capacity building and training; gender mainstreaming; and research, technology development and transfer.
9) **Financing integrated water resources development in the region**.

The thirteen GWP toolkit elements and nine SADC Regional Water Policy themes have been consolidated into eight focus areas, in order to provide an assessment of the progress with IWRM in the SADC context. From the authors' perspective these eight areas give a broad picture of the key dimensions of IWRM:

- *Policy and legislation*: whether water policy and legislation cover the key elements of IWRM, and the status of the legislative reform programme and its harmonization regionally and sectorally, covering the GWP Enabling Environment concept, as well as the SADC Regional Cooperation theme.
- *IWRM planning*: whether a strategy has been developed for IWRM, and whether supporting instruments have been developed to ensure implementation. The nature of the IWRM planning process should indicate whether a traditional reconciliation approach, an integrated hydrological approach or a water for growth and development approach has been adopted by each country.
- *Institutional framework*: the issue of institutional capacity includes both aspects contained under the Institutional Roles in the GWP approach i.e. looking at both the organizational framework and the capacity within that framework, for implementation, as well as mechanisms for dispute resolution.
- *Environmental sustainability*: the GWP toolbox does not give particular prominence to the issue of environmental requirements, but it is an element that is being given increasing importance in global dialogues around water management, as indicated by inclusion in the SADC Regional Policy.
- *Water allocation and demand management*: Demand side planning is used as shorthand for integrated water resources planning which has moved beyond supply side infrastructure planning to planning that considers demand side issues, alternative water sources, and the conjunctive use of water.
- *Infrastructure management*: While not explicitly highlighted in the GWP toolkit, the development, financing and management of water infrastructure is critical to the ability of the region to manage variability and uncertainty for development purposes, as reflected in the SADC RWP.
- *Stakeholder engagement*: The engagement of stakeholders encompasses the concept of social change instruments as envisaged in the GWP Toolbox, looking at issues of awareness, stakeholder consultation, and engagement between sectors.
- *Monitoring and information*: The issue of monitoring has been highlighted because of the importance of good data and information as a foundation for IWRM.

3.2 PROGRESS AT THE REGIONAL AND TRANSBOUNDARY LEVEL

At a regional level, SADC has embraced IWRM through the development of the Regional Water Policy and Strategy, has linked this with other sectors to some degree through the Regional Indicative Strategic Development Plan, and has developed the Regional Strategic Action Plans to focus on key enabling, institutional, strategy/instruments and infrastructural dimensions of water resources management at the national and transboundary levels.

There has been progress with the imperative for regional integration and cooperation through the establishment of basin institutions, notably OKACOM and ORASECOM, as well as the formulation of transboundary basin strategies. Regional groundwater challenges are being engaged through focused attention and the establishment of a Regional Groundwater Institute, while a regional Climate Change Adaptation process is attempting to build resilience in water, food, health and energy across the region.

A key challenge remains in the development and financing of strategic joint infrastructure throughout the region, except in the case of South Africa, while some progress is being made on the joint operation of infrastructure, such as the hydropower facilities on the Zambezi. Joint management of floods also remains a challenge, particularly in the eastern coastal areas for Mozambique.

Various other IWRM-linked initiatives are being conducted at a regional scale, but while their concepts, policies and strategies are sound, actual implementation is dependent upon action within the member States, which is the focus of the next sections for the 12 countries.

3.3 NATIONAL POLICY AND LEGISLATION

Since the early 1990s, most (but not all) of the SADC countries have revised their water legislation, bringing them more in line with international best practice, with SADC policy, and with IWRM. However, most of the countries are currently either revising or amending their legislation, and some countries still have to promulgate their revised legislation. While most of the countries have recent policy in place which reflects the principles of IWRM, some countries still have to finalise and adopt IWRM policies. Interestingly, only Angola and Swaziland do not appear to be currently involved in a revision or amendment of the water legislation. This makes the national policy and legislative environment within SADC relatively dynamic, which is advantageous for the ongoing evolution of IWRM practice in the face of change and uncertainty that will be experienced over the next decade.

South Africa, Mozambique, and Zimbabwe, were the first SADC member states to reform their water laws, to strengthen permit or licensing systems and to create new institutional arrangements. Since then, experience has shown that the permit systems work better in the formal economy than in rural, small scale land-use areas where traditional water use governance systems still function. Namibia, despite revising its Water Act did not promulgate the revised Act and is still operating under the Water Act of 1956 while the 2004 Water Bill is revised. Botswana is still operating under a range of pieces of legislation including a Water Act dating from 1968, and the Draft Water Bill of 2006 is still to be presented to Parliament.. Zambia is operating under legislation dating from 1948. A revised water policy 2007 and a new Water Resources Management Bill 2006 have been developed in Zambia as part of a water reform programme. Malawi developed a new policy in 2005 but has not yet translated that into legislation. Lesotho has revised its 1978 water Act, which, however, remains effective until the promulgation of the new water resource bill. The new bill deals with all aspects of water management, including water quality, and conservation and protection of the resource. The bill has been aligned with the ORASECOM Treaty and the legislation of the other riparian states in the Orange-Senqu River Basin (Botswana, Namibia and South Africa).

Legislation in most countries introduces the management of water according to hydrological boundaries to balance water resources protection, utilization and development, together with decentralised water resource management institutions at the basin level that facilitate stakeholder participation. The Swaziland Water Act encompasses the principles of IWRM and establishes water management institutions at local, catchment and national levels, as does policy and legislation in South Africa, Zimbabwe, and Namibia, and these have been proposed in Zambia. Although the Lesotho national Water and Sanitation Policy (2007) promotes integrated water management at the catchment level, there are no plans to establish basin level organization's in the near future. Given the size of Lesotho and the technical capability of the existing institutions, integrated management at catchment level currently remains in the office of the Commissioner of Water (COW). Basin level IWRM plans will thus be developed by the COW.

In most of the countries, but not all, the legislation specifically aligns water resources management and water services, taking a more integrated approach to these two aspects of the water business. However, institutionally, there is often a separation between the delivery mechanisms for rural and urban water supply.

Most of the SADC states are dependent to some degree on water resources flowing in from outside their borders. As a result, and because of the work done in SADC on this issue, the legislation of all of the SADC countries, except the island states, recognises the importance of transboundary river basin management both in legislation and in the establishment of transboundary river basin organisations. SADC is unique in having a regional Protocol on Shared Watercourses which all states have signed (although some have still to formally ratify it). Over the past decade, the focus has shifted from bilateral agreements to basin wide agreements and the establishment of basin Commissions such as Okacom and Orasecom.

However, a legislative challenge is that laws in most member countries were developed with a particular focus on the regulation of surface water. Even where there is an appropriate legal framework, implementation of the legislation in order to ensure sustainable use of groundwater is often poor because of the lack of resources and a lack of training and capacity.

3.4 NATIONAL IWRM PLANNING

The intention of this section is to look at IWRM planning in its broadest interpretation, rather than only to focus on specific IWRM/WE plans as required by the Johannesburg Programme of Implementation.

There are a range of approaches being taken to the development of water strategies or plans in the various countries. One approach taken in several countries is that of developing a National Water Master Plan, based on reconciliation of water demand and availability through traditional water management and infrastructure approaches. Typically this is done at a basin scale, which is complicated in many cases by the transboundary nature of these basins.

The development of IWRM/WE plans as envisaged under the Johannesburg Programme of Implementation is in place in some countries, including environmental sustainability, water use efficiency and equity considerations. The content of these IWRM/WE plans varies quite considerably between countries. However, some countries are still lagging in this regard and have not developed national level water resources strategies or plans that embody the principles of IWRM.

A trend can be seen in several countries of alignment between the water resources strategy/plan and the national development plans. Several national development plans make direct reference to water issues. The challenge appears to be translating such planning into implementation.

In Angola, through a consultative process with the lead water ministry, Angola CWP facilitated the drafting of an IWRM road map towards IWRM implementation (supported also by UCC Water and UNEP). In Botswana, a

National Water Master Plan (NWMP) (reviewed in 2006) provides the overall framework for IWRM. An IWRM/WE plan is currently under development with financial support from UNDP-GEF and co-financing from the Government of Botswana, modeled along the lines of the NWMP. The IWRM planning process is being led by government and facilitated by the Botswana Water Partnership. Planning for water is linked to the National Development Plan processes. The NDP for 2009 – 2016 has just been completed. The review of the NWMP attempts to align water resources development priorities with those in the NDP and Vision 2016.

Lesotho's water and sanitation policy recognised the need for a holistic and sustainable water resources management and development approach, ensuring as wide a participation of water stakeholders as possible, as well as treating the resource as an economic, environmental and social good. In recognition of the fact that water impacts on many other sectors, the water policy is aligned with the National Vision 2020, the Poverty Reduction Strategy, the Millennium Development Goals and other related developmental policies such as those on Decentralisation, Energy, Environment, Food Security, Gender, Forestry and Land Reclamation, HIV/AIDS, Industrialisation, National Irrigation Policy, and Science and Technology. In all these policies, water is recognised as the key driver for social and economic development. Lesotho developed an IWRM strategy in 2007 with two supporting strategies: Water Demand Management and Drought Management. The Lesotho Water Partnership was instrumental in engaging stakeholders in the IWRM strategy development process, which was followed by the Lesotho IWRM Road Map exercise. Plans are underway to develop an IWRM strategy implementation plan as part of the ongoing Water Sector Improvement Project.

In Madagascar, the Water Act, adopted in 1998, commits the country to the implementation of IWRM. The Madagascar Action Plan (2007-2012) mentions national Water Sanitation and Hygiene programme (WASH) which takes IWRM into account, and commits to the development of an integrated plan for water resources management. IWRM is also taken into account in the national water supply and sanitation programme. While no specific IWRM plan has been developed, some IWRM actions are underway. Alignment of processes could, however, be improved, and implementation is still in its infancy.

In Malawi an IWRM/WE plan was finalised in 2008 but has not yet been approved by Cabinet. It is linked to the Malawi Growth and Development Strategy and the MDGs. The Malawi CWP facilitated the multi-stakeholder IWRM planning process with the Ministry of Irrigation and Water Development during the 2004-2007 period. Key implementation activities have been planned in the national budget, indicating government's commitment to taking forward the IWRM process.

In Mauritius, although the Draft National Water policy of 2007 is not yet finalized, the general principles of IWRM are applied in *ad hoc* planning. Some elements of IWRM are in place, but no formal IWRM planning process or plan.

In Mozambique a National Water Resources Management Strategy (ENGRH) was adopted in 2007. It covers the main aspects of IWRM, including the situation analysis required in the Master Plan. Attention is now being given to the development of a Master Plan for Water Resources Management. The IWRM planning process is incorporated into the Master Plan development process, with facilitation by Mozambique CWP towards engaging other sectors and relevant stakeholders in the process.

In Namibia, IWRM is supported by several of the country's planning processes, policy and legislation such as the Constitution, the Decentralisation Act and the National Development Plans. The 3rd National Development Plan sets out development objectives for the country for the next five years and there is a specific section on water resources development. The IWRM Plan is expected to consider the overall vision of the country (Vision 2030) as well as the poverty reduction strategies. The MAF, with the Namibian CWP, is currently facilitating a process to establish an IWRM plan on which stakeholders will be widely consulted.

In South Africa, the National Water Resources Strategy (NWRS) sets out how South Africa aims to achieve IWRM. Each CMA must develop a Catchment Management Strategy (CMS) for its area, in line with the NWRS. No CMS has been developed yet although the first one is underway. IWRM at local government level is in the pilot phase through the development of Water Management Plans in selected municipalities. Relevant government departments are consulted in the development of the NWRS, but there is still a lack of integration between economic development planning by sectoral departments and water planning. A strategy for Water for Growth and Development has recently been finalised and launched in South Africa. This strategy is of particular importance as it represents a phase of planning in which socio-economic objectives and water planning are clearly linked. This approach will be taken forward in the revision of the National Water Resources Strategy which is due by 2010.

The Swaziland National Development Strategy (NDS) was finalised in 1999. It made recommendations on water policy, planning, research, access and use, conservation, efficiency and participation. Recommendations of the NDS inform the Integrated Water Master Plan which is in the process of development. The formulation of the IWRM plan began in 2005 with GWP funding. At the same time the Government of Swaziland (National Water Authority) was also to start the development of a Water Resources Master Plan as per the dictates of the Water Act. The two organizations then agreed to combine efforts and form one national water strategy which was then termed the Integrated Water Resources Master Plan. The plan development process is still in progress and participatory in approach. A process which defined the country's water situation among other activities was undertaken, followed by an ongoing process to consolidate and finalize the plan.

Zambia, in 2002, began a process of developing a WRM plan, co-ordinated by the MEWD, under the Water Resources Action Programme (WRAP), and later in 2004 an IWRM/WE plan facilitated by the Zambia Water Partnership under the Partnership for African Development (PAWD). It was a participatory process across the country and ensured political support for IWRM. It is the primary instrument for implementing the water related programmes of the Fifth National Development Plan (FNDP). The FNDP (2006 – 2010) and the National Long Term Vision (2030) set out the development objectives and plans for the country. The FNDP, developed through a participatory approach, includes a vision for water services and water resources. IWRM planning is integrated into the FNDP processes and the linkage is seen as critical to poverty reduction. Water is one of seven priority sectors of the NFDP.

In Zimbabwe, a Water Resource Management Strategy was passed in 2000, and activities under the strategy are being implemented. There is some progress on some of the key aspects of IWRM. The institutions have been established but are not financially sustainable yet. A review of the Water Act is underway. However, under the Zimbabwe Economic Development Strategy the sectors plan separately and IWRM planning is not well integrated. Water is regarded as a thematic area not as a cross cutting theme.

3.5 INSTITUTIONAL FRAMEWORK

With the introduction of water law reform, has come the reform of water management institutions in a number of SADC member states. However, a great deal of work is still need to ensure the effective functioning of these institutions. In most of the member states, one Ministry has overall responsibility for water resources management, and in some case for water supply and sanitation as well. The separation of water supply provision in rural areas is found in several of the member states.

Several of the states are moving towards or have already implemented decentralised water resources management institutional arrangements, with differing degrees of success. The key challenges in the implementation of this approach are: the time that it takes for new institutions to become functional (at least

three to five years); the financing of the new institutions, and appointing the human capacity to staff these institutions effectively.

The issue of sustainable financing of water resources management institutions raises the issue of water pricing arrangements. Few of the SADC countries appear to have clear and transparent arrangements for charging for raw water. Tariffs are in place for potable water, although there are significant challenges in terms of how the tariffs are determined, and with revenue collection. However, the pricing of raw water is not addressed in the same way, and raw water is provided free in several countries, particularly for the agricultural sector. The result is a lack of financial support for the water resources management institutions, particularly at basin level.

A key challenge remains the co-ordination between the range of institutions involved in water and water related management. While some countries have specific institutions or apex ministries charged with co-ordinating the IWRM related strategies and policies, it is an area where considerable improvement could be seen in most countries.

3.6 ENVIRONMENTAL SUSTAINABILITY

While most countries have introduced the application of Environmental Impact Assessments on water resources development projects, the protection of environmental water requirements has received far less attention. Much of the policy and legislation refers to the need for sustainable water resources management, but little has been done to translate this into implementation in relation to the protection of environmental water requirements. Even where legislative requirements are in place to protect the water (quantity and quality) required to maintain functioning aquatic ecosystems, the translation of legislative requirements into implementation has been poor. While some excellent methodologies have been developed in the region for determining the environmental water requirements, challenges still exist around the methodologies for environmental water requirements for estuaries and ephemeral rivers. The protection of environmental water requirements is one in which little progress has been made, and substantial work must be done to ensure that water resources management not only serves the social and economic needs of the states, but also meets environmental sustainability requirements.

Water quality management of point source discharge is not as well developed throughout the region as abstraction, but this largely reflects the relatively lower importance and localized nature of water quality concerns in most countries.

3.7 WATER ALLOCATION AND DEMAND MANAGEMENT

In most of the member states, a permitting or licensing process has, at least, been included in the legislation for raw water abstractions, but with differing degrees of implementation success to date. In most member states, the national water department is responsible to allocation of water and permitting of water use. However, poor monitoring and compliance enforcement programmes make it hard to ascertain to what extent the allocations are complied with.

A particular challenge experienced in several countries is that the formal allocation system does not mesh well with traditional allocation systems that are in place in some rural areas still. The allocation mechanisms and the legal framework need to be able to work within this plural legal tradition.

Some countries have, however, moved towards a more integrated approach to water planning, looking at both demand side and supply side planning. This is particularly true of those countries that are already experiencing water stress. There are some countries that are particularly advanced in this regard that can share experiences

and lessons with other countries in the region. The capacity to ensure implementation of the integrated planning approach remains a challenge.

3.8 INFRASTRUCTURE MANAGEMENT

Lack of water resources infrastructure remains a critical element in water resources management in SADC, including South Africa and Zimbabwe where water resources infrastructure is relatively well developed. Until the lack of infrastructure is resolved, most of the countries will continue to be held hostage to the vagaries of rainfall. This has dramatic consequences for drought and flood management, as well as the potential development of agricultural, industrial and energy production.

Financing of infrastructure development appears to be the greatest impediment, linked to the economies of resulting water use and the institutional capacity to manage the infrastructure.

The transboundary nature of much of the region's water resources requires significant cooperation, both between potential parties to the development and with those impacted by the development. While notification is generally being done in line with the Protocol, there are some details on the way in which affected countries can engage that require further clarity. Similarly, the management of reservoir systems between countries may benefit from further cooperation, particularly around hydropower production (such as on the Zambezi) and flood control (such as for Mozambique).

3.9 STAKEHOLDER ENGAGEMENT

There is clear evidence of greater awareness of IWRM in the region, among both stakeholders and decision makers, although the challenge still exists to build an understanding of IWRM in other sectors in government, such as the economic and development planning sectors. Awareness amongst stakeholders has also grown considerably, at least partly due to the work of the GWP in the region.

There would appear to be general acceptance across the region of the need for stakeholder participation in water resources management, even, in some instances, at the transboundary level. However, the challenge, once again, resides in the translation of this understanding into practice. In this regard, a number of challenges militate against effective implementation of stakeholder participation.

Financial constraints limit the extent of stakeholder participation in some countries. Large distances and poor transport and communication infrastructure also make stakeholder engagement and awareness building difficult. Nonetheless, some innovative programmes have been put in place to bring stakeholders into the management of water resources at the local, national and transboundary level.

3.10 MONITORING AND INFORMATION

There are several aspects of monitoring and evaluation that are important to effective implementation of IWRM. The first is the monitoring and evaluation of water resources status, use and management, in terms of both quantity and quality parameters. Generally, member states report a poor and sometimes degenerating picture in relation to this aspect of monitoring and evaluation. In many cases, the monitoring infrastructure needs rehabilitation, or is only present in some areas, or the indicators are not sufficiently well developed to be useful. Lack of integration of monitoring systems is also cited as a challenge. No single state was reported as having an adequate monitoring system. The challenge posed by this weakness is that inadequate water data and information exists to inform management decisions. Equally, poor monitoring makes it difficult to assess

the impacts of management decisions and to correct and adapt such decisions where necessary. While the SADC Hydrological Cycle Observing System (HYCOS) attempts to engage this challenge at a regional level, progress has been slow in implementing the frameworks.

A second level of monitoring is the monitoring of the implementation of IWRM within a country. In order to monitor such implementation, it is necessary to have implementation targets and a baseline against which to monitor, preferably with an implementation plan. However, clear IWRM implementation plans and targets do not appear to exist, and little monitoring is in place for IWRM implementation progress. Some monitoring and review processes for national development plans are in place, but it is not clear how widely these deal with water issues as well.

A third level of monitoring and evaluation would relate to the impact of IWRM, which would enable the assessment of what benefits, economic, social or environmental, had been derived from the introduction of IWRM approaches. It does not appear that any of the countries have yet progressed to this most complex and challenging level of monitoring and evaluation. In terms of both this level of monitoring and evaluation, and the second level of monitoring and evaluation, the development of appropriate indicators and mechanisms is needed.

3.11 SUMMARY CONCLUSIONS

The preceding synthesis of progress throughout the region is supported by more detailed evaluation of specific issues in Appendix B, together with narratives of the experience and practice of certain themes in selected countries in Appendix C.

The progress with IWRM is summarised in the two tables below, based on more detailed, annotated tables presented in Appendix D. As a high level summary of implementation progress, the following tables offer a quick dashboard scrutiny, focused on nine key areas of IWRM. These nine areas cover the key aspects of IWRM as highlighted in the GWP toolbox and the SADC Regional Water Policy. Red ( ) signifies little achieved, orange ( ) signifies limited achievements, and green ( ) signifies substantial achievements. The arrows reveal trends, with ↑ indicating a positive trend towards improvement, ↔ indicating little movement (either improvement or degeneration) from the current status, and ↓ indicating a downward trend from the current status.

Table 1: Dashboard of IWRM implementation in twelve countries in southern Africa: Enabling environment

Enabling Framework								
	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure / supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Angola	↑	↑	↑	↑	↑	↑		
Botswana	↑	↑	↑	↑	↔	↔	↔	↔
Lesotho	↑	↑	↑	↑	↑	↑	↑	↔
Madagascar		↑	↔	↔	↔	↑	↔	↓
Malawi	↑	↑	↑	↑	↑	↑	↑	
Mauritius	↑			↑	↑	↑	↑	↔
Mozambique								
Namibia	↑	↑	↑	↑	↑	↑	↑	↔
South Africa	↑	↑	↑	↑	↓	↓	↑	↑
Swaziland	↔	↑	↑	↔	↔	↑	↔	↔
Zimbabwe	↑	↔	↓	↑	↓	↓	↓	↓
Zambia	↔	↑	↑	↑	↑	↑	↑	

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Angola	↑	↑		↑	↑	↑	↑	
Botswana	↑	↑	↑	↑	↑	↑	↑	↑
Lesotho	↑	↑	↑	↑	↑	↑	↑	↑
Madagascar	↔	↑	↔	↔	↔	↑	↔	↓
Malawi	↑	↑	↑	↑	↑	↑	↑	↑
Mauritius	↑	↑	↑			↑	↔	↔
Mozambique								
Namibia	↑	↑	↑	↑	↓	↑	↑	↑
South Africa	↑	↑	↑	↑	↓	↔	↑	↑
Swaziland	↔	↔	↔	↑	↓	↑	↑	↔
Zimbabwe	↓	↓	↓	↔	↓	↑	↔	↓
Zambia	↑	↑	↑	↑	↑	↑	↑	↑

Table 2: Dashboard of IWRM implementation in twelve countries in southern Africa: Implementation of key instruments

In conclusion, there definitely seems to be progress in the region in relation to IWRM, but that there are also a number of areas of concern. As can be expected, the policy, legislation and strategy components are ahead of implementation, while elements of environmental sustainability are monitoring are less well developed than more traditional water resources activities.

Most countries are engaging IWRM practice at the integrated hydrological level, while some still have a more traditional water resources planning focus. Only Zambia and South Africa have made real headway with engaging water as part of the broader development planning process, but this seems to be a theme that has emerging resonance with water and other sector planners throughout SADC, given the increasing uncertainties and pressures that will be placed on the region's water resources.

4 ACTUAL STATE OF WATER ACCOUNTING

4.1 RELIABILITY OF WATER USE INFORMATION

The reliability of water use information is linked to the issue of monitoring and evaluation discussed above. The weakness in monitoring systems impacts negatively on the availability of information. Water use data and information is not as readily available or as reliable as would be liked. In most countries, metering of water use is limited, and varies between different user groups. In Mauritius, for example, all municipal use is metered, but hydropower use is not metered. However, data on raw water use in Mauritius is available and reliable.

In Botswana, information on water and waste water stocks is limited, although water use trends have been plotted for the water use sectors through a Natural Resources Accounting project. In Malawi, data is readily available from regional water boards, but data from other suppliers is not necessarily reliable. In Namibia, water use information per sector is available, and some information is available at the catchment level, although obtaining water use information takes a long time. NamWater, DWAF and the municipalities have information on water use, but it is not always accessible. Information on discharges is limited. In South Africa, information per water management area is available through the Internal Strategic Perspectives and the NWRS which are available on the DWAF website. These are based on 2000 figures. Reconciliation strategies have been completed for some of major water supply systems and provide an accurate picture of water demand/supply and how to balance the two. Reconciliation strategies will be completed over the next few years for all major towns. There is, however, a lack of information on water use efficiency. Poor monitoring of water use in the irrigation sector in particular reduces the reliability of data, and data from municipalities on water services provision is not always reliable.

In Madagascar, information is available from the National Water and Electricity Utility (JIRAMA) for hydropower, domestic or industrial water use. Data is not available for other sector, such as irrigation, or for waste water stocks. Data on raw water in each catchment in the different seasons is insufficient due to lack of metering and poor consolidation of data and systems by the Ministry of Water.

In Swaziland, water use information is generally lacking. Actual volumes in irrigation are poorly monitored, and what information does exist is not easily accessible. DWA has data on water use at the national scale, but the data was last captured in 1996. The Water Resources Master Plan that is being prepared in accordance with the Water Act of 2003 will contain an inventory of the total water resources, and it is presumed that it will introduce a systematic way of collecting water inventory and use data. The Water Act specifies that the Water Resources Master Plan should be reviewed every three years. Data on rural sanitation is very poor. Water demand is estimated per basin and per sector. In Zambia, water use data by sector has not been updated since the 1995 Water Master Plan. Waste discharge information is not available to the public without permission from the relevant companies. There is a lack of data with regard to water services because of poor metering in areas still largely under Local Authorities. However, this has improved tremendously, in some cases to near full cost recovery under some of the 10 Commercial Water Utilities in the country. In Zimbabwe, ZINWA has a Data and Research Department responsible for data collection and reporting on surface water resources and a separate section on groundwater. Data and information is available at concessional rates and free to universities and students, but the reliability of data collected over the last 3 years is questionable. Due to wear and tear on the equipment, the monitoring of floods remains a challenge. The HYCOS equipment from SADC, however, provides real time data. Gaps in data limit the possibility of producing national trends, and estimations must be made instead. ZINWA and CCs do not have sufficient resources to monitor all abstractions.

Water used from own boreholes for domestic purposes is not reported or monitored. Water use by sector is calculated from permits issued rather than actual abstractions.

In Mozambique, there is little systematic qualitative or quantitative information available on effluent discharge, water consumption by different users, and efficiencies in either distribution or the use of water resources. Some basins, such as the Púngwè, have projections on water needs for different sectors until 2025. Many basins have this type of tool at their disposal, but the data needs to be verified by field studies.

In Lesotho, information is not adequate, although reliable and consistent information exists on potable water supplied by the Water and Sewage Authority (WASA), and for water abstractions by WASA and the LHWP transfers. For other uses, estimates are made.

4.2 ALLOCATION OF WATER

In most of the member states, a permitting or licensing process has been put in place for raw water abstractions, but with differing degrees of implementation success to day. In Angola, for example, users are legally obliged to obtain permission to use water, but the controls on this process are not in place yet.

In most member states, the national water department is responsible for the allocation of water and the permitting of water use. In Botswana this is done through the Water Apportionment Board under the DWA. Water resources management, including activities from planning and development to water delivery at the customer end, is the responsibility of a number of institutions. The Water Utilities Corporation is responsible for development of infrastructure and water supply to urban centres and other areas as may be designated by the Minister, while development work aimed at rural villages is mainly shared between DWA, DLG&D and DEA. The Ministry of Agriculture is responsible for constructing small dams targeted mainly for agricultural use. However, coordination of water sector activities remains a challenge. The on-going water sector reforms in the country seek to resolve or mitigate some of these challenges.

In Madagascar, permitting or licensing is done by the National Water and Sanitation Authority (ANDEA) under the Water Act, but it is not effective. Currently, the National Water and Electricity Utility (JIRAMA), makes decisions on its catchment programmes, within a framework of national priorities of which health is key. Domestic and productive water consumption and utilization for hydropower are accounted for by JIRAMA while the consumption for agriculture is estimated.

In Malawi, allocation is the responsibility of the Water Resources Board which falls under the Ministry of Irrigation and Water Development. However, the legislation regulating the allocation of water and waste discharge is outdated and needs review. There is also poor compliance monitoring of water use – a situation that pertains in many of the member states. While Swaziland used to have a Water Apportion Board, its powers to allocate water have now been delegated to River Basin Authorities.

In Mauritius, the WRU monitors bulk water resources. The CWA allocates water to domestic, industrial and commercial uses. Irrigation water is the responsibility of the Irrigation Authority. Hydropower allocation is normally the responsibility of the CEB for single-purpose dams and is a joint IA/CEB/Planters' community exercise for dual-purpose dams (i.e. involving water resources storage and management as well as hydro-power production). In general terms, the water allocation strategy and implementation can be considered to be satisfactory.

In Lesotho, the allocation of raw water is done by the DWA under the 1978 Act. It is governed by equity and environmental sustainability issues. The Act requires a water permit for all water uses, except for domestic purposes. Permits are granted for a limited period not exceeding 5 years and may be renewed for a period not

exceeding 3 years. The allocation of potable water in urban and peri-urban areas is done by the Water and Sewage Authority (WASA). In this case, metering is used and water allocation is based on volumes.

In Mozambique, allocation is the responsibility of the Ministry of Public Work and Housing (MOPH). The MOPH delegates the licensing and concessions of water resources to the ARAs. For concessions of more than 25 years, the ARAs must get authorization from the DNA (MOPH).

In Namibia and South Africa, water allocations are authorised by the national water departments, although in South Africa this is due to be delegated to Catchment Management Agencies in due course. South Africa uses four key mechanisms for authorising water use: existing lawful use, a license to use water, general authorisations to use water in a particular area, and schedule 1 use for domestic or emergency purposes. In Namibia, the Department of Agriculture must be consulted on water allocated to irrigation. Where water management bodies exist, these are consulted on all permits.

In Zambia, water rights are not considered property rights and are not transferred with land. Thus the new owner of land must apply for water rights – the authority can defer the application, or grant a water right with new terms and conditions if required.

In Zimbabwe, water is allocated by ZINWA based on estimates of available water and applications received. Currently all users are operating on temporary permits. In 2007, the agriculture sector received 81% of available water; conservation 2%, mining and urban 2% and industry, 15%. Farmers applying for water must attach a certificate from Agritex showing the acreage under cultivation, the crops being grown and the water quantities required. Mining and industry have to produce certificates from their parent ministries indicating the intended water purpose and disposal processes. Water permits are not tradable and if the full amount is not used, ZINWA may redistribute the unused amount. Water users wishing to abstract from ZINWA dams are issued agreement water contracts not permits. These are for shorter periods and can be cancelled at any time if there is violation or high priority in water demand.

4.3 WATER PRICING AND TARIFFS

Most countries have relatively clear policies and procedures for setting tariffs for potable water, particularly in urban areas. The processes for setting the tariffs are clear, and in many cases include approval of the tariffs by the Minister of Water or even by Cabinet. Stepped tariffs are in use in a number of countries in urban areas. In many countries rural water supply does not attract charges.

However, the pricing of raw water is more complex. Most countries appear to have accepted the principles of water being both a social and economic good, and from a pricing purpose, have given emphasis to the concept of water as an economic good. However, this has translated poorly into raw water pricing policies and tariffs, although there appears to be movement towards more appropriate pricing of raw water.

Both the polluter pays and the user pays principles appear to have been fairly widely accepted, but translation into implemented pricing strategies is poor, particularly in relation to the polluter pays principle. No charges are yet in place in the region for waste water discharge outside the municipal systems.

Without effective pricing strategies in place, the sustainable funding of much-needed water resources infrastructure remains difficult. The combination of poverty and lack of pricing strategies for raw water mean that the region remains dependent on donor support for both water resources and water services infrastructure financing.

While the nine IUCN led water demand management studies conducted between 1999 and 2002 looked at the issue of pricing and tariffs further work needs to be done to ascertain to what extent these issues have been taken up in actual pricing strategies.

In Mozambique, a Water Tariff Policy (Resolution 60/98) was approved in 1998 which defines water as an economic good and that tariffs must ensure cost recovery. The Water Policy of 2007, however, recognises the social and economic value of water. The Water Tariff Policy (Resolution no. 60/98) is based on the principles of user pays and polluter pays principles, equity and sustainability. The Regulation for Water Licensing and Concession (Resolution 43/2007 of 30th October) was also recently approved. This document states for large investments in infrastructure, operational and maintenance costs must be covered by tariffs and correct rates must be charged to the water users. It is therefore, necessary to balance the cost, price, and value with to the role water plays in health and in the well being of beneficiaries. As a result, tariffs are set in a way that protects the interests of the users, the sustainability of the economy and efficient management of the system, amongst other criteria, and are adjusted to the real conditions of each region. Both Resolution 60/98 and the Decree 72/98 cover issues pertaining to the rights and obligations of users and service providers. Services are provided after a contract is signed. There is, however, an approved document called "General Conditions for Water Supply", which regulates all mechanisms from connection requirements through to disconnection and penalties. For example, it is the responsibility of each ARA to collect rates for raw water usage (e.g., water for irrigation, hydropower, etc.) while for potable drinking water particularly in urban areas, FIPAG, in collaboration with the Municipalities, is responsible. The charges for raw water and other water tariffs are set out in State Bulletin Resolution 60/98 of 23 December 1998, entitled "Water Tariff Policy", which covers the use of untreated water, drinking water, water for sanitation and receiving and purifying water. The current water tariffs are fixed in accordance with ministerial Decree (70/97) of 1997. It is acknowledge that the tariffs are very low and need to be adjusted to reflect the operation and maintenance for each specific river basin. The water supply tariffs in five towns where Águas de Moçambique is the operator have been agreed by the regulator, CAR. The agreed rates are subjected to periodic review for expenditure needs, improvements and inflation.

In Namibia there is no water tariff policy to guide prices and tariff setting. NamWater determines and sets the prices and tariffs and submits the proposed tariffs to the Minister of Water Affairs and Forestry, who, in turn, submits the proposed prices and tariffs to Cabinet for approval. Once the tariffs are approved by Cabinet they are then gazetted and are implemented in that financial year. According to the proposed Water Resources Management Bill, the Minister will have to determine a water, wastewater and effluent pricing policy after consultation with persons invited by the Minister by notice in the G*azette*. Currently, however, NamWater is obliged to recover the costs of capital and operation and maintenance. It proposes annual tariff adjustments which are reviewed by the MAWF. Local authorities review their own tariffs and submit their retail tariff amendments to the Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD). The Minister of MRLGHRD submits the tariffs to Cabinet for approval. No link between the two tariff setting processes. Cost recovery for water services in rural and urban settings is marginally successful, but there is a significant local government debt to NamWater. Information on tariffs is generally available but not easily accessible because of the format of the data and the need for detailed knowledge on how to use the system.

In Swaziland, water pricing and tariffs are only applied to treated water, but it is expected that the National Water Authority will develop and approve a pricing and or tariff policy that will charge for bulk water use on a volumetric basis.

In Angola a Decree from the Minister of Finance (1998) delegates the setting of potable water tariffs to provincial governments and lays the basis for setting tariffs on cost of extraction, storage, treatment and distribution. 6 monthly increases can be made, but not to exceed 15% and to be inflation adjusted. However, there is no consistency in the administrative approval of price increases. Tariffs are low and water companies

cannot cover their costs. Provision is made for a 'social tariff' for poor and vulnerable people. There are high water costs in the "parallel water market" where reticulated services are not provided and people have to buy water from vendors. Water is considered a social rather than economic asset by many local politicians, resulting in reluctance to enforcement payment for water. Irrigation water is free.

In Botswana, the water supply authority sets out tariffs which are approved by the Minister and/or Cabinet. Currently, the DWA administers tariffs for rural users which are much lower than the WUC tariffs, as they are highly subsidized by government. Standpipe users receive their water free, or at a flat rate. The WUC is responsible for administering tariffs for urban users, based on the principle of full cost recovery, achieved through a block tariff system for bulk supplies and a stepped tariff for other consumers. With this background, the DWA is currently undertaking a tariff review to check on the affordability and willingness to pay by customers. The study result in water tariff policy recommendations which will guide tariff increases, taking cognizance of government cost recovery initiatives. In addition, a cabinet memorandum has been prepared to separate water resource management from service delivery. As part of this, the WUC will take over the supply of potable water to most consumers.

In Lesotho the strategy for mobilizing funding is done through Sector Wide Approach (SWAp) basket funding for water development as articulated in the LWSP (Policy statement 5), Medium Term Expenditure Framework (MTEF) – Budget Framework Paper and Water Sector Investment Program/Plan – which is used as a business plan or marketing tool used to attract funding from donors. Financing is done through recurrent budget for some pilot projects or through counterpart (capital) funding/contribution on donor funded projects. Currently tariffs are determined by the WASA Board which is chaired by Principal Secretary of the Ministry of Natural Resources. The suggested rates have to be approved by government through parliament as dictated by the Performance Agreement between WASA and the Government of Lesotho. The tariff has a banded structure taking into account different income groups. Water for low-income households should not exceed 5% of income. Under the new water tariff strategy (waiting for the gazetting of the new law) tariff setting will be different. The banded tariff structure will apply to domestic water users including those using standpipes, while a flat rate charge will apply for all non-domestic water uses. Royalties are received by the LHDA from South Africa, part of which is used for rural development through the Lesotho Fund for Community Development (LFCD). Other water charges such as license fees are collected by the government of Lesotho and go into the government revenue pool.

In Madagascar, tariffs are determined up by the National Water and Electricity Utility (JIRAMA) with approval by the Ministry of Water. There is no differentiation of pricing between sectors. The domestic water tariff incorporates a "punitive" approach i.e. higher rates for higher "band" consumption. However, neither water for irrigation nor waste water is charged for.

In Malawi, in setting charges for industry, the full economic value of water is taken into account. For agriculture, manufacturing, power generation and bulk supply to Water Boards tariffs are based on the capacity to pay and the profits they generate. Tariffs set by utilities reflect their intended profit margins and may also depend on the dictates of donors who have funded the infrastructure and desire repayment. Water utilities submit their proposed tariffs to government (MoIWD) for approval. There are no charges for rural water supply and communities perform their own O&M on these schemes. Urban water charges depend on 4 categories of residential area (e.g. low density, middle density, high density and traditional housing areas). A stepped tariff approach is used in the first three areas while a flat rate is applied in traditional housing areas (for a pail of water from a vendor which have now been taken over by Water Boards);

In South Africa, water services capital expenditure for basic services is funded from the Municipal Infrastructure Grant. The Equitable Share portion of nationally raised revenue is used by municipalities to contribute to the costs of O&M of basic water services. Municipalities also charge, through block tariffs, for

water use. A Bulk Infrastructure Grant has been established to pay for regional bulk water schemes for municipal water use. The Raw Water Pricing Strategy, under the National Water Act, sets out the charges for the use of raw water. The charges are composed of an infrastructure charge which includes capital costs, O&M and return on assets, and a water resource management charge which covers the cost of managing the catchment. A waste discharge charge system has been designed but not yet implemented. Currently DWAF sets the tariff for the water resources management charge, although this will be done by CMAs in future. DWAF also sets the water resource development charge. Bulk water tariffs are set by Water Boards and must be tabled before the Portfolio Committee of the National Assembly. Retail water and sanitation charges are set by the Water Services Authority in line with standards set by DWAF under the Water Services Act. Information on the charges is easily available.

In Mauritius, the formulation and application of a pricing strategy, be it for the domestic, irrigation or wastewater sector, is a sensitive exercise which is initially undertaken by the relevant institutions but approved finally by the Government. The CWA, CEB and WMA, holding the status of "parastatal bodies" normally have the power to secure donor support, primarily in the form of loans to carry out infrastructure development projects, but only with the approval of their parent Ministry (MREPU) (through the representative of the Ministry who sits on the Boards of the institutions concerned), and in several instances with the Government acting as "guarantor". These financing arrangements also apply to the Irrigation Authority, operating under the aegis of the Ministry of Agro-Industry, Food Production and Security.

In Zambia, tariffs are set by Commercial Utilities (CU) and municipalities and sent to NWASCO for approval. They are reviewed annually. CUs have implemented block tariff systems. For raw water, charges are applied under the 1948 Act. Calculations for various sectors are set out in the Statutory Instruments which are supplements to the Water Act Cap 198. The statutory instruments set out how fees and charges are determined for different uses of water (primary, secondary and tertiary) based on fee units set by Government. However, there is a need for revision of this approach in terms of charging for consumptive and non-consumptive use. Water sector financing in Zambia comes from public finances, ODA and water use charges. The FNDP[2] sets out sector expenditure for next 5 years (2006-2010). More than 75% of water services capital financing is from donors. Several water funds have been established by government, such as the Irrigation Development Fund, the Devolution Trust Fund, and the Social Investment Fund. The Water Development Trust Fund has been proposed within the 2006 Water Resources Management Bill.

In Zimbabwe, the user pays principle is included in the water policy. Currently a blend price[3] is charged for water to cover recurrent and capital costs. In the agricultural sector, only farmers with "agreement water" have been paying (i.e. those that take water from ZINWA dams). No charges are levied for water abstraction from rivers, private dams or boreholes. As a result, the present system is dependent on significant funding from the fiscus. Water resource and services infrastructures development is funded by Zimbabwe government, EC, AfDB, ZINWA, various international organisations and NGOs. However, the economic hardships over the recent years have limited infrastructure development. There are three elements of raw water prices: a sub-catchment levy, ZINWA tariffs, and a Water Levy. The SCC sets the sub-catchment levy to cover sub-catchment operations while the tariffs and water levy are set by ZINWA. The tariffs must be tabled by the Minister of Water

[2] Fifth National Development Plan

[3] Blend prices are calculated by adding redemption of historical capital costs of all Department of Water dams to actual operating and maintenance costs and dividing by the sums of the yields (10% yield for agricultural water and 4% yield for UIM water)(Robinson P. B., 1998). The intention is to spread the costs of new developments across all users, thereby ensuring that the cost of water from new dams is not prohibitive. There were two national blend prices, one being for agricultural water and the other for UIM (urban-industrial mining) water.

Resources in Cabinet. Tariffs are announced through the newspaper or a press conference once approved. The tariffs are based on the principles of equity, affordability, proportionality of use, cost, user sector differentiation and transparency. The National Pricing Commission has the mandate to amend the prices based on the prevailing family basket and consumer index. Affordability is given more importance than the requirement to meet the budgets of Authorities. Thus, although the intention is for water utilities to be able to generate sufficient revenue to reinvest in the water sector, the current pricing arrangements don't support this and tariffs are not sufficient to cover O&M costs, let alone capital costs. Donor funding has dwindled since 2000 and resulted in some large dam projects not being completed. The low tariffs on raw water mean Catchment Councils are under-funded and the Catchment Outline Plans were donor funded.

4.4 ECONOMIC DATA

Economic data is available in all of the countries, but little is available at the sub-national or basin level. In Lesotho, the Bureau of Statistics (BOS) compiles national economic accounts for all sectors or economic activities on a monthly (e.g. CPIs), quarterly and annual basis (e.g. GDP, GNP). These measures are reliable and follow the System of National Accounts (SNA) Framework of 1993. However, these measures are only produced at national level. In Botswana statistics are available at the national level and a monthly bulletin is produced by the Bank of Botswana and the Ministry of Finance and Development Planning. While the census gives sub-national data, there is limited data at the district level.

In Madagascar, the National Institute of Statistics (INSTAT), with the Ministry of Planning and Finances, ensures GDP data consolidation based on information from the different sectors and ministries.

In Malawi the National Statistical Office and the Dept of Economic Planning and Development are responsible for economic data which is reliable and credible. In Namibia, there is reliable national level GDP data available by sector, but not by area. In South Africa reliable data is easily available at the national and sub-national level, but the sub-national level tends to be by provincial and local government boundaries, which don't accord with the water management area boundaries. In Swaziland, information is available at the national level, but not at the sub-national level. The Central Statistics Office compiles GDP and monthly CPI figures.

In Mozambique, the National Directorate of Water (DNA) is responsible for collecting, synthesizing, sharing and storing information on water resources. Information on GDP and economic growth can be accessed promptly from the National Statistic Institute (INE). The Ministry of Planning and Development and other water related institutions also hold a lot of information on economic data. However, the system is not yet working properly and a lot of information is still in raw form and is held by the different ARAs and other water resources management agencies. There is therefore, an urgent need to gather and systematize the available information.

In Zambia, information on GDP by sector is readily available through the annual economic reports by the Ministry of Finance and National Planning and from the Central Statistical Office. While consistent and reliable data is released on time, it is only available at the national level. GDP data by area is not available. In Zimbabwe there is no economic data or information collected on use of water or the contributions to the GDP by the productive use of water.

In Mauritius, the Central Statistical Office regularly publishes economic data for the whole island. The Mauritius Employers' Federation (MEF) publishes the same type of data for the private sector.

4.5 ECONOMIC WATER ACCOUNTS

No water accounts are conducted in Lesotho, but the Centre for Environmental Economics and Policy in Africa (CEEPA) did a study on water accounting in the Orange River Basin in 2001. This only looked at water flow

accounts. Data constraints prevented the development of monetary accounts. A further study was also done on the regional comparative advantage of water use in the Orange River Basin. Most of the information used for these studies came from outside Lesotho e.g. South African DWAF and FAO.

There are no water accounts in place in Swaziland. However some data on allocation of water per sector for 1996 for different river basins are available. The data that exist can be used to generate economic water accounts, even though the information may not be sufficient, or up to date. It is expected that one outcome of the Water Resource Master Plan will be up-to-date and reliable information on the physical water supply and current use by sector and indications of future water requirements. Information on costs associated with water use and supply in Swaziland is currently not available. The Central Statistics Office of the Ministry of Economic Planning and Development is responsible for collecting and compiling information of social and economic indicators in the country, however the office does not collect information on water use and supply for the different river basins and water use sectors. The introduction of a broader 'natural resource accounting' system would provide many benefits to sectors beyond water use including land use and natural vegetation use.

In Botswana, the first set of water accounts were produced in 1998 and then updated to cover 1998 – 2003. Water accounts were constructed for the WUC, DWA and District Councils and other users, and for groundwater, dams, rivers etc for period 1993 – 1998. They provide an overview of water use for different economic activities, the economic contribution of water use from each sector, the costs of providing water and the revenues received. The Department of Environmental Affairs (DEA) coordinates the updating of the accounts and has proposed setting up of focal persons for sustainability.

In Madagascar, the collection of data and the management of information on domestic water consumption are ensured by the National Institute of Statistics (INSTAT). Information on water expenses in household budgets is also available at INSTAT. Domestic and productive water consumption is accounted for by JIRAMA (National Water and Electricity Utility). Generally, agriculture consumptions are not accounted for.

There are no water accounts in Malawi. While there is good information from the Water Utilities it is hard to assess from the information provided whether this is sufficient to construct effective economic water accounts.

Mauritius does not have economic water accounts, although some data exists that could be used to construct such accounts. The information should, however, be improved, to give accurate accounts.

Based on the UN SSEAW[4], Mozambique has started to build a water account system although the reliability of available information needs to be checked. Although there is some scattered information, particularly in relation to physical accounts for surface water resources, there is little, if any, information on groundwater availability (including water quality, environmental flows, water infrastructure, and waste water) and monetary accounts. The water account includes water supply (annual runoff & specific yield), water demand accounts (consumptive & non consumptive water use), and water balance accounts. The whole country has been considered, as well as different regions (Mozambique South (Maputo, Umbelúzi, Incomáti & Limpopo river basins), Central Mozambique (Púngwè, Búzi & Zambezi) and Northern Mozambique). Each region has also been analyzed in terms of its river basins. However, a serious constraint to the establishment of water resources account is the lack of data on water quantity, quality, accessibility, dissemination, and use. In the case of Mozambique South, the data largely exists, but the data for the Central and Northern regions is more limited.

In Namibia economic water accounts were started in 1995. There is a steering committee that meets twice a year with representatives from the Directorate of Rural Water Supply, Water Resource Management, the

[4] The System of Environmental-Economic Accounting for Water.
Available: http://unstats.un.org/unsd/envaccounting/workshops/Jordan2008/5.1_Asset_E.ppt

Division of Agricultural Engineering (all within MAWF), NamWater, the City of Windhoek, the Ministry of Environment and Tourism, the Desert Research Foundation of Namibia, the Namibian Economic Policy Research Unit, and some Namibia water sector consultants. The methods used for compiling the NRA (Natural Resource Accounts) for water are: desktop studies, regional consultations with service providers and stakeholders, and interviews. Due to insufficient capacity, the last NRA were done in 2002. Currently work is being done on the period 2007 – date.

The South African economic water accounts are based on the UN Framework for water resource accounting. However, economic data is not available according to catchment boundaries so no monetary accounts were created per water management area. The valuation of water resources and their depletion was not attempted. Swaziland, Zimbabwe and Zambia have not created economic water accounts, although some aspects of the framework for water accounts are available in Zimbabwe.

4.6 CONCLUSION

On the whole, the status of data collection, monitoring and evaluation across the SADC region is inadequate for effective integrated water resources management. The monitoring and evaluation of primary water management data (flow, quality, etc) is poor, with gaps in spatial coverage, non-integrated systems, and poor data quality in many countries.

The weakness of the water data is then compounded by the lack, in most countries, of effective systems for monitoring the implementation of IWRM plans, and of monitoring the water-related development targets. Lack of technical capacity and lack of funding are two key cause of the weakness in monitoring and evaluation systems. This is a critical area for intervention, as monitoring is one of the foundation stones of effective IWRM.

Some kind of allocation system exists in each of the countries and many appear tailored, in some way, to meet the vagaries of rainfall in Southern Africa. There are, however, plural legal systems operating in all the countries in the region, with formal systems implemented by the state structures, and informal or traditional systems operative in rural and traditional areas. The alignment of these two legal systems would ensure more effective IWRM implementation, particularly where the, largely unrecognized, traditional systems are more effective in meeting the needs of the poor and the marginalized.

While water accounting has been done in several of the countries, in many cases it was a once off exercise. Only Botswana appears to be driving water accounts as a regular process. In many countries water accounting is hampered by the lack of economic and water data, and particularly by the lack of relevant data at the appropriate basin scale.

5 FUTURE PERSPECTIVES

This section describes some of the future perspectives from most of the countries surveyed.

5.1 FUTURE PERSPECTIVES AT THE COUNTRY LEVEL

Angola

In Angola the key priority for the next 4 years, as set by the government, is the provision of water supply and sanitation in both urban and rural areas.

However, the IWRM Master Plan also needs to be formulated, and the CWP/PAA could assist in facilitating the process to ensure good inclusion of stakeholders. The promulgation of the Water Act will be a key instrument in the entire water sector. The urgent development of water institutions is crucial in the future development of the country and to achieve the Millennium Development Goals (MDGs).

Botswana

In Botswana the future plans are articulated in the National Water Master Plan (2005 – 2020), which is focused on water resources management, rather than water resources development. However, there is a need for better inclusion of stakeholders and improved sharing of experiences and information between SADC countries. The CWP has been driving the IWRM/WE process, which means that IWRM is no longer only the purview of government, but of society more broadly.

The NWMP review process has identified the need for institutional reform that will see the institutionalisation of broader stakeholder participation in water resources planning and management. The IWRM/WE plan that is under development will also contribute to the realisation of this, as the broadening of the stakeholder base in IWRM planning that has been heralded by the NWMP review process will facilitate the participation of a larger number of stakeholder groups and relevant institutions. The inclusion of community groups in the process will greatly enhance their active participation and contribution to decision making.

IWRM has brought about increased realisation of the need to work with other sectors such as agriculture. However, there is a lack of practical action on the ground. The IWRM planning process must address practical problems of continued limited access to water for the majority of the region's population and countries should be provided with guidance on how to address this issue. In relation to the guidelines, the Kalahari Conservation Society (KCS), the facilitators for the IWRM/WE planning process in Botswana, undertook a research project, funded by the EU, aimed at improving the capacity of local governments in the Limpopo basin to implement IWRM, thus contributing to the achievement of water related Millennium Development Goals (MDG's). The project produced a set of materials that addresses theory and practices aimed to support local authorities with active participation in IWRM. This work will further be complemented by the on-going IWRM planning project for Botswana.

Lesotho

The Lesotho IWRM strategy activities include policy dialogue, institutional strengthening and capacity building, governance, technological innovations, surveillance, monitoring mechanisms and information sharing. The intention is to encourage the water sector and stakeholders to work towards a common vision. Improved sharing of information and regular consultations are intended to encourage streamlining of human-resource-environment interactions. Finally, joint planning and implementation will benefit from horizontal and vertical consultations and ensure that local community needs are mainstreamed within the IWRM Strategy. To ensure sustainability of the IWRM Strategy, local needs must be mainstreamed into national, sectoral and transboundary initiatives. This should be followed by the elaboration of the Roadmap or IWRM Action Plan for Lesotho.

Madagascar

In Madagascar, the key task is implementing local IWRM within the two most critical catchment areas out of the six in the country. This includes:

- ensuring data collection with regard to water resources, stakeholders and uses;
- assessment of capacity for managing IWRM processes by existing stakeholders;
- identifying some micro projects to be planned for and supported by IWRM mechanisms and tools (focusing on the priorities of health, potable water, sanitation and irrigation);
- capacity building appropriate to the needs and in partnership with other institutions;
- implementation and funding of infrastructure;
- monitoring and evaluation of water use.

The second key task is the development of nationally co-ordinated Master Plans for all six catchments.

Malawi

In Malawi the IWRM/WE plan has been approved by Cabinet, and implementation of plan is now underway, including capacity building, setting up an effective regulatory framework, and so on.

Development partners should be encouraged to focus on account national priorities rather than those driven by global agendas. In this regard, if IWRM is taken into consideration by both the National Water Policy and is also mentioned in the Malawi Growth and development Strategy, it ought to be given prominence in the national development agenda.

The Government of Malawi should approve and launch the IWRM/WE Plan soon after May 19, 2009 when a new Cabinet is formed. The Ministry of Irrigation and Water Development should push for the approval of the Plan through its Minister and should spearhead IWRM/WE in its development programmes to show that it is committed to it and realises the importance of water as one of government's high priorities.

Mauritius

In Mauritius the Draft Water Act must still be finalised. The new Act will improve integrated planning which could result in better reuse of wastewater, the effective use of hydropower water; enhanced water use efficiency, the review of pricing for irrigation water; better water quality monitoring and enforcement and the investigation of other water sources such as desalination.

WRM is in place and is being implemented. However, what needs to be further and more thoroughly addressed is the 4 basic guiding principles inherent to IWRM namely:

- holistic (integrated) approach linking with social and economic development, growth, protection of natural ecosystems, land use, water linkages across sectoral conjunctive (and conflicting) use.
- Participating approach involving users, planners and policy makes at all levels.
- Involvement of women (gender issue) in providing, managing and safeguarding water resources.
- Water as an economic good and having economic value.

In late 2007, the Government of Mauritius produced a draft on "Mauritius National Water Policy" – (NWP) advocating and promoting IWRM. The document was distributed to all stakeholders of the water sector, including the private sector, for their views and comments, but it has not been officially published yet. The NWP addresses all issues of IWRM, including the "Water Act". It is recommended that the NWP should now be finalised and published as it will open the way to the full spectrum of IWRM planning and implementation. It is also recommended that the Water Master Plan, for which Expressions of Interest have lately been invited, should be re-styled into an "IWRM Master Plan"

Mozambique

The establishment of a National Water Partnership (PNA) which includes members from various institutions and sectors presents an opportunity to improve on IWRM awareness, to drive participatory processes for decision makers on water resources development, to revise legal instruments and to build human resources capacity. However, this partnership needs to be consolidated and to do so it must engage with other institutions in order to be a truly national partnership, this is an ongoing process. For the Mozambican CWP to play this role, additional technical and financial support is required from GWP-SA or other cooperating partners, beyond the PAWD Programme timeframe. The capacity building plan for IWRM, the monitoring of water resources (quality & quantity; efficiency), and information management and sharing are also priorities.

Namibia

In Namibia the formulation of the IWRM Plan will create further opportunities for implementation. The revised Water Supply and Sanitation Policy (WSASP) has opened opportunities around water supply and sanitation, including looking at alternative sanitation technologies. The formulation of the IWRM plan will result in sensitising decision-makers through workshops, reports and special documentation; the review of the institutional framework, review of the financing of IWRM and technical support for implementation. However, there is limited human resource capacity for implementation and limited understanding by decision makers.

South Africa

In South Africa the Water for Growth and Development framework forms a good platform to build on and strengthen the gains already achieved through the IWRM approach. However, it is necessary to develop appropriate institutional and human capacity. The provision of services to scattered rural settlements and informal settlements remains a key challenge.

Swaziland

In Swaziland there is a need to complete the establishment of the River Basin Authorities and to create secretariats to support them. There is also a need to build capacity to implement IWRM including the training of DWA staff. In this regard, the strengthening of organisations offering water related courses is important. It is also important to improve metering and accounting for water use, to improve innovative financing mechanisms, especially for the RBAs, and to improve information dissemination. It is also important to develop the necessary policies and regulations, including the national water policy.

Zambia

In Zambia, preparations are underway for the 6th National Development Plan (2011 – 2016). The current IWRM/WE Implementation Plan (2008) need updating to take into account the next NDP (2011-2016).

Zimbabwe

In Zimbabwe a number of actions have been planned under ZINWA and the Catchment Councils. Plans for the Water Act Review are at an advanced stage. The consolidation of Stakeholder Participation and Interaction is taking place, especially at national and catchment levels. It is important to mainstream water demand management into the catchment outline plan formulation and to update information in order to guide the catchment councils regarding the feasibility of allocating water. Plans for the streamlining of water management institutions and functions between the Ministry of Water and ZINWA (commercial and statutory functions) are being developed. A constitution for the National Water Steering Committee is planned. Aligning the Water Policy and Act with other sectoral policies and legal instruments is planned, especially with the Environmental Management Act and Water Supply and Sanitation. A programme on attracting back water professionals (through incentives) has been developed under the short term economic recovery programme to be implemented by December 2009.

5.2 REGIONAL CONSTRAINTS, OPPORTUNITIES AND PERSPECTIVES

This report has outlined many achievements and experiences, which provide an understanding of the constraints, opportunities and perspectives relating to IWRM implementation in the region. While some of the key issues in this regard are summarised below, some overall points should be made up front.

The first of these is that there is a capacity shortage generally across the region. A shortage of skilled and experienced water resources staff is hampering the implementation of good legislation. In this regard, it is critical that the IWRM programmes of SADC countries are tailored according to these capacity constraints. It is more effective to implement a limited number of initiatives effectively, than to strive for an extensive IWRM programme that cannot be implemented because of lack of capacity. In this process, it is best to identify the foundation elements of an IWRM programme, those that are critical to effective water resources management, and to focus on these. The additional elements of IWRM can be added on in due course when strong foundations have been built.

The second is that the country water partnerships have played a critical role in driving awareness and understanding of IWRM in the region, and in developing multi-stakeholder platforms for IWRM strategy and implementation processes. The GWP SA and the country water partnerships should examine how best to build on this role, taking into the understanding of IWRM in the region, the need to align IWRM plans with available capacity and to focus on getting the basics right, before venturing into the “nice to have”.

Some further constraints, opportunities and perspectives are outlined below.

Political support:

Political support for change in the water sector is critical, at all levels of government. However, there is a balance to be found between political support and political "interference". For delivery in the water services sector, in particular, autonomy is seen as essential for the restructured and new institutions that emerge.

Political support is likely to be enhanced where IWRM planning and implementation aligns with local and national development needs priorities. It is particularly important that Ministries of Finance and Development Planning understand the importance of IWRM in the long-term sustainability of the work that they are trying to do.

Legal and policy issues

The suite of SADC water-related policies and documents form a useful framework against which to align country level policies and legislation. None the less, despite the progress in legislative reform in the region, some countries are still facing incomplete water reform processes. In some countries, the process of legal reform has taken a very long time, and has made it difficult for water managers and stakeholders who are expecting a new paradigm which has not been introduced. It is important that legislative and policy reform is completed and communicated within a reasonable time. It is also important not only to have legislation in place, but to have good policy, developed with stakeholder input, as well. Not all of the member states have appropriate policy in place yet. The final element of the legislative framework is a clear implementation plan for rolling it out.

The alignment of new legislation with customary or traditional use and practices is also important. Little of the current legislation formally recognises customary water rights or management. This is an important area where further research is needed, particularly since customary practices and law generally prevail in under-developed and impoverished rural areas where formal systems do not necessarily penetrate effectively.

Institutional arrangements:

A number of countries have reviewed, or are reviewing, the institutional arrangements for the implementation of IWRM. While it is necessary to create the appropriate institutions for the implementation of IWRM, the length of time needed to set up these institutions must be recognised, and appropriate time allocated. It is suggested from experience that a minimum of 3 - 5 years is required before newly established institutions will be functional. If the process of setting up the institutions is participatory, the time required will be longer. In Mozambique, the establishment of five ARAs took almost 15 years.

Managing water according to catchments or river basins means that the water management boundaries cut across existing administrative and political boundaries, creating overlapping jurisdictions and mandates, and making coordination across administrative boundaries essential and formidable. The creation of new institutions at the catchment level does not necessarily recognize the role of existing institutions. Part of the challenge is to reconcile the new institutions with existing formal and informal institutions at the district, provincial, and central government levels.

The existence of one, clear apex Ministry for Water makes the implementation of IWRM easier, although it must be recognized that there is no simple blueprint for the most appropriate institutional arrangements for IWRM.

Capacity:

As has been mentioned above, lack of capacity to implement IWRM has been cited as a challenge by all the member states, and the need for ongoing capacity building and training is seen as critical. Capacity is weak in water management institutions, and amongst stakeholders, exacerbated by a brain drain of professionals to other countries. However, there are many opportunities for training and capacity building both locally and nationally that should be taken up. Capacity building must focus on the user level, not just the central bureaucracy, including capacity building for financial management by communities.

Infrastructure

Poor infrastructure capacity remains a critical threat to effective IWRM in the region. Without sufficient storage to manage drought periods, effective IWRM will not be possible in the region. Equally, poorly maintained infrastructure results in major water losses, lowered assurance of supply and potential safety hazards. This will become increasingly important as climate change and development pressures pose challenges for water management.

Planning, monitoring and evaluation:

It is important that IWRM planning is not seen as an end in itself, but as a means to an end. The end is improved water management to support the achievement of national social, environmental and economic goals. Conducting an IWRM/WE planning process reveals the deficiencies in the system in terms of poor co-ordination of policies, weak institutional arrangements, and the need for practical demonstrations of the benefits of IWRM. Co-ordination between sectors needs improvement in both the planning and implementation phases. The linkages between National Development Plans and water planning are critical and must be improved. This requires the involvement of other Ministries such as the Ministry responsible for national planning and finances.

The presence of a structured co-ordination mechanism, supported by an effective communication plan, can contribute significantly to the successful implementation of IWRM. Collaboration between institutions yields greater results than the sum of each institution working in isolation. Multi-disciplinary teams of various experts should combine efforts and skills to plan for land and water resources in an integrated manner.

There is a major opportunity to identify water and IWRM-related actions in National Development Strategies and plans and PRSP and other water-related sector plans, and to develop coordinated programmes for implementation as part of the IWRM Plan. Water issues that have been identified in national development strategies should be incorporated into the IWRM plan.

Access to information and data through good monitoring and evaluation systems is critical for the achievement of IWRM and for effective IWRM planning. This is a general weakness in the SADC member states, particularly in relation to raw water data. Improvements in this area are necessary, but it is also important that the monitoring systems address the real needs for effective water management, within capacity constraints, and

do not become over-ambitious. The monitoring of essential parameters such river flow, rainfall, groundwater levels, and water use, remains critical. As well as effective monitoring systems, effective information systems must be developed. Effective monitoring is dependent, inter alia, on ensuring effective maintenance, rehabilitation and expansion of monitoring systems.

Effective monitoring should produce data that can inform planning and implementation processes over time. The plans and approaches should be sufficiently flexible to allow changes driven by the assessment of the monitoring and evaluation results.

Stakeholder involvement and Communication:

The need to involve stakeholder is recognised by many practitioners and in much of the legislation, and stakeholder participation is being conducted to some extent in all of the countries. The challenge now, is in implementation and in improving participation. Part of this will require a vigorous communication campaign on the message of IWRM. Experience from member states shows that outcomes are most effective when beneficiaries are involved from the beginning of the process – this promotes local ownership, and enables beneficiaries to be sensitised to benefits from process, programme or project to ensure sustainability. Local organisations should be identified to support the process, programme or project and impart knowledge and competencies to community. For effective stakeholder involvement in planning, the users must be aware of the issues, concepts and principles in catchment planning.

The implementation of IWRM often requires unanticipated changes which are not always readily accepted either by stakeholders or managers. Ongoing provision of information and explanations of the implications are essential, through communication and awareness-raising platforms. Equally, it is important to ensure wide dissemination of key documents such as the IWRM/WE implementation plan, to inform development managers about their roles and responsibilities in relation to IWRM. The role of the media in educating the public is very important.

The level of awareness of IWRM has risen considerably in the SADC region over the past few years. Nonetheless, the support of GWP-SA is crucial in implementing awareness campaigns and advocacy for importance of sustainable water management and on an IWRM approach in development and implementation of other sector plans' strategies and programmes.

Water Conservation and Demand Management:

There is an increasing understanding of the need for water conservation and demand management in the region and increasing recognition that supply side management is no longer workable in the face of increasing scarcity. Between 1999 and 2002 the IUCN led regional WDM initiatives, phase I and II, developed 9 WDM country status reports (for Botswana, Malawi, Mauritius, Mozambique, Namibia, Swaziland, RSA, Zambia and Zimbabwe). In many countries, water conservation and demand management is increasingly being practiced, particularly by the private sector.

Equally, it is imperative to seek innovative mechanisms to conserve water. Conservation of water requires adequate technical capacity to maintain existing systems, effectively apply WDM strategies and practices, and investigate and implement new and innovative approaches. The importance of adequate technical capacity, within government and the private sector, in addition to theoretical understanding of IWRM including WDM,

cannot be over emphasised. Namibia has practical experience in WC/WDM which can benefit other countries in the region.

Environmental water requirements:

Currently the protection of environmental water requirements is extremely weak in most of the SADC member states. Even where legal protection exists, implementation is poor. There is a need to ensure effective enforcement of the ecological reserve. There is also a need for further development of methodology for determining environmental flows, egg for ephemeral rivers.

Pricing and tariffs:

Innovative methods of revenue generation and sustainable funding need to be secured to cover the costs of IWRM implementation. Currently, raw water pricing is poorly regulated in many of the member states resulting, inter alia, in unsustainable institutional arrangements. Effective funding of IWRM is further constrained by challenges in relation to cost recovery, the unfavourable economic climate and the lack of capacity to autonomously finance projects by many states, which creates dependency on donors.

It is important to that the process of setting tariffs is transparent and that mechanisms are put in place to ensure effective cost recovery. Within this, it is important to recognise the value of water as both an economic and a social good. Linked to this issue, is the challenge of educating politicians on the need to charge effectively for water and to ensure effective cost recovery, within a framework that protects the poor and ensures their access to affordable water.

Transboundary basin management:

Most of the transboundary agreements that are in place in the SADC region incorporate the key principles of IWRM in transboundary basins. However, the issue of equitable sharing of benefits between riparian states remains a challenge. Furthermore, in the absence of sufficient capacity to manage water resources effectively on the national level, it is difficult to see how it will be done effectively at the international basin level.

6 CONCLUSION

In conclusion, there are four key messages to be derived from the assessment of IWRM implementation in the region. The first of these relates to the purpose of IWRM, the second relates to the development of IWRM programmes that are aligned to the capacity of the relevant country; the third relates to the identification of the key IWRM programmes relevant to the specific context, and to the issue of selective consultation processes. Each of these is discussed briefly below.

1) IWRM is not an end in itself, but only a means to an end. The end is the environmentally sustainable management of water resources in a manner that supports the social and economic development of the country or region. The most effective IWRM planning would be that which finds the simplest means to achieve this end.

2) Aligning IWRM programmes to capacity. One of the challenges of IWRM is that it is sometimes interpreted as requiring the implementation of all of the elements of IWRM, at the same time. However, it is very clear from the country assessments, that capacity is a major constraint to water resources management across the region. While capacity building and training programmes are important and must continue, it will be a long-term process to reverse the capacity constraints currently present in the region. In the meantime, however, implementation capacity will continue to place limitations on what can be achieved. In order to implement sustainable and effective IWRM, it is important to align IWRM implementation plans with available capacity, rather than developing ambitious programmes which cannot be implemented effectively because of limited capacity.

3) As a follow on from the above comments, there is no blue print for IWRM that can be implemented in all contexts. IWRM, as a philosophy for water resources management, contains a number of possible elements. It is not, however, necessary that all of these elements be put in place simultaneously. The implementation of effective IWRM is based on the identification of the key elements of IWRM that are appropriate to a particular context (including the capacity constraints as discussed above). It is important to identify the particular challenge(s) pertaining in a basin/country, and to identify the key actions required to address those challenges. It is best to begin with ensuring that the fundamentals of water resources management are in place (where necessary), recognizing that other aspects can be put in place over time as and when the capacity is available. This includes the priority other sectors that water needs to engage to ensure effective IWRM, given the ecological, social and economic challenges facing the water sector. The key actions may vary considerably from one area to another. In one area, a key challenge might be increasing storage capacity through further infrastructure development. In another area, a key challenge might be understanding and managing current water use in order to ensure sustainable use of limited water resources. The actions identified in an IWRM strategy or plan should address these key challenges.

4) Within this, while consultation is a key aspect of IWRM, it is important to ensure that it remains appropriate to the needs and capacity of the country, project or programme. Just as it is important to understand what the key actions are to address the key water resource management challenges, it is important to understand the key stakeholders in any particular context. Stakeholder consultation or engagement does not require the involvement of all stakeholders in all processes. Clear identification of the purpose of the consultation/engagement, and the key stakeholders to be consulted, may enable more effective implementation of IWRM than attempts to consult too widely and too often.

7 APPENDIX A: PHSICAL AND SOCIO-ECONOMIC CONTEXT

7.1 GEOGRAPHIC CONTEXT

The SADC region, excluding the Democratic Republic of Congo, covers nearly 6.8 million km^2. The relative sizes of the member states varies considerably, from the very small Lesotho and Swaziland, to the much larger South Africa, Mozambique, Namibia and Angola. The relative sizes of the member states are shown in Figure 1 below.

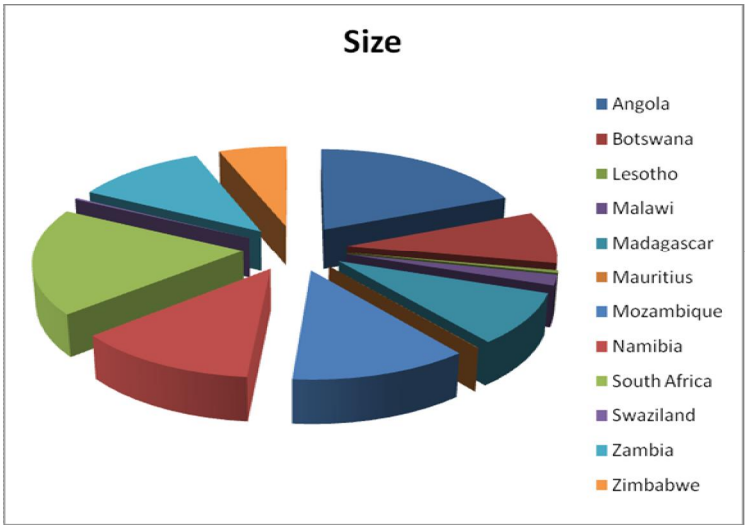


Figure 1: Relative size of the SADC countries (based on information from Mongabay.com)

The region has renewable freshwater resources of around 650 billion m^3 per annum (surface and groundwater). However, these resources are inequitably distributed between the countries, and water availability per capita varies significantly, influenced both by topography and climate. The climate is characterised by wet and dry periods with recurrent droughts and floods, which impact negatively on economic growth and human well-being. The western part is arid to semi-arid, with average annual rainfall of less than 300 mm, while the eastern parts are much wetter, with annual rainfall over 800 mm (cf Figure 2). Angola is largely humid. The SADC region can be divided into 12 major ecozones, with forests making up about a third of the land area, around 21% desert, and the rest largely savannas and grasslands. The SADC region contains some major and important wetland systems, some of which, like the Okavango swamps, have global significance.

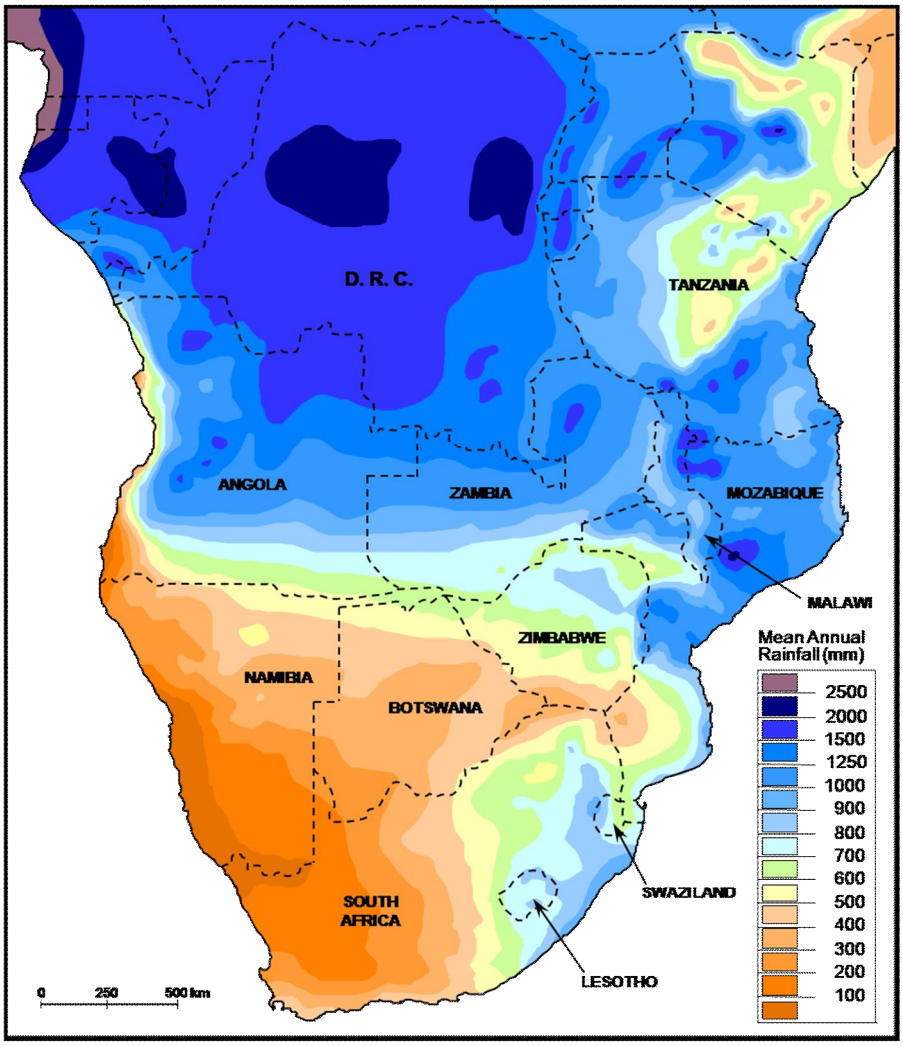


Figure 2: Average rainfall across the SADC region (excluding Mauritius and Madagascar) (Source P Ashton)

Water stress is predicted to increase as a result of population growth, economic growth, and climate change. Figure 3, below, shows the prediction of water stress in the major basins across the region by 2025. The Orange-Senqu and Limpopo river basins face particular stress challenges.

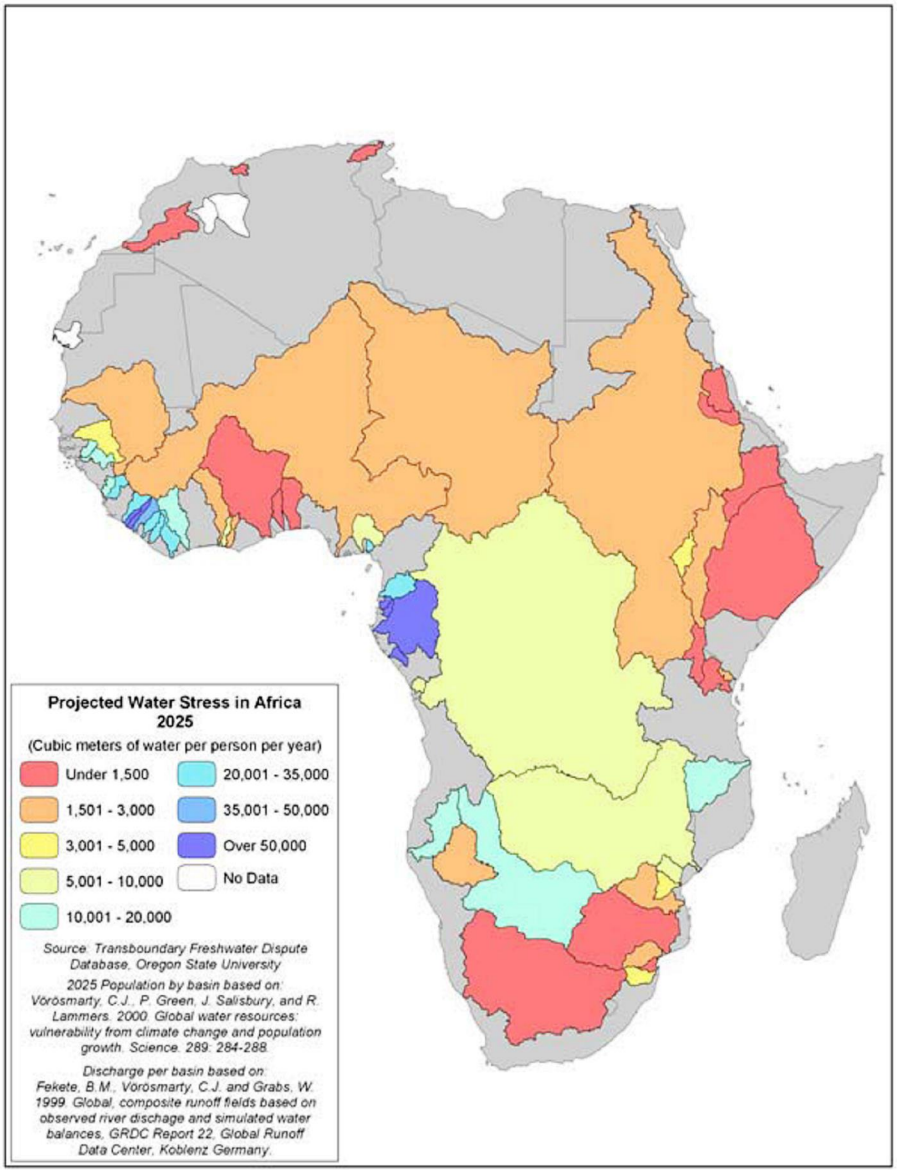


Figure 3: Projected Water Stress in Africa 2025 (Source: Transboundary Freshwater Dispute Database, Oregon State University)

Fifteen of the major river basins in SADC are transboundary in nature, and all of the SADC countries, except the island members, share at least one river basin with other states. There are also a number of transboundary aquifers. Figure 4 below shows the percentage of annual renewable water available to each country from outside its borders. Namibia, Botswana and Mozambique are particularly vulnerable in this regard, with the major portion of their water resources flowing in from outside their borders. Lesotho is the only country which falls entirely within one river basin (the Orange-Senqu).

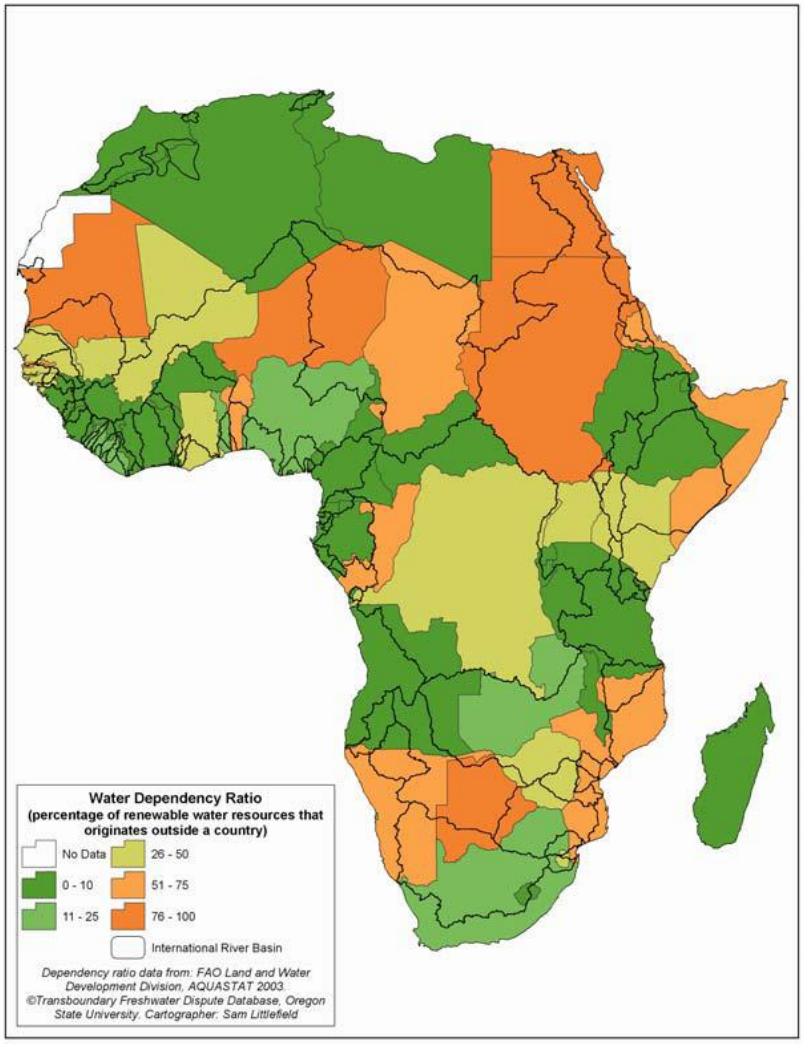


Figure 4: Percentage of renewable water resources originating outside a country (Source: FAO Aquastat 2003)

The SADC region is particularly vulnerable to climate change impacts, as a result of its historically high climate variability, high levels of food insecurity and poverty, and high levels of water stress. Forecasts made by the Intergovernmental Panel on Climate Change (IPCC) (Christensen *et al.*, 2007) estimate a 20% decrease in rainfall in southern Africa with the major drop during the June to August where it could reach 30% (Figure 5). Figure 6 shows, at a macro level, the predicted temperature increases, which will exacerbate water stress.

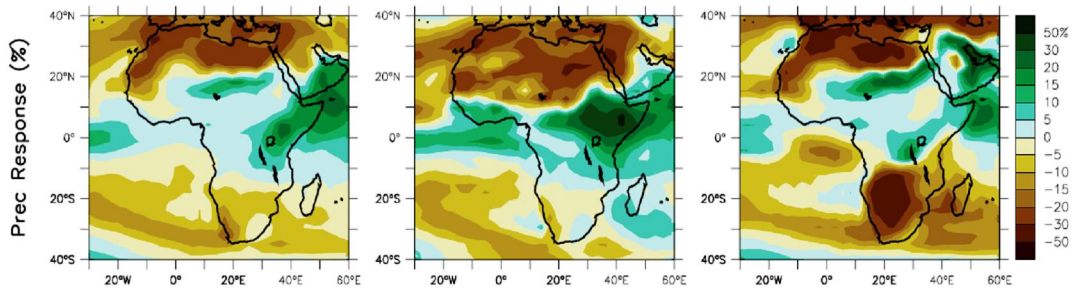


Figure 5: Projected Rainfall variance in Africa (until 2099) as a result of climate change (Source: Christensen *et al.*, 2007)

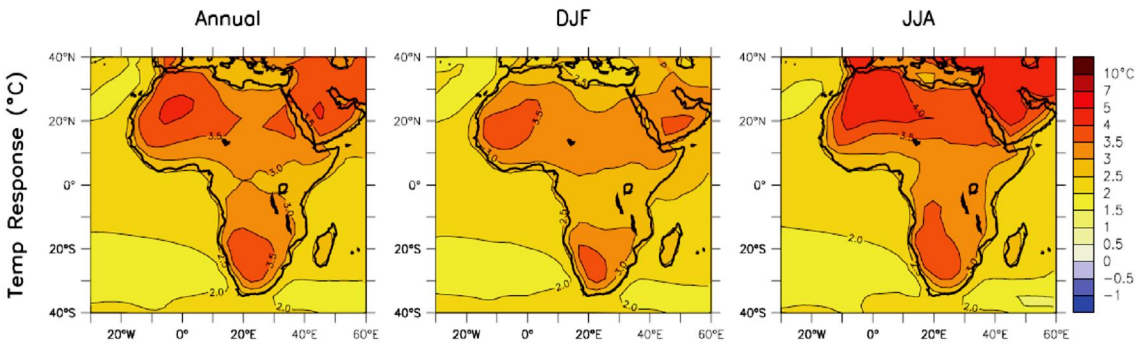


Figure 6: Projected temperature variance in Africa (until 2099) as a result of climate change (Source: Christensen *et al.*, 2007)

According to the IPCC, it is possible that the incidences of drought will increase with a major impact particularly on pasture, cattle and water resources in marginal areas. The shortage of water, already a problem in many southern African countries, is likely to worsen, and will pose a threat to food security in countries like Mozambique. Climate change is also likely to increase desertification, bush encroachment, soil erosion, deforestation, floods and droughts. Crops yields are expected to drop. The pattern of infectious and water borne diseases may change as temperatures rise. For example, malaria is expected to spread into new parts of Namibia and South Africa.

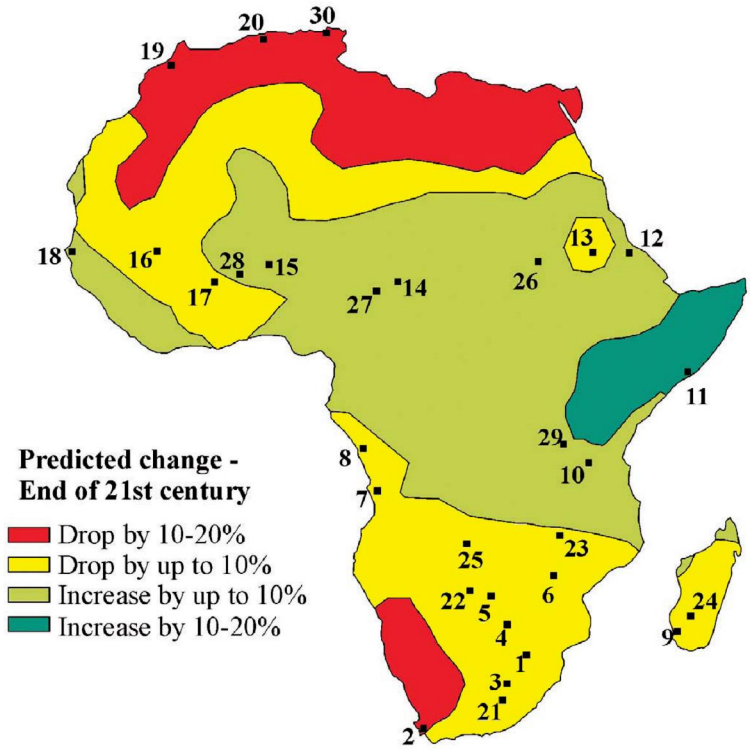


Figure 7: Predicted impacts of climate change on rainfall by 2100 (Source GWP)

Despite being generally well endowed with natural resources, and having seen good economic growth over the past few years, the southern African region remains extremely poor and suffers from low levels of social and

economic development,. Around 45% of the total population survive on less than 1 US$ per day. Malnutrition averages around 36%. Largely because of HIV and AIDS, life expectancy has declined from around 50 years, to slightly less than 40. Infant mortality remains high at above 50 per 1000 births in most of the states.

Economic development is uneven, with South Africa being the largest and most industrialised economy. Angola, as a result of mineral wealth, has a relatively high GDP, but even within these two countries, development is uneven, with high levels of poverty for large parts of the population and extreme wealth for a small minority. The mixed levels of development in the region can be seen in the levels of access to basic water and sanitation as shown in figure 8 and 9 below. In all the countries, the urban areas have better access to services than the rural areas and access to sanitation lags behind access to water. It is also important to note that these figures probably indicate access to infrastructure rather than access to a functioning service.

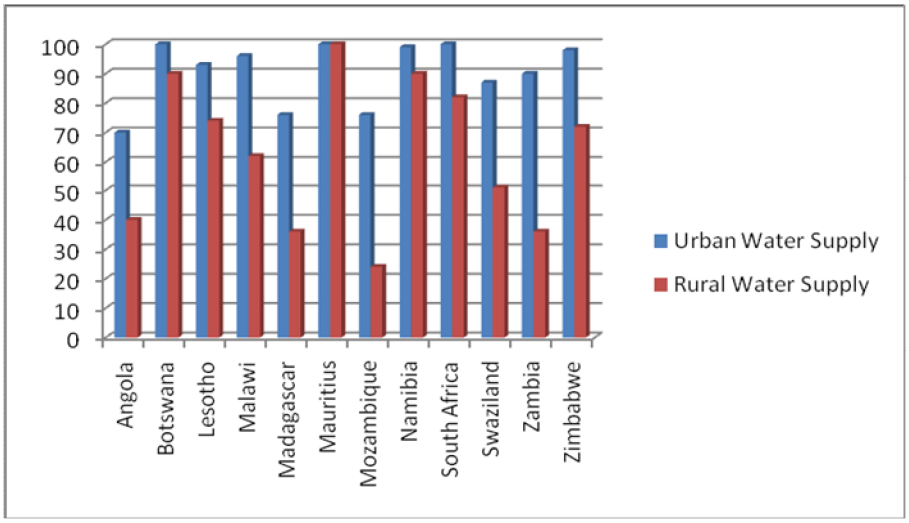


Figure 8: Access to improved water supply in urban and rural areas 2006 (Source: data from Unicef)

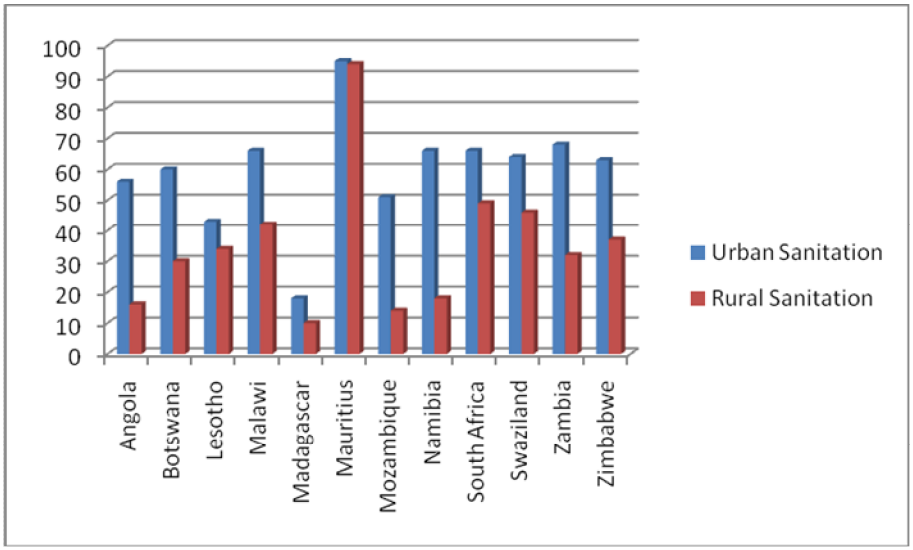


Figure 9: Access to improved sanitation in rural and urban areas 2006 (Source: data from Unicef)

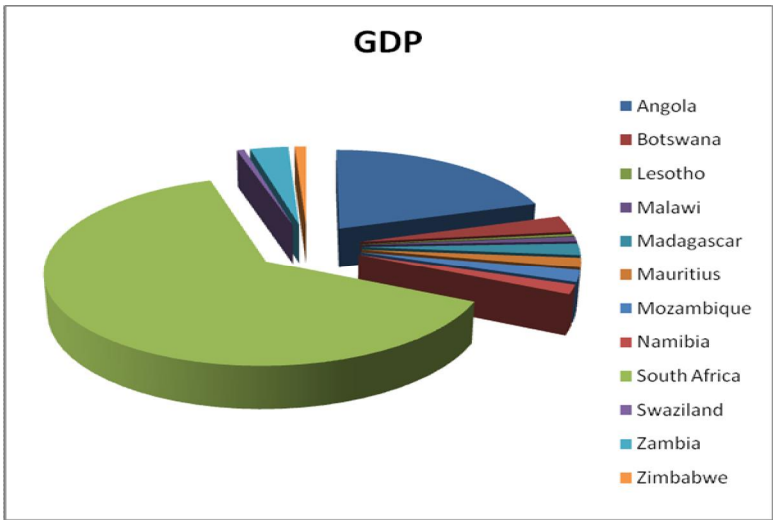


Figure 10: Relative GDP of SADC countries (based on information from CIA Sourcebook 2009)

The Human Development Index (HDI) also varies across the different states Mauritius ranks relatively high on the HDI scales, while Mozambique is the lowest, with the highest levels of poverty in the region, measured in terms of education, life expectancy, health conditions and general standard of living. HIV and AIDS have exacerbated poverty in the region and decreased life expectancy. In Namibia, for example, in 2007, 23% of all deaths were as a result of HIV related causes. In Swaziland the HIV prevalence rate is estimated at 38%. In 2005, HIV prevalence in Malawi for the 15-49 year old age group was 14%, and 40% of all in-patient admissions were as a result of HIV related illnesses.

Figure 5, below, reflects the relative population sizes of the states, with South Africa the largest, and Namibia, Mauritius, Lesotho, Swaziland, and Botswana having populations of only a few million. By 2020, the region's population is estimated to reach around 262 million people.

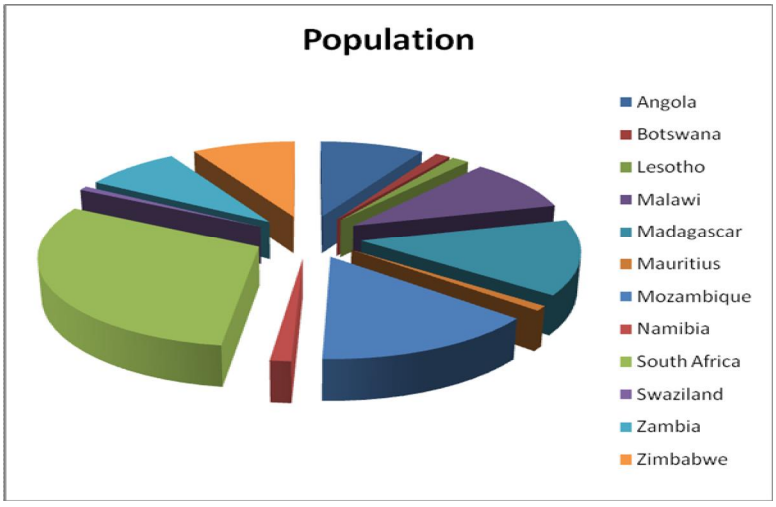


Figure 11: Relative population sizes of SADC countries (based on information from Mongabay.com)

Migration, both within and between countries, is a common factor, with strong urbanisation patterns, seasonal migration between cities and rural areas, and migration between countries as a result of economic and political pressures. These migration patterns have major impacts for water availability, water services provision, and management of water-borne diseases.

7.2 MAJOR ECONOMIC SECTORS, AND SOCIAL AND ECONOMIC CHANGES

Over recent years, the region has experienced relatively good economic growth, which has been negatively affected by the recent global slowdown. In 2006 the region experienced an average growth in real GDP of 6.0%, partly due to good rains having a positive effect on agriculture. There was also good growth in the mining sector which stimulated the manufacturing sector. However, manufacturing remains a small sector in all SADC countries, except South Africa and Mauritius. Angola has had particularly high levels of growth (27% in 2007). In Zimbabwe, recent changes have dramatically dropped inflation and changed the economic picture.

In most of the SADC countries, agriculture remains a key economic sector, and provides livelihood and jobs to a large part of the population. While countries like Botswana, South Africa and Angola are driven by mining and industry rather than by agriculture, it still remains an important part of rural livelihoods, and a significant water user. The Mauritian economy has moved over the last decade from a focus on agriculture to information technology, industry and tourism.

In Malawi, the planned Shire-Zambezi waterway will provide access to the sea, reducing import and export costs in the currently landlocked country. Mozambique has seen good growth over the past few years, particularly around mineral resources, industry and services. The services sector is the major contributor to the Mozambican economy, at 39.7% of GDP, as opposed to an agricultural contribution of 21%.

In 2007-8, Namibia removed privatisation from the government agenda, to focus with on strengthening state-owned enterprises instead. South Africa, during 2008, experienced negative impacts to the economy from power outages resulting from limitations in power generation capacity.

Many of the SADC countries that are dependent on an agricultural base remain vulnerable to climate variability and natural disasters. This is well illustrated in Figure 7, below, which maps rainfall variability and economic growth in Zimbabwe, showing the correlation between the two.

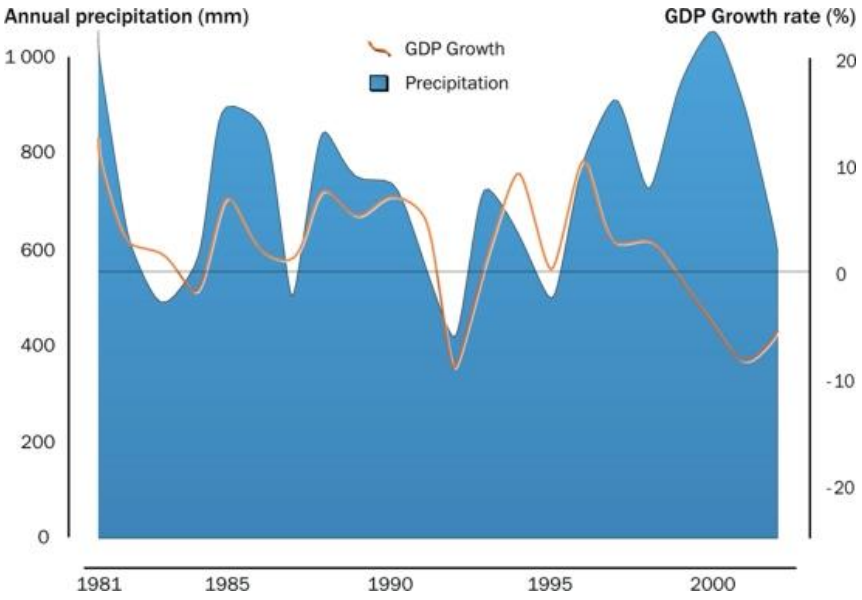


Figure 12: Rainfall variability and economic growth in Zimbabwe (Source UNEP GRID)

8 APPENDIX B WATER RESOURCES SITUATION

8.1 WATER AVAILABILITY AND INFRASTRUCTURE

Surface water availability varies enormously across the region, with Angola (1320 billion m^3) the most well-endowed with surface water resources. Namibia, on the other hand, which has limited surface water resources near the major urban areas, is very dependent on groundwater, with 73% of all water used coming from groundwater. In many areas freshwater is a scarce and vulnerable resource.

Due to poor storage infrastructure development, in most of the countries the availability of freshwater is dependent largely on rainfall. Infrastructure development (dams) is concentrated mostly in South Africa and Zimbabwe (figure 11). Even in Zimbabwe, many of the dams are relatively small, and the economy is vulnerable to climate variability, with GDP closely linked to rainfall (cf figure 9 above). In most of the region, rainfall is limited to a few months of the year, increasing the need for effective storage to ensure water availability during the dry months. Malawi is blessed with a number of large lakes, which provide a major source of stored water. However, changing rainfall patterns and increasing water use are seeing the levels of the lakes dropping. Malawi also has around 700 small to medium-sized dams with a total storage of around 100 Mm^3. Mozambique, while it has around 12 000 m^3 water per capita per annum is vulnerable in the sense that all of its major rivers are transboundary and they are the downstream country in all cases.

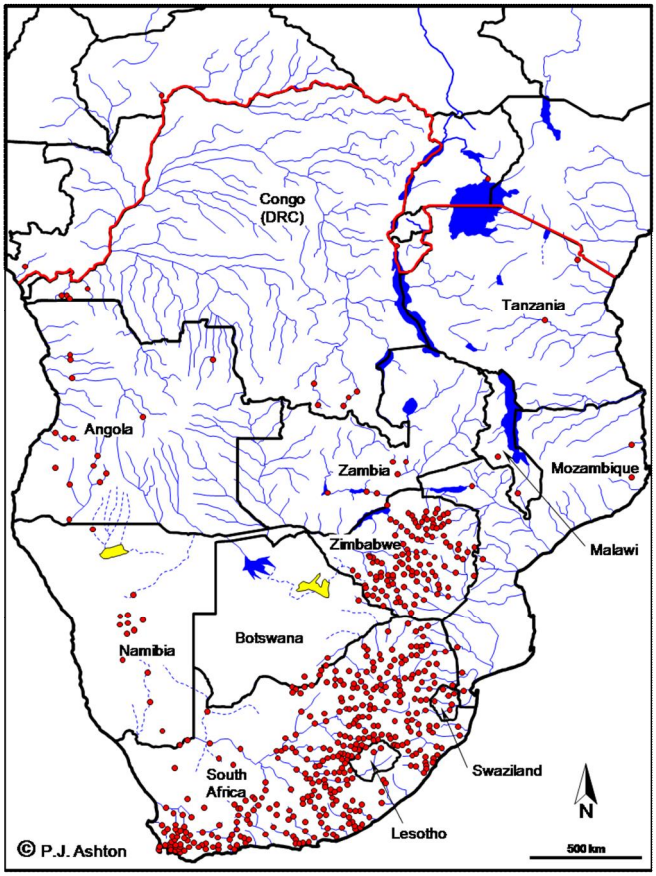


Figure 13: Distribution of dams in SADC (Source P Ashton 2005)

Since hydropower is an important (if underdeveloped) source of energy in SADC, the management of water resources and water storage is critical in ensuring sustainable energy supply throughout the year. Hydropower in southern Africa remains significantly underdeveloped.

Groundwater is of critical importance, particularly for providing water sources to rural communities, stock watering, and small towns. However, there is insufficient awareness and ability to implement effective management of groundwater and drought in the region despite the fact that groundwater is the source of water for more than 70 percent of the population.

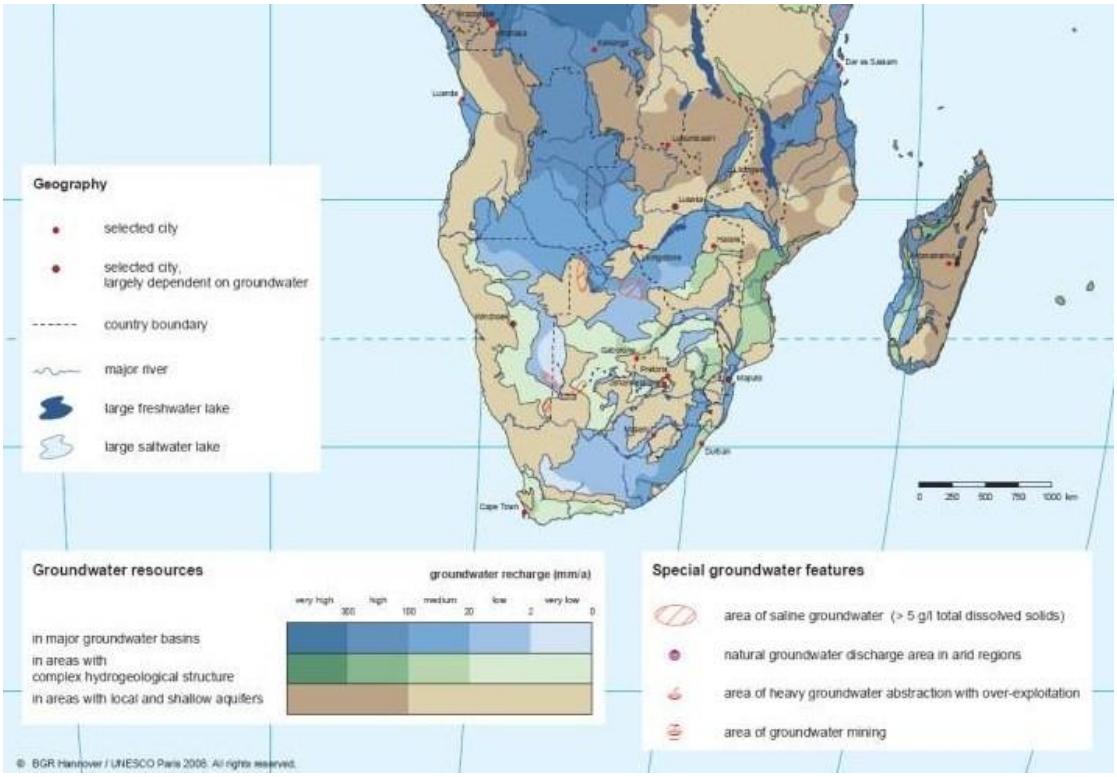


Figure 14: Map of groundwater resources in Southern Africa (Source BGR.UNESCO 2006)

Botswana has limited sites for further dam development. Namibia is planning to raise Hardap dam and is investing in alternative technology, including desalination plants on the coast. South Africa is currently building further storage infrastructure (e.g. de Hoop and Steelpoort Dams). Phase 2 of the Lesotho Highlands Water Scheme is scheduled to go ahead. Mozambique is looking at further dam options.

8.2 WATER USE, DEMANDS AND REQUIREMENTS

Demand for water is increasing across all sectors of the economy, leading to further water scarcity, and competition and disputes over available water (SADC *et al* 2005). In Namibia, the driver of increased demand is likely to be agriculture and uranium mines, while urban demand increases will be kept low by water conservation and demand management. In Zambia, water demand is being driven by irrigation development in 3 farming blocks and later in 6 farming blocks, bringing the total to 9, one in each province. Other areas are mining, urban growth and power generation.

Water availability per capita will decline over the next ten years. Figure 13 shows expected population growth vs. available water over the period 1995 – 2025. By 2025 it is expected that Malawi and South Africa will be facing absolute water scarcity, and Lesotho, Mauritius and Zimbabwe will be water stressed; Angola, Botswana, Mozambique, Swaziland and Zambia are likely to experience water quality and availability problems in the dry season. Madagascar is likely to be facing water quality challenges, particularly for domestic use.

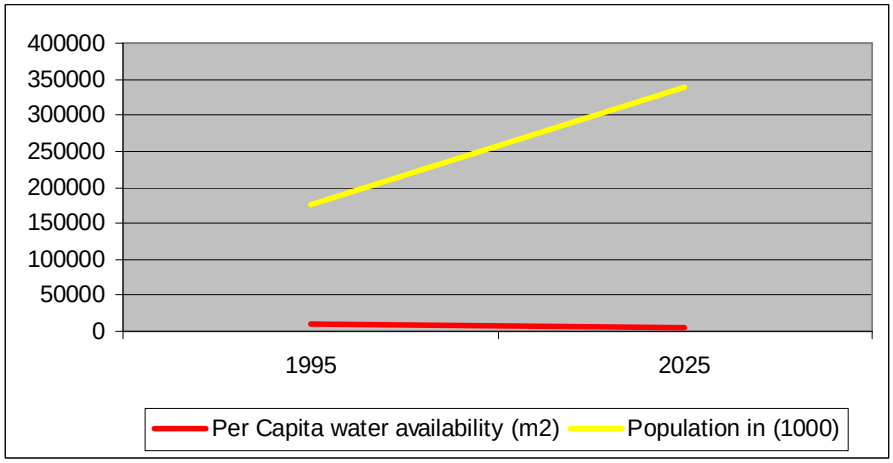


Figure 15: Population growth and water availability in the SADC region (Source SADC EC 2006)

Agriculture, as has been mentioned, is the biggest water user in the region. Water use, even in countries that are not dominated, economically, by the agricultural sector, is dominated by agricultural use. In South Africa, where agriculture contributes between 2 – 4% of GDP, water use by the irrigation sector is 60%. In Angola, agricultural water use is 86%. In Lesotho, however, because of the lack of irrigated agriculture, the largest water user is industry (51%) against 1% for agricultural use.

Environmental water requirements

Most states have, or are in the process of, developing legislation which aims for the sustainable management of water resources. However, environmental requirements have not been quantified in the majority of SADC states, and not much priority is currently being given to this aspect. Even in countries like South Africa, where environmental requirements must be protected by law, and have, to a large extent, been quantified, there is little evidence that this has been given effect on the ground. Monitoring of environmental flows remains a significant challenge. Namibia has been struggling with the lack of internationally accepted methodology for determining environmental flow requirements for ephemeral rivers, but has nonetheless been doing work in this regard. In Malawi, a minimum of 8% is allocated to environmental flows, but it is not clear to what extent this is achieved or monitored.

In Lesotho, as a result of the Lesotho Highlands Water Project, an instream flow requirements (IFR) Policy has been developed. The intention is to adopt the IFR policy for the whole of Lesotho such that it becomes part of the legal regulatory framework, and can be operationalised for every major water development project in the country. In Zambia, environmental flows were determined for the Kafue flats during a WWF natural restoration project, but not for other water resources or other areas.

The protection of environmental flows is important in the protection of inland fisheries which provide a major source of protein (0.65 million tons caught in 2002). But inland fisheries production in SADC has stagnated or

declined in almost all countries over the past years because of overfishing, environmental degradation and poor management.

Water conservation and demand management

The countries experiencing increasing water scarcity, such as Namibia, Botswana, South Africa and Swaziland, have all put in place, to some degree, water conservation and demand management measures. Namibia, and particularly Windhoek, have been leading the field in this regard for many years, combining use of unconventional water sources, recycling in industrial processes, reuse, reclamation of domestic sewage effluent to potable standards, artificial groundwater recharge, banking of treated surface water in depleted aquifers, desalination, and water conservation and demand management. Both Botswana and South Africa have divisions in their national Departments of Water Affairs focused specifically on water conservation and demand management, and in South Africa is has been declared a national priority by the Department of Water Affairs and Forestry. Lesotho has developed a Water Demand Strategy as an integral part of its IWRM strategy. However, the implementation of WDM measures, in general are on an ad-hoc basis and still limited. There are a number of measures, though, that already reflect the idea of WDM in Lesotho. Those measures are: block tariffs for urban water supply, an active leakage control and metering programme using the concept of DMA, detection programme of illegal connections, public awareness programmes and recycling of industrial water. In Zambia, Commercial Utilities on the Copperbelt, Lusaka and Southern have undertaken WDM through metering. The Mpongwe Wheat Scheme, Nakambala Sugar, and the Kaleya small-holders irrigation schemes also practice WDM.

In Mauritius, the CWA has started to address the reduction of unaccounted for water. The implementation of water conservation in agriculture has started, while recycling in industry has been advocated but has not been very successful yet.

8.3 INSTITUTIONAL ARRANGEMENTS

With the introduction of water law reform, has come the reform of water management institutions in a number of SADC member states. However, a great deal of work is still need to ensure the effective functioning of these institutions. In most of the member states, one Ministry has overall responsibility for water resources management, and in some case for water services management as well. The separation of water supply provision in rural areas is found in several of the member states.

In Angola, the responsible Ministry is that of Energy and Water, and it is responsible for water resources, water services and hydropower development. Provincial government is responsible for provision of water services in urban areas and the Ministry of Agricultural and Rural Development has responsibility for water supply in rural areas. Unfortunately, provincial government is weak and water services provision is poor. As a result, NGOs and water vendors are active in this area. Basin offices should have been established for decentralised water resources management but are not active in all basins. The intention is that they should all be in place by 2025.

In Botswana the responsible Ministry is that of Minerals, Energy and Water Resources. The Department of Water Affairs works closely with a range of other bodies, including the Water Utilities Corporation, Geological Survey, the Water Development Division in the Ministry of Agriculture, District Councils, and the Ministry of Environment, Wildlife and Tourism. However, planning is done on a sectoral basis, with poor co-ordination, and an extensive review of institutional and legal arrangements is recommended.

Water resources management in Lesotho falls mainly under the responsibility of the Minister of Natural Resources. The Water Commission, within this Ministry, is responsible for policy planning and strategic

guidance to the sector. The Department of Water Affairs is responsible for water resources assessment, protection and conservation. The Department of Rural Water Supply is responsible for rural community water supply while the Water and Sewage Authority (WASA) is charged with water supply in 15 urban centres. The Lesotho Lowlands Water Supply Unit is responsible for bulk water development and local urban water supply, and the Lesotho Highlands Development Authority is responsible for bulk water development for export to South Africa, dam safety and maintenance, the instream flow requirement policy and community development for the Lesotho Highlands Water Project.

Malawi has adopted a decentralised approach, under the guidance of the Ministry of Irrigation and Water Development. A National Water Resources Authority and Catchment Management Agencies are to be established – each major basin will fall under a CMA for water allocation and resource management. 5 statutory water utilities supply water for urban and peri-urban areas, while Water Boards, NGOs and CBOs provide water supply in other areas.

In Madagascar, inter-sectoral coordination of the water sector by the Ministry of Water was introduced in 2008. Because of the size of country and the difficulty in accessing outlying areas, Madagascar has adopted a decentralized institutional approach, with the country divided into six catchment areas, each with a water agency and its committees. The institutions have different approaches for water management in urban and rural areas.

In Mauritius, the Central Energy Board, the CWA, the Wastewater Management Authority (WMA), and the Water Resources Unit (WRU) all fall under the Ministry of Renewable Energy and Public Utilities. The Irrigation Authority falls under the Ministry of Agriculture, Food Technology and Natural Resources. The WRU is responsible for the formulation of policy, and management of all raw surface and ground water resources including infrastructure development, monitoring, and pollution control. The CWA is responsible for treatment and distribution of water to domestic, industrial and commercial consumers. It is dependent on income derived from water sales. It also makes water available to the Irrigation Authority for irrigation. The WMA develops, monitors, maintains, manages and controls wastewater treatment works. The Irrigation Authority manages and constructs irrigation systems, and the Central Electricity Board (CEB) develops and manages hydropower schemes.

In Mozambique the National Water Council (CNA) is a consultative body for the Council of Ministers with its main objective being inter-sectoral coordination of the water sector. It integrates all ministries responsible for water related issues and is supported by a Technical Committee and a Secretariat that are presided over and administered by the National Water Directorate (DNA). In this context, DNA is the key Mozambican institute responsible for planning and management of the water sector (DNA, 1994). The Water Law of 1991 and the recent National Water Resources Management Strategy of August 2007 recommends the decentralisation of water resources management and water supply and sanitation services. The DNA and five Regional Water Administrations (ARAs) are envisaged as fulfilling this role. To date, all five ARAs have been established (ARA-South, ARA-Central, ARA-Central-North, ARA-Zambezi and ARA-North). The setting up of ARA-Central North is at an advanced stage. The ARAs are responsible for operation and maintenance of dams, monitoring, flood management, water use licensing, etc. The operational water resources management throughout the country is under the responsibility of the regional water administrations which receive organizational, financial and human resources support required for its consolidation from DNA. All ARA´s should constitute Basin Committees and the stakeholders should be adequately represented in the administrations management boards. Each Basin has a Basin Management Unit, made up of district government representatives, water users and civil society representatives. Basin committees are responsible for development of basin plans, tariffs and other management instruments at ARA level, after approval by the DNA. A Council for the Regulation of Water Supply acts as water services regulator in Mozambique. A Water Supply Investments and Assets Fund (FIPAG) receives state funding for water distribution systems.

In Namibia, the Department of Water Affairs and Forestry, under the Ministry of Agriculture, Water and Forestry, is overall responsible for water allocation and water resources management and for sanitation. Three basin management committees have been established, and three have ongoing activities, while 5 have been initiated. But limited capacity means the basin committees cannot carry out their mandates effectively. NamWater is a state owned enterprise which provides bulk water to waterworks and water schemes throughout the country, including some rural water supply schemes under Directorate of Rural Water Supply (DRWS). The DRWS has offices in 12 of the 13 regions where communal areas occur. Rural Sanitation falls under the Ministry of Health and Social Services. A Directorate of Water Supply and Sanitation Co-ordination is to be established to co-ordinate this sector. Water Point Associations and Water Point Committees have an important role to play in water management in rural areas including maintenance and cost recovery. Local government is responsible for urban water supply.

In South Africa the Department of Water Affairs and Forestry is the custodian of water resources and the water sector leader. Water services provision is a Constitutional responsibility of local government – either district or local municipalities are formally declared Water Services Authorities in different areas. Catchment Management Agencies are being established (8 have been formally established in law so far but only 1 is functional), but the number and size of the CMAs is under review. Parastatal Water Boards provide bulk water to municipalities in some areas – the boundaries and number of these Water Boards is also under review. Water User Associations have been established in some areas to manage local, shared, water resources, mainly, but not only, for irrigation purposes.

In Swaziland the National Water Authority was established under the National Water Act (2003) to advise the Minister on water affairs and to co-ordinate the work of other water institutions (boards, agencies, commissions). It is composed of all key ministries and stakeholder representatives. The Department of Water Affairs in Ministry of Natural Resources and Energy is the secretariat for the NWA and provides technical support. The Ministry of Agriculture is responsible for small irrigation dams. The Ministry of Health is responsible for construction of VIPs, hygiene education, and spring protection. The Ministry of Economic Planning and Development is responsible for allocating financial resources to national policy objectives and priority development initiatives. The Swaziland Water Services Corporation is responsible for water and sanitation in urban areas while the Rural Water Supply Branch in the DWA is responsible for rural water supply. Two River Basin Authorities (Usutu and Komati) have been established, and 3 others are still to be established. Their members are nominated by stakeholders and they are accountable to the NWA. They allocate water, monitor water use and pollution, and collect levies and water use charges. The Swaziland Water and Agricultural Development Enterprise is a public utility which facilitates small-scale irrigation for commercial purposes. There are several private irrigation water services providers that supply bulk water for irrigation purposes in the different basins. There are also Water User Associations while Irrigation Districts are in the process of formation. Also present are trans-boundary water multi-stakeholder forums like the Komati Joint Operations Forum which facilitates water resources management dialogue.

In Zambia, the lead ministry is the Ministry of Energy and Water Development (MEWD) which is responsible for overseeing water resources development and management and for providing policy direction. Water Services fall under the Ministry of Local Government and Housing. There is a National Water Supply and Sanitation Council (NWASCO) which is the regulator for the water services sector. There are 10 commercial water utilities. The pending Water Resources Management Bill proposes the creation of a National Water Authority and Catchment Councils (6). A Water Sector Advisory Group advises government on water policy and provides a forum for SWAP planning, budgeting and delivery. It includes line ministers, statutory bodies, donors, academic and research institutions, NGOs and other water associations.

In Zimbabwe, the Ministry of Water Resources and Management is the apex department. Under the MWRM is the Zimbabwe National Water Authority (ZINWA) which oversees national water resources development, and

gives technical advice to the Ministry and Catchment Councils, and provides potable water to some RDCs and Town Councils. Each river basin falls under a Catchment Council (CC). The basins are divided into sub-basins falling under Sub-catchment councils. In some areas further sub-divisions fall under Water User Boards or Associations. A CC must prepare a Catchment Outline Plan, do water allocation, develop and supervise catchment protection programmes, issue and oversee permits; etc. SCCs must regulate and supervise the exercise of permits, co-ordinate stakeholder participation, implement catchment protection, gather data, and collect permit levies. Each SCC elects 2 representatives to the CC. There is an Inter-Ministerial Co-ordinating Committee for rural water supply and sanitation (National Action Committee) with a National Co-ordination Unit as secretariat. Co-ordination is also done at provincial level. The primary responsibility for water services lies with local authorities. Some Basin Commissions have been established for transboundary basins.

In terms of stakeholder participation, there is a strong sense that the CWPs have played an important role in mobilising stakeholders in most of the member states, and even contributed to collaboration between various relevant Ministries. While stakeholder participation is recognised in many policies and legislation, as in South Africa, it is not necessarily well executed. In South Africa, there is a sense of poorly planned stakeholder consultation programmes resulting in stakeholder fatigue and frustration. Both stakeholder participation and intersectoral collaboration are areas in which improvement is required. In Lesotho, the Water Commission holds quarterly meetings with water sector stakeholders, including donors. The Ministry of Forestry and Land Restoration, DWA and Agriculture also have stakeholder forums. The policy also makes provision for stakeholder participation.

8.4 KEY WATER RESOURCES ISSUES, CONCERNS AND PRIORITIES

There are a number of factors that impact on the availability and management of water resources in the SADC region. These include:

- extreme climate variability and the impacts of climate change;
- population growth and migration (between and within countries);
- unsustainable water and land use practices;
- degradation of watersheds;
- wetlands degradation and destruction;
- introduction of alien species, including alien water weeds and alien aquatic species; and
- increased water demands due to economic development.

Effective water governance is critical to manage these challenges. Unfortunately, the region is facing a number of governance related challenges. Some of these, such as policy and legislative challenges and institutional arrangements, are dealt with later in this report. However, some aspects are touched on briefly here.

Lack of capacity is a critical challenge in water governance faced in all the SADC member states. While water reforms have progressed to different levels in the different states, the capacity to implement new legislation remains the biggest challenge. This is compounded by institutions that have not been fully established, and lack of collaboration and communication between government structures. Insufficient funding for implementation, and political interference or lack of understanding of the water business by politicians, have also been cited as governance challenges facing the region. Poor financial and human capacity leads to poor infrastructure management, resulting in high levels of water loss.

Most countries are also operating in a context of plural legal systems, with traditional land and water systems still operating in many of the rural areas (outside commercial farming areas). However, the formal legal systems do not necessarily recognise or make space for traditional water management systems.

Population growth, rapid urbanisation, poor infrastructure management in urban areas, and increasing economic activity are putting increased strain on water resources (surface and groundwater). This is compounded by increasing water quality and habitat destruction challenges. Groundwater abstraction for agriculture, mining and domestic purposes is contributing to a decline of aquifers. Water quality in the region is threatened by siltation due to deforestation, intensive irrigation, pollution from mines, cities and industries, including leachate from landfills, and poor sanitation facilities.

Unfortunately, data on water quality across the region is lacking, as is an analysis of the impacts on social and economic well-being. In some countries, pollution controls either do not exist or are poorly enforced. There is not enough quantitative analysis of the cumulative impacts of deteriorating water quality and increasing abstraction on surface and groundwater systems.

As is discussed later in the report, many countries have made strides in water planning, and arising from this, key priorities have been identified, related to the specific context of the individual country. For example, Botswana, which has limited physical opportunities for further dam construction, is focusing on water resources management rather than the development of further storage. Malawi and Mozambique are looking to further dam construction to increase storage, as well as tree planting programmes to reduce erosion and siltation. The Malawian IWRM/WE planning process identified poor catchment management, inadequate water supply and sanitation, poor stakeholder co-ordination, lack of harmony between policies and legislation, and lack of capacity, as the key priorities to be addressed in the country. Sanitation, which lags behind water supply delivery, remains a key priority in many countries. Namibia cited the need to increase the understanding of decision-makers of IWRM. South Africa has identified water conservation and demand management as a national priority, as well as bulk water provision, meeting the water supply and sanitation backlogs, and the management and refurbishment of existing infrastructure. Zambia has identified infrastructure development and management, and the management of international rivers as a priority, as well as institutional and human resource development. The financing of water resources infrastructure is also a priority.

In Swaziland the participation of smallholder farmer organisations in irrigated agriculture and the development of other enterprises in support of poverty eradication in rural areas are seen as priorities. The Government has begun a programme of dam construction to increase water security for small holder farmers.

In Mauritius, the government has identified the following key priorities: reduction in the number of operating sugar factories through a “centralisation” policy; assembling all polluting industries within a common “bad neighbour” environment through the creation of industrial parks and the provision of sewerage networks to 50% of the total households by the year 2015. It is proposed to increase the total household population sewered to 50% by the year 2010. An “Industrial Agreement” has been proposed to industries to, inter alia, regulate industrial effluent discharge, and make provision for penalties for non compliance. For the domestic water sector, the priority is to construct a new dam to serve the central conurbation of the island.

9 APPENDIX C: NARRATIVES FROM COUNTRY IWRM PRACTICE

Some examples of current practice of IWRM in the SADC region are highlighted below.

IWRM in the Transboundary Context:

BOTSWANA

Botswana has been participating in various transboundary water resources management initiatives for a considerable length of time now. The most notable initiative has been the involvement of Botswana in the management of the waters and resources of the Okavango Basin together with Angola and Namibia. The Permanent Okavango River Basin Organisation (OKACOM) was the first River Basin Organisation (RBO) in Southern Africa. The experience with this process has guided the formation of other basin management organisations in other parts of the region. In addition to its involvement in the Okavango basin, Botswana is also involved with processes in the Orange Senqu, Zambezi, and Limpopo river basins. A special feature of Botswana's participation in these initiatives is the country's focus on the participation of as broad a spectrum of stakeholders as possible from central government to the community level. Decision makers at all these levels are aware of the need for integrated water resources management. This was recently demonstrated through the participation of Ministers and Senior Officials from the Ministries of Environment and Tourism, Agriculture, Lands and Housing, Foreign Affairs and local Government in a national workshop convened by the International Rivers Unit of the Ministry of Minerals, Energy and Water Resources to discuss the implications of Botswana's participation in transboundary water resources management. The experience with the Every River Has its People initiative in the Okavango is a flagship of this focus.

LESOTHO

Lesotho constitutes the headwaters of the mighty Orange-Senqu River basin thus tranboundary issues related to management and resource use is of highest relevance for Lesotho. IWRM measures undertaken in Lesotho have the potential of affecting the downstream states, especially big structural interventions but also managerial ones. The LHWP is a good example to show how Lesotho and South Africa are sharing in the benefits of using Orange River. The water is supplied under gravity from Lesotho into the Vaal Dam near Johannesburg. Lesotho receives royalties for the water conveyed to South Africa while South Africa is saving the costs of pumping the water from the Orange after it flowed across the border from Lesotho into South Africa. Lesotho is interested in utilising the financial benefits of the LHWP to supply more water and electricity to its people and to raise the standard of living for all. Future options from the LHWP Phase 2 should however consider diverting water from the Lesotho Highlands to the growing population and industries in the Lesotho lowlands, where demand for water is prone to increase. Although also a political issue, this is a main IWRM challenge since the Metolong dam will not solve the long term demand challenges in the lowland, and neither for the greater Maseru area. Lesotho has revised its water act to be streamlined towards ORASECOM Treaty also in harmony to legislations in downstream Orange-Senqu river countries (South Africa and Namibia).

Water allocation:

LESOTHO

In Lesotho, in relation to the process of managing water rights and licensing, all registered water users are quantified. The water uses include water for hydropower, irrigation, water abstracted by the water utility company (Water and Sewage Authority) for distribution in urban and peri-urban areas, water for domestic use in the rural areas and water transferred to South Africa. Domestic allocations of raw water are governed by the Water act 1978 (until the new law is promulgated) while those to South Africa are governed by the LHWP treaty (1986). Allocations are done through the permit system except for water used for domestic purposes. Permits are granted for a limited period not exceeding 5 years and may be renewed for a period not exceeding 3 years. The permits are not based on actual volumes abstracted, which makes assessment and monitoring of actual volumes used problematic. Allocations of potable water to different users by WASA exist as they are volume based and metering exists.

ZIMBABWE

One of the key roles of Catchment Councils is to facilitate equitable allocation of water. The current practice is that, based on assessment figures, catchment-level "water allocation planning fixes volumes of water that can be taken from a catchment area for use by various sectors (i.e. primary; environment; urban, and industrial and mining; agriculture; and reserve for future use). Priorities are not considered when allocating water at this level and the allocation is based on the mean annual runoff, and the amount that each sector gets is tied to how much is available in a particular year.

Water permits are issued based on two scenarios linked to water availability, i.e. sufficient water and insufficient water. When there is sufficient water, permits are issued based on proven requirements for annual use, especially in agriculture and urban, industrial and mining use. No prioritization is necessary since water requirements for users will be met. In situations of insufficient water, the challenge is to identify strategies that promote equitable distribution to avoid conflicts. In most cases, prioritization of water use is based on the country's strategic goals and this is based on the assessment of the economic benefits derived from water use, weighed against social costs. In some cases, this calls for reallocation of water to promote efficiency in the system, e.g. reallocation from the reserve, or in cases where permits have expired, or using the *"use it or lose it*" concept. The system also makes provisions for fractional allocation that addresses equity issues. In the case of drought, water allocation is based on catchment level drought mitigation plans that are part of the catchment plans. However, due to the current process of Fast Track Land Reform and limited capacity, ZINWA and catchment councils do not have up to date records of water permit holders, and the monitoring and enforcement of water permit regulations is a challenge.

Participatory planning:

MALAWI

In Malawi, an IWRM/WE Plan was prepared through a consultative approach with the assistance of the CWP. As at 2009, the Plan still has to be adopted by Cabinet. Government, through the Ministry of Irrigation and Water Development has made a strong commitment to support the implementation of the Plan's activities by providing some financial resources through its local financing arrangements. The Malawi Water Partnership has also committed itself to preparing bankable project proposals from the Project Concept Notes in the Plan so that some of the proposed projects can be implemented.

A strong awareness programme was put in place while preparing the Plan, which took the form of literature, advertising, audio and visual aids. Fact sheets were prepared on various thematic areas with a focus on IWRM and Water Efficiency and were disseminated to various stakeholders such as secondary schools, District Assemblies, public and private organisations and tertiary education institutions. An IWRM Newsletter was produced every quarter containing various articles on IWRM-related issues and distributed to the same recipients. Umbrellas and other pieces of convenience with IWRM messages on them went further to "advertise" IWRM, supported by IWRM/WE programmes in the papers, on radio and television. The IWRM/WE Plan and the CWP's Strategic Plan allow for promotional campaigns, including capacity building, and gender mainstreaming, and HIV/AIDS education. Specific budget requirements have been indicated for the same.

Malawi is an excellent example of how 22 ministries were engaged in the national IWRM planning process and brought together by Malawi Water Partnership working with the office of the President. In participatory planning the one of the critical issues is meaningful engagement across sectors and this is an area where Malawi made some remarkable achievements.

ZAMBIA

Zambia, in 2002, began a process of developing a WRM plan co-ordinated by the MEWD, under the Water Resources Action Programme (WRAP), and later, in 2004, an IWRM/WE plan facilitated by the Zambia Water Partnership under the Partnership for African Development (PAWD). It was a participatory process across the country and ensured political support for IWRM. It is the primary instrument for implementing the water related programmes of the FNDP. The Fifth National Development Plan (FNDP) (2006 – 2010) and the National Long Term Vision (2030) set out the development objectives and plans of the country. The FNDP, developed through a participatory process, includes a vision for water services and water resources. IWRM planning is integrated into the FNDP processes and the linkage is seen as critical to poverty reduction. Water is one of seven priority sectors of the FNDP. An IWRM Centre was established at the University of Zambia in 2006 for human capacity building.

Catchment level planning:

ZIMBABWE

In compliance with the Water Policy and Water Act provisions, water management in Zimbabwe is being carried out on a catchment and sub-catchment basis. Catchment Outline Plans (COPs) have been developed in accordance with Section 12 of the Water Act (1998), in consultation with sub catchment councils and the Zimbabwe National Water Authority (ZINWA). All seven catchments have draft outline plans based on a 20 year planning horizon, with a five year provision for review. The Catchment Outline Planning process involves the definition of the catchment boundaries, population determination, determining water resources availability, assessing the existing situation in the catchments, stakeholder involvement, land use assessment, resource protection, efficient utilization of the resource, and the development of an integrated management plan. These COPs serve as a guide to water management, and to the interventions to take in the event of excess demand. Water quality issues and environmental aspects are also covered in the COPs. Under the Environmental Management Act provisions and EIA Policy (1997), water resources development projects require an EIA to be conducted.

The Water Act provides for the division of the seven catchments into sub catchments. To facilitate the effective implementation of IWRM, sub catchment plans have been developed in some of the catchments. In Manyame, for example, the catchment has been divided into five sub catchment areas, i.e. Upper Manyame, Middle Manyame, Msengezi, Lower Manyame and Angwa/Rukomichi areas. Detailed plans are used as an instrument

for IWRM implementation at this level. In some cases, such as the Upper Manyame sub catchment, micro catchments have been established to foster effective stakeholder participation. In addition to catchment outline plans, detailed sub catchment plans and micro catchment planning, international river basin water resources management strategies are also used in Zimbabwe. Zimbabwe is actively participating in the implementation of the Pungwe and Zambezi basin IWRM strategies and is engaged in the process of IWRM development in the Save and Buzi basins.

The draft catchment outline plans are still to be gazetted. The progress of developing COPs has been very slow due to lack of capacity, financial constraints and general lack of coordination among institutions. The main concern expressed by the key stakeholders in the Water sector in this regard is that long term water permits cannot be issued in the absence of approved plans, and the objectives of the reform process cannot be fully realized. However, temporary permits are being issued.

Water pricing and tariffs

SWAZILAND

Historically water has been a free resource, which has resulted in major inefficiencies in use, particularly in irrigation use - 95% of Swaziland surface water is used for irrigation. In terms of the 2003 Water Act, water now has a value. One of the objectives of the Water Resource Master Plan is "to develop a water pricing policy based on the economic value of water". In Part II, section 8 (c), one of the functions of the NWA is "the setting of fees or charges for covering operation, cost and maintenance of government works, application fees, fees for appeals or charges for use of water". Under Part IV, section 28 (2) each RBA is mandated "subject to the approval of the Authority, to levy and collect rates and charge to defray part or all costs of the River Basin Authority". Although the Water Act has been in effect for five years, there has been little movement on implementing the above requirements because of the on-going process of preparing the Water Resources Master Plan and the establishment of RBAs. Once the WRMP has been completed and approved, the NWA should initiate its responsibilities as presented in Part II, section 10 subsection 6(f). However, Part II, section 8 allows for the gradual implementation of the Plan and by default any strategy recommended in the WRMP can be delayed. Section 8 reads "The Authority shall develop and adopt the Plan in stages and shall prepare for the approval of the Minister a schedule and timetable for the proposed development of the Plan".

It is likely that once a pricing and or tariff policy or regulations are in place that charges will be based on volumetric units. It is also likely that each RBA will establish its own pricing structure reflecting its water development needs and basin management complexity. While no pricing structure is yet in place for bulk water abstraction, a pricing structure does exist for the sale of treated water in mainly urban areas but also in some rural areas. Treated water pricing, which is reviewed annually, is available from the Swaziland Water Services Corporation (SWSC). If the property is connected to the public sewerage system, a charge of 90% of water consumed is levied against the property. The SWSC sets different tariffs for residential and non-residential consumption. The minimum monthly charge for residential is R52.85, while that for non residential is R198.60. The cost for $1m^3$ for public connections/prepaid meters is R3.65. Rural water supplies are priced for operation and maintenance and costs covered by users either monthly usage fee (flat rate) or via meters.

Environmental water requirements

NAMIBIA

Environmental Water Requirements (EWRs) have been established for the Lower Orange River but are, however, not achieved. The process of establishing EWRs on the Okavango River has been initiated. However, to date no internationally accepted methods exist for assessing EWRs of ephemeral river systems. Nevertheless, there has been an attempt to determine adequate environmental water releases from the Oanob Dam. The idea was to maintain the Camel thorn (*Acacia erioloba*) woodland in the floodplain immediately below the dam. This was one of the first government initiatives in Namibia to assess EWRs. Other studies have been done on the Karst aquifer and Kuiseb River. For major abstraction, Environmental Impact Assessments (EIAs) are conducted.

SOUTH AFRICA

The ecological reserve, that water required to protect ecological functioning, is protected as a priority right under the National Water Act. No authorisation to use water may be given without the reserve for the affected water resource having been determined. South Africa has been at the leading edge, globally, of developing the methodology for determining environmental water requirements. To date, methodology is in place in South Africa for determining environmental flows for rivers and wetlands, but the methodology for estuaries remains a challenge. Methodologies exist for determined both quantity and quality reserves. To date, reserves have been determined for 42% of South Africa's water resources. The challenge, however, lies in ensuring that the reserve is achieved on the ground. Work is currently ongoing in DWAF to develop appropriate methodologies for ensuring the implementation of the reserve determinations. Work is also ongoing on a systematic examination of the conservation of South African rivers, with the intention to determine, across the country, those stretches of river that need to be protected for conservation purposes.

Water conservation and demand management

NAMIBIA

The Division of Planning within DWAF is developing a Water Demand Management (WDM) Policy for the country. However, much has been done already in promoting more efficient use of water. Unconventional water sources (recycling of water in industrial processes, the reuse of water for industrial or irrigation purposes, the reclamation of domestic sewage effluent to potable water quality standards, the artificial recharge of groundwater resources with surface water, the banking of treated surface water in depleted aquifers and the desalination of brackish groundwater or sea water) are used in selected locations in Namibia. Windhoek was the first city in the world to reclaim its domestic sewage water to potable water quality for use in the reticulation system. The banking of treated surface water is being planned for Windhoek.

Namibia uses inter-basin water transfers to increase the efficiency of surface water resources by transferring water from a basin with less favourable to one with more favourable evaporation characteristics to reduce losses e.g. between Omatako Dam and the von Bach Dam. The infrastructure is available to include the Swakoppoort Dam in the system with Omatako and von Bach. The conjunctive use of surface water from perennial and ephemeral rivers, groundwater and unconventional water sources, such as reclaimed effluent, is an important management tool to conserve water, to increase resource efficiency and to reduce water supply costs. Artificial aquifer recharge was established in the Omaruru River at Omdel Dam about 20 years ago.

Pricing is also used to drive WDM. Towns such as Windhoek, Swakopmund and Okahandja use block tariffs. However, the water supply and use chain involves at least three parties on different levels (NamWater, Municipalities and then the users) and not all of them practice water conservation.

Co-ordination

ZAMBIA

Recognising that coordination is weak among sectors of Government, the Government adopted the concept of Sector Advisory Group in each sector through which the FNDP was approved, for instance the Water Sector Advisory Group (WSAG) for the Water Sector. The WSAG has organized itself into four strategic inter-sectoral sub-committees. The four strategic focal areas include (i) Water Resources Management, (ii) Water Resources Infrastructure Development, (iii) Water Supply and Sanitation; and (iv) Monitoring, Evaluation and Capacity Building. The Water SAG advises government on sector policy issues and on the performance of sector and on efficient/effective use, transparent management and sub-sectoral coordination of assistance to the sector and provides a forum for Sector Wide Approach (SWAp) to planning, budgeting, delivery and implementation of programmes. It comprises representatives from key institutions and stakeholders which currently include the line ministries, statutory bodies, cooperating partners, academic and research institutions, NGOs and other associations actively involved in the water sector. This approach will ease monitoring of implementation of the programmes, projects and coordination.

LESOTHO

In Lesotho, a new institutional structure for the water sector has been approved by Cabinet, for better management of water resources. However, there are still some challenges within the overall framework that need to be solved, and the institutions and regulatory framework need to be strengthened. The Commissioner of Water is mandated to promote improved coordination of programmes and activities within the water sector, but effective sector wide coordination remains a challenge. A Sector wide approach has been initiated to improve co-ordination in the sector.

Monitoring

MAURITIUS

Most of the boreholes for groundwater exploitation in Mauritius are metered so that abstraction can be measured. This has resulted in proper recording of the groundwater potential and the abstraction, leading to the conclusion that Mauritius is reaching the upper limit of groundwater exploitation within the Young Volcanics (i.e. the Intermediate and Young Lava Flows). This has in turn led to a policy decision to prospect into the Intermediate and Old Volcanics by drilling boreholes to greater depths for better yields, although long-term sustainability of this approach remains to be ascertained.

Stakeholder engagement:

MALAWI

Through collaboration between the MoIWD and the Malawi Water Partnership there has been considerable progress in bringing awareness to the people on sustainable and integrated water resources management in the country. This drive has been achieved through a series of consultations involving Members of Parliament, Chiefs, Chief Executives of companies and parastatals, Principal Secretaries of government ministries and their Directors, Directors and officials of Non-Governmental Organisations and Community-based Organisations, academics and others. The development of a common focus and vision for water during these consultations

has led to the full understanding of the benefits if integration and appreciation of their involvement in developing strategies for water resources management and development.

However, water management is still a male-dominated enterprise in the country. Representation of women in the water sector is too low and decisions on water supply and sanitation technologies, location of water points and operation and maintenance systems are usually made by men. As a result, the government has hired a consultant to ensure gender mainstreaming in the various projects under the National Water Development Programme II; and to build capacity at the district, local service providers and community level to effectively plan, design, construct and sustainably manage water supply and sanitation systems while addressing cross-cutting issues of gender and HIV/AIDS.

ANGOLA

Angola applied for help from the WSSD to achieve the Millennium Development Goals (MDG). Unofficial research conducted by the Global Water Partnership (GWP) in 2006 stated that Angola did not have a water resources management policy and had not met the 205 target for an IWRM/WE plan. As a result, the SADC Water Division in collaboration with the United Nations Environment Programme (UNEP) extended financial support for a roadmap to be developed.

There was official and unofficial contact between the Global Water Partnership – Southern Africa (GWP-SA) and the Ministry of Energy and Water through the Office for the Administration of the Cunene River Hydrological Basin, through which steps towards the development of a roadmap for IWRM in Angola were drawn up. Consequently, in March 2005, the first workshop for the Angolan Water Partnership (PAA) took place. This was followed by a second workshop on IWRM, in April 2007, where a report on the current status of IWRM in Angola was analysed and PAA's by-laws were outlined. The third workshop formalised the PAA's constitution. In December of the same year, the fourth PAA workshop took place, which dealt with the drafting of a roadmap for Integrated Water Resources Management in Angola. At the launch of the PAA, the Minister of Energy and Water, Eng. Botelho de Vasconcelos officially appointed GABHIC and ACADIR as the PAA's host institutions. Their role was to support the PAA's activities.

Through various work groups, the workshop selected several priorities for IWRM implementation in Angola, which were shortlisted to the following six:

- Strengthening the role of the PAA;
- Completion of water resource studies and research;
- Promulgation of the Water Law;
- Training of Staff;
- Creation of a management body
- Rehabilitation of technical resources for the reestablishment and consolidation of hydrometric and hydro-meteorological networks; and
- Updating of databases with reliable information;

Despite the constraints, some research has been conducted and investments made. At governmental level, some strategies and action plans related to integrated water resource management in Angola were outlined. Legal approaches have been created to rationalise the consumption and development of water resources.

Capacity building and awareness creation

ZAMBIA

In the 1980s, due to the poor performance of water management institutions, the Government realised the need to reform the Water Sector and initiated the WRAP, a reform programme of the WRM sub-sector aimed at supporting the National Water Policy (1994) by developing a comprehensive legal and institutional framework for the use, development and management of water resources in a sustainable manner. Following this, as a result of the WWSD target on IWRM/WE plans, in 2004, the Ministry of Energy and Water Development, with facilitation by the Zambian Water Partnership (ZWP), GWP-SA, and the Partnership for African Development (PAWD) started developing an IWRM/WE Plan for Zambia.

The main outputs of the WRAP were the definition of an enabling environment for water resources management, an institutional framework and roles, revision of the existing National Water Policy, the proposal of a new Water Resources Management Bill, and proposals on the development of sustainable instruments for water resources management. To achieve these outcomes, WRAP had to be a participatory process involving country wide stakeholder consultations accompanied by a record number of capacity building sessions, mainly for the WRAP Team. Similarly, PAWD used the multi-stakeholder platform created by ZWP as an avenue for facilitating wide stakeholder participation for the formulation of the national IWRM and Water Efficiency Plan, which were integrated into the Fifth National Development Plan (FNDP) using the Water Sector Advisory Group.

Throughout these processes, in excess of 150 individuals were trained in understanding IWRM and in an awareness of key and cross-cutting issues in Water Resource Management such as HIV/AIDS, gender and environment. In both WRAP and PAWD, training has inculcated a positive change among the Management Team members with an increased commitment to work, goal oriented work approaches, efficiency, improvement on organizational skills, and follow-ups in the execution of tasks. This awareness was extended to decision and policy makers, water users and public about the practical implementation of IWRM, and indeed led to the linkage of IWRM water programmes into the FNDP.

MOZAMBIQUE

With the assistance of German co-operation, the ARA-North catchment authority did a survey on the capacity building needs of its employees, committee and Rovuma Basin parties and developed a capacity building programme that is now being implemented. The objective of the capacity building programme is to contribute to the integrated and sustainable management of the Rovuma Basin water resources through a programme that meets the needs of ARA-North, basin committee members and other parties. The programme covers a range of general and technical topics related to IWRM. The following outcomes are expected as a result of the capacity building programme:

- Skilled ARA-North technical people able to carry out their duties
- Rovuma Basin committee members and stakeholders capable of facilitating information exchange on IWRM with the local communities and users of the Rovuma Basin
- Rovuma Basin stakeholders and users who are aware of and implement good practice in water resource utilisation with attention to sustainability and conservation of the environment.
- Rovuma Basin stakeholders and users capable of negotiating and defending their interests in issues related to IWRM of the Rovuma Basin.

The increased awareness of IWRM awareness is noticeable in ARA-North and among Rovuma Basin committee members. The MCWP has engaged consultants to develop a Capacity Building Plan which should identify capacity building needs of all partner institutions and allow for better planning of capacity building activities.

Decentralised institutions:

SWAZILAND

Swaziland is currently in the process of establishing five River Basin Authorities. This process is being driven by the Department of Water Affairs who are providing the institutional support to interim steering committees, elected by basin stakeholders, to organise themselves into functioning entities. The River Basin Authorities were to be established within five years after the signing of the Act. However, so far only two River Basin Authorities have been established. It was easy to form River Basin Authorities in the Komati and Usutu basins because there were already stakeholder organisations in the basins. In the Komati basin, small-scale irrigated farmers had already created water user associations, and were using water from Maguga dam under the Komati Downstream Development Project. In the Usutu basin, small-scale farmers fall under the LUSIP and are in the process of forming water user associations. The small-scale farmers responded positively when meetings were called to discuss water issues, and to nominate their representatives to the basin authority.

The time frame of five years given to establish River Basin Authorities appeared to be enough, but when different stakeholders are involved in setting up institutions, more time is needed to inform and create stakeholder awareness. Stakeholders' participation is also costly, as there may be need of financial or technical benefits before they can take part in the process, such as for transport costs, meals or personal allowances. The financial requirements for the implementation of IWRM may go beyond government allocations and there is need for creative and sustainable means of raising additional funds.

When forming institutions under the Act there may be capacity imbalances between stakeholders, For example, representatives of small-scale farmers in Swazi Nation Land have a lower educational background than representatives of large-scale commercial companies. This may lead to domination of activities by representatives of large companies who may be experts in IWRM leaving the smaller water user unsatisfied.

MADAGASCAR

In order to deal more effectively with the issue of water rights and to ensure local awareness and participation of stakeholders in the WASH programme, six decentralized catchment management agencies have been established. However, the basin committees need empowerment in order to achieve better management of IWRM processes in their areas. The National Water and Sanitation Authority (ANDEA) with the Ministry of Water share the responsibility for co-ordination. Master Plans must be established for each catchment area and managed through an IWRM approach and in accordance with the National Water Master Plan.

10 APPENDIX D: SUMMARY OF IWRM PROGRESS

The tables below outline the picture of implementation of IWRM at a high level in each country in the region, focused on nine key areas of IWRM. These nine areas cover the key aspects of IWRM as highlighted in the GWP toolbox and the SADC Regional Water Policy. Red ( ) signifies little achieved, orange ( ) signifies limited achievements, and green ( ) signifies substantial achievements. The arrows reveal trends, with ↑ indica ng a posi ve trend towards improvement, ↔ indicating little movement (either improvement or degeneration) from the current status, and ↓ indica ng a downward trend from the current status. The colour coding and arrows are complemented by comments on actual implementation within each country.

The aspects considered under the various headings in Table 3 (Enabling Framework) are as follows:

Policy and legislation: Is the policy and legislation in place and does it reflect the principles of IWRM;

WR Planning: Infrastructure/ supply; catchment development: Does the planning reflect traditional supply side/infrastructure based approaches, or does it reflect catchment based processes and the integration of water and economic planning/

WR Planning: Disaster/ climate change: Does the water resources planning deal with disaster management planning and planning for climate change.

Institutional: Arrangements: Are effective institutional arrangements in place to support IWRM

Institutional: Capacity: Does adequate institutional capacity (finance, human resources etc) exist to implement IWRM

Monitoring and Information: WR Monitoring and information: Is there adequate monitoring of water resources (quality and quantity)

Monitoring and Information: Strategy implementation: Is there effective monitoring and information on the implementation of the IWRM strategy

Monitoring and Information: Impact: Is there effective monitoring of the impact of IWRM implementation

Table 3 : Dashboard of IWRM implementation in twelve countries in southern Africa: Enabling environment

Enabling Framework								
	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Angola	↑ Water Law approved in 2002; regulations not yet promulgated	↑ Planning for infrastructure & water use as well as integrated hydrology	↑ The national disaster management commission was established in 2008; The Ministry of Environment is developing a national policy on climate change	↑ Basin offices due to be established in all basins by 2025	↑ Capacity building is urgent in government institutions, civil society and private sector	↑ Hydrometric network needs rehabilitation		

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Botswana	↑ No Water Policy in place. Water Act of 1968 in place. Draft Water Bill of 2006 still to be presented to Parliament	↑ Predominantly infrastructure and water use planning, but some elements of integrated hydrology and growth and development included.	↑ Disaster Management Office in place, but forecasting tools still lacking, Move to mainstream climate change into development plans being initiated.	↑ Catchment management institutions considered but found to be not practical. Trans-boundary RBO's functioning. Move to separate water resources management from service delivery at an advanced stage. Institutional restructuring ongoing to implement above moves.	←→ Development of capacity to manage the water resources ongoing.	←→ Attempts being made to update WR information Surface water resources better understood than ground water despite ground water being main source of water supply. Water resources accounting project has also provided information for resource monitoring	←→ National Water Master plan review was a major monitoring and review programme. Monitoring also provided for through the government performance measurement systems. Reviews of the national development planning process.	←→ Monitoring and evaluation systems are not adequate and effective and needs to be improved.

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Lesotho	↑ Legislation passed in 1978; currently under review	↑ Planning focused on Growth and Development for South Africa's needs A mix of Integrated hydrology & Growth and Development	↑ Policy and climate change national plan in place	↑ Water Commission responsible for overall strategic direction and co-ordination of the sector	↑ Capacity is available but there is internal and external brain drain	↑ Although water quality is monitored country wide, the water use is not monitored	↑ Though there is no implementation plan, IWRM is being implemented through the water policy	↔ The IWRM strategy plans to monitor the impact

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
		↑	←→	←→	←→	↑	←→	↓
Madagascar	Water act passed in 1998; National Program of Access to Potable Water (PNAEPA) validated in 2005 and set up in June 2008; National Strategy & Policy for Sanitation (PSNA) adopted in November 2008; National strategy mentioned in Madagascar Action Plan (2007-2012) for Water Supply Sanitation & Hygiene (WASH); WASH implemented with good participation of local stakeholders; Some IWRM actions are underway	JIRAMA (National Water and Electricity Utility) responsible for dams. Rural Water Supply and Sanitation Programme, municipalities and NGOs in rural areas generally through boreholes and human operated pumps.	National Committee for natural disaster (cyclones, floods, droughts) and inter ministerial committee for Health and climate change exist, but no clear links with water management	Existing institutions with well defined roles but not good practices: Ministry of water; National Water and Sanitation Authority (ANDEA); National Office for Environment (ONE). National Water and Electricity Utility (JIRAMA); National Center for Water, Sanitation and Rural Engineering (CNEAGR);	Lack of resources and adequate personnel, lack of finance, lack of data base for coordination which is its function; Restructuring; Empowerment needed for management of Human and Technical Resources Center (HTRC) for water, established in 2009;	Data base for water in Ministry of Water recently implemented; Insufficient information for ANDEA and six catchment areas agencies; Human and Technical Resources Center (HTRC) recently created within CNEAGR; lack of monitoring by ANDEA; Lack of metering system for water resources (flows rivers); Monitoring for waste water by ONE (National Office for Environment) but not especially waste water and not with implemented system	Insufficient information for co-ordination and planning; Problem for implementation process; Insufficient monitoring by enterprises; Insufficient monitoring in rural areas	

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Malawi	↑ The current National Water Policy was approved in 2005. The Water Resources Act of 1969 has been revised and awaits approval by Cabinet.	↑ IWRM/WE Plan submitted to government in 2008 but not yet approved. The Plan has been linked to the National Water Development Programme (NWDP), the Sector-wide Approach (SWAp), Malawi Growth and Development Strategy (MGDS), and the Millennium Development Goals (MDGs)	↑ Disaster Management Unit in Office of President tends to be reactionary with no clear national strategy for disaster preparedness and mitigation. National Adaptation Programme of Action (NAPA) addresses climate change. Will need to be advanced as more climate change impacts are felt and understood.	↑ National Water Resources Authority and CMAs will be established in each major river basin as provided for in the Draft Water Resources Act of 2009.	↑ The establishment of these institutions will therefore demand strengthening of the present capacity.	↑ Monitoring and Evaluation is being achieved through joint reviews with non-state actors and Cooperating Partners through the Sector-wide Approach.	↑ The Second National Water Development Programme puts M&E as a separate and key activity as there is current lack of information on the status of M&E across	Impact will only be felt and recognised when M&E is fully in place in the medium to long term after implementation of the IWRM/WE Plan.

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Mauritius	↑ Existing legal framework comprises of 6 Acts, with WRU acting as central clearing-house for their alignment. An umbrella Water Act has been prepared in 2001 – but is still in draft form. The existing legislations do not provide for IWRM. A National Water Policy was drafted in 2007, incorporating IWRM policies, but is yet to be officially proclaimed	Well developed. Renewal of supply infrastructure is practiced. Renewal of faulty domestic meters regularly undertaken. Development of dams curtailed by excessive costs. Need further harnessing of WR. Previous NWMP (1991) will be shortly updated. No river basin management per se is necessary. Inter-catchment mobilization and distribution is carried out, for system optimization. Water quality is recurrent for all river catchments	Rainfall records show decrease in WR because of climate change. Disaster preparedness for cyclones well established. Tsunamis now constitute a threat. Rising sea levels causing erosion of beaches.	↑ Ministry of Renewable Energy and Public Utilities responsible for policy formulation and implementation of WR. 5 main institutions responsible for water resources (WRU), water treatment and supply (CWA), allocation of water for hydro-power (CEB), allocation of water for irrigation (IA), wastewater collection, treatment and re-use (WMA). Linkages between institutions on administrative and management levels only, not for IWRM policy and implementation	↑ Fairly adequate. But veracity requires improvement. Training is implemented but trained personnel are always in demand.	↑ Hydrometry network coverage is ok. Information on surface and groundwater resources available and reliable. Publications through Hydrology Year Books. Municipal use comprehensively metered. Monitoring system must be further improved.	↑ In place and being practised. Monitoring / gauging of surface water is on-going, but needs to be expanded to cover all rivers. Groundwater abstractions are metered. However room for improvement	↔ Monitoring of impacts not operative. Mechanism needs to be developed. However, EMP's mandatory for new undertakings. Tends to be reactive rather than pro-active

Enabling Framework								
	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Mozambique	Legislation passed in 1991; currently under review	Infrastructure & water use as well as integrated hydrology	The National Water Resources Strategy (2007) emphasizes the need to include the disasters management issue when planning WR but not clearly regarding climate change (need to develop specific legislation)	Five ARAs established and some Basin Management Units in place; need to review the current water sector (DNA) arrangement	The existing DNA & ARAs capacity is limited; need to build capacity thorough the Country Water Partnership (PNA)	Hydrometric information available for some basins; need to improve the sharing information system; lack of qualified staff	Five ARA's established and responsible for implementing the strategic recommendations drown on the ENGRH 2007	Improvement on WR management. Need to improve monitoring systems & information dissemination

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Namibia	↑	↑	↑	↑	↑	↑	↑	↔
	Still operating under the Water Act of 1956. Water Supply and Sanitation Policy of 2008 in place & implemented. Water Policy of 2000 in place. Water Resources Management Act of 2004 – not being implemented. Being revised and developing supporting regulations.	Planning for infrastructure for bulk and rural water supply is on-going. Resource protection is being planned for and on-going and things are deteriorating. WDM is being implemented in a few larger towns. Framework for water quality management is in place, but implementation is static. Stakeholder engagement is increasing. Overall, Namibia is initiating integrated hydrology, and awareness raising is the major activity. Planning for growth and development is on-going.	Early warning systems for floods are in place and improving. Embarked on a process to develop disaster management policy through consultation with other sectors. Ongoing research on the impact of climate change. Excellent drought policy and strategy not implemented at all.	At national level, bulk water supplier, Ministry & Local Authorities are operating, while some proposed institutions awaits implementation of the Water Act of 2004. At local level water point associations, water point committees and basin management institutions (three basin committees established; three with activities; 5 not initiated). In addition there is one groundwater management body that is functional & another one being developed.	Limited capacity means institutions do not function effectively. Capacity is not well developed and not well allocated.	Separate bulk water database. In DWAF, there are databases in place for both surface and groundwater. In DWAF, there are databases in place for both surface and groundwater.	Several systems in place for monitoring of implementation of development plans e.g. national population census, National Housing, Income and Expenditure Survey. A monitoring and evaluation framework for the implementation of IWRM Plan will be developed during the formulation of plan.	No monitoring of IWRM impacts on economic, social and environmental benefits.

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
South Africa	↑ Legislation passed in 1998; currently under review	↑ A mix of Integrated hydrology & Growth and Development	↑ Policies and strategies are in place	↑ Well established institutional arrangement.	↓ Severe capacity challenges hinder the successful implementation of water related policies and legislations and poses a threat to the effective functioning of water institutions	↓ Although several monitoring systems are operating, the loss of technical staff threatens hydrometric data collection	↑ The National Water Resources Strategy (2004) is based on the principles of IWRM; Integrated Strategic Perspectives developed for each water management area; licensing, water trading, water pricing, in place.	↑ It is expected that the review of the NWRS will assist in monitoring the impact.

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Swaziland	↔	↑	↑	↔	↔	↑	↔	↔
	Legislation passed in 2003. Supporting regulations are being finalised	IWRM planning began in 2005 but hampered by capacity constraints and participation requirements; consultants appointed in 2008 to develop National Water Resources Master Plan; National Development Strategy (1999) makes recommendations on water policy etc	Disaster management act does exist as well as National Disaster Management Agency under the Deputy Prime Minister's Office	NWA, RBA, ID, WUAs established by Act	Not all institutions are functional due to capacity constraints	Information on water flow and major dam levels is collected and available. But there is problem in dissemination of the data. Mechanisms for collecting water used for agriculture are not fully developed for some river basins.	No formal M&E for policy or development plans	Impact is not known because of lack of information

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Zimbabwe	↑	↔	↓	↑	↓	↓	↓	↓
	Water Policy exist and Legislation passed in 1998; currently under review	Water Resources Management Strategy adopted in 2000. Some progress on implementation of actions. Water planning not integrated into national economic planning.*	National disaster management plan exist and national action plan for climate change exist and a Climate Change office does exist under the Ministry of Environment	Catchment Councils and Sub-Catchment Councils in place in all hydrological catchments and functioning	Zimbabwe suffered a serious technical brain drain and financial constraints	Water resources assessment is carried out, and water resources data is produced annually. There is weekly stake of major dams report produced weekly.	No comprehensive and effective M&E system; sectoral M&E systems exist in water use sectors, but not based on IWRM targets; ZINWA has institutional M&E systems based on institutional goals and priorities.	Impact is not known because of lack of information

Enabling Framework

	Policy & legislation	WR Planning		Institutional		Monitoring and information		
		Infrastructure/ supply; catchment development	Disaster/ climate change	Arrangements	Capacity	WR Monitoring and information	Strategy implementation	Impact
Zambia	↔ 1994 Water Policy, Revised Water Policy 2007 (not adopted) Legislation passed in 1948; New WR Management Bill 2006 not enacted	↑ IWRM/WE planning began in 2002. IWRM planning integrated into national development planning and 5th National Development Plan includes vision for water resources and services. Water is one of 7 priorities of FNDP	↑ Water Disaster Management Unit under Vice President's Office. NAPA strategy development, 2007	↑ Lead agency is Ministry of Energy and Water Development; Water Sector Advisory Group advise on water policy and sector wide planning and budgeting; National Water Authority and Catchment Councils proposed in new legislation	↑	↑ Lack of baseline info against which to measure performance – no funds available to develop such; new Bill requires quantity and quality monitoring; need indicators for climate change	↑ M&E system in place for FNDP but need for improvement in water key indicators; annual monitoring reports made to SAG; objectives and targets for WR developed in Feb 2009; still under discussion by WSAG	

The aspects considered under the various headings in Table 4 (Instruments) are as follows:

Environmental sustainability: Are environmental impact assessments conducted on water resources infrastructure development projects, are environmental water requirements met, and is water quality managed effectively.

Allocation and Efficiency: Water Allocation/ authorization: Are effective allocation and authorization mechanisms in place that support the principles of IWRM

Allocation and Efficiency: Water Use Efficiency: Are water use efficiency (water conservation and demand management) initiatives being implemented

Infrastructure: Development: Is there sufficient infrastructure to meet needs and to ensure availability of supply during droughts

Infrastructure: Operations: Is water infrastructure being effectively operated and maintained

Stakeholder Engagement: Is there effective stakeholder engagement in place

Finance: Pricing (users): Are there clear tariff policies for raw and treated water, and is there effective billing and revenue collection.

Finance: Sustainable/ adequate finance: Is there adequate, sustainable finance available to support the implementation of IWRM.

Table 4: Dashboard of IWRM implementation in twelve countries in southern Africa: Implementation of key instruments

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Angola	↑ No legislation but EWR have been determined for some basins (Okavango, Kunene & Kwanza)	↑ No clear mandate for water authorisation especially for bulk/raw water.	Considerable water use efficiency in urban water supply system but little in the raw water supply system including agriculture and industry	↑ Several irrigation systems are being planned & some dams have been approved & constructed	↑ The existing irrigation system and dams are not operated very efficiently	↑ CWP is bringing together different stakeholders from government, academic & NGOs.	↑ The potable water tariff was established in 1998 although the taxes are low and cannot cover the costs. Water for irrigation and industry is free	

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Botswana	↑ Environmental Impact Assessment Act in place. All developments subject to EIA. Although no policy on EWR, NWMPR recommended consideration of EWR for all developments; current development plans have included EWR.	↑ Allocation done by Water Apportionment Board. Department of Agriculture responsible for water for irrigation. Coordination regarding planning still lacking. Lack of capacity to monitor and enforce compliance allocation conditions	↑ Water Conservation Policy developed but not yet approved. IWRM/WE currently under development. NWMPR provides a framework for IWRM. Still low efficiency for irrigation.	↑ The planning and development is undertaken by various institutions. Potential surface water development sites limited. Potential wellfields still being investigated. Financial constraints limit development	↑ The operation of dams and boreholes is between DWA, WUC, MLG, DEA and MoA	↑ National Water Master plan provides for stakeholder engagement and participation in water resources management .National GWP IWRM process also promotes stakeholder engagement including NGOs and other civil society organisations. Focus is on resource management Water Awareness committees in place in most water	↑ Water pricing is on the basis of full cost recovery for urban consumers and highly subsidized for rural consumers. The current water sector reform exercise gives WUC the mandate for water supply services to most consumers which will change pricing for these.	↑ Financing for water development is available through government resourcing. This has resulted in Botswana achieving one of the highest levels of access to clean water for its population in the region at over 90%. External financing still needed for big infrastructure development.

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Lesotho	↑ EWR determined for LHWP	↑ Centralised and not quantified. Low registration fee to be increased in the new law.	↑ WDM policy in place but not enforced. No efficiency in water allocation	↑ LHWP II (for South Africa) Low land water supply scheme and several dams planned	↑ LHDA is managing the infrastructure for LHWP. WASA is also doing well. However it is poorly operated in rural areas.	↑ Existing stakeholder forum (water sector) that do not reach all stakeholders	↑ Tariffs for potable water are available. There are also royalties for raw water supplied to SA. Internal raw water is not charged	↑ Sustainable funding for infrastructure and O&M.

Instruments

	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Madagascar	↔ Environmental protection of water flows (raw, potable, waste) is not sufficiently established; Environmental impact assessments established for new projects; WASH (Water Apply Sanitation and Hygiene) in process on 17 zones out of 22; Water Quality management well developed by JIRAMA (National Water and Electricity Utility) and Pasteur Institute of Madagascar but insufficient for all the country	↑ Permitting or licensing process included in Water Act; Madagascar has a provision potential in usable water 490,000 millions m3 and equivalent is 25,600 m3 per capita per year so the country is therefore not in situation of water-stress. Allocation and authorisation done by ANDEA (National Water and Sanitation Authority) within each catchment area but not effective	↔ Efficiency 26.7%; Access rate to potable water 37.45% with 63.49% in urban area and 30.09% in rural area	↔ Hampered by lack of funding: infrastructure underdeveloped: need to develop metering stations for data collection, maintain and rehabilitate existing infrastructure; build new infrastructure for storage and distribution to satisfy needs	↔ Management by JIRAMA (National Water and Electricity Utility), NGOs in rural areas, Municipalities, PAEAR (Rural Water Supply and Sanitation Programme)	↑ Decision maker for planning Ministry of Water; Co-ordination and authorization by ANDEA (National Water and Sanitation Authority); Catchment area agency engaged in IWRM implementation in each area but not effectively. This approach is necessary because of the size of the country. Engagement is better at the local level with national coordination	↔ Equalization of tariffs throughout the country; No differentiation according to domestic, industrial or tourism sectors; Higher rates for higher band of consumption for private consumers	↓ Lack of finance for management processes; Lack of finance for infrastructure financing for JIRAMA's needs; Establishment of Master Plan by each catchment area must be financed; Need empowerment for implementation of National fund for water mentioned in the Water Act

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Malawi	↑ Minimum of 8% is allocated to the environment but no effective measurement of whether this is achieved. EIAs are however mandatory for any water-related development programmes and projects.	↑ The Water Resources Board has got a comprehensive database of water rights, discharge permits and water point maps for the entire country. However updating is a problem due to inadequacy in capacity, technical and financial resources.	↑ No Water Demand Management strategy is in place. However, it is done on ad hoc basis by the five water utilities in the regions and major cities.	↑ The government has taken strides in developing a network of dams, irrigation schemes, hydrometric stations, rural water supply schemes which include boreholes and gravity-fed water supply schemes. There is however, exceptional need for huge investment in multipurpose schemes in all the river basins.	↑ The government's approach is to decentralise the operation and maintenance of these schemes which in some cases are currently partially operated by central government.	↑ Collaboration between the Ministry of Irrigation and Water Development and the CWP increased water awareness; included consultations with Members of Parliament, Chiefs, CEOs of Companies, Principal Secretaries, officials of NGOs and CBOs etc.	↑ Pricing of raw water by the Water Resources Board has to be revised in order to reflect the current economic realities. With respect to the fiver water utilities, pricing of water has been based on (a) raising financial resources for partial cost recovery, (b) partial capital investment, (c) water demand management (d) environmental protection.	↑ More resources will be required through bilateral and multilateral arrangements to develop the current infrastructure, capacity and to achieve sustained socio-economic growth, development and environmental sustainability. The government is however tapping into its local resources in investing in water resources development and management.

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Mauritius	↑	↑ WRU monitors bulk water resources. CWA allocates water to domestic, industrial and commercial uses. Irrigation water allocation is responsibility of IA. Hydro-power allocation is responsibility of CEB for single-purpose dams and joint IA/CEB/Planters' Community for dual-purpose dams. Water allocation strategy and implementation is satisfactory. Water abstractions subject to licensing and permits. Water Rights well documented, but enforcement is difficult because of changes in land use. Must be reviewed in the light of changes.	↑ 99% of population served by piped water supply. 94% has access to individual piped supply. Efficiency of distribution systems must be improved. RUFW programmes are implemented but should be consolidated. Hydro-power water not metered and tail-race water re-use must be improved. Irrigation systems fairly efficient	Striving towards multi-purpose dam projects. Renewal of pipelines and metres regular. Development of new boreholes when required.	Adequate. Strategy for O&M well established. Consumer complaint mechanism in place Lag time to attend to consumer complaints being reduced as a process. Hotline available to public	↑ In place, as validated below: (i) Free sewerage household connections offered by Government (ii) CEB has representative of consumer association on its board (iii) IA empowers planters' community through Water Users' Associations (iv) The Department of Environment links with the Police of Environment dealing with the public (v) The CWA interacts with consumer associations, association of hotel owners and operators, and SME's. Gender issues not critical. But there is room for improvement.	←→ Principle of water as social and economic good accepted among users. Formulation and application of pricing structure is undertaken initially by the institutions but require approval by Government. Domestic and wastewater tariffs "graded" to protect low income segment of users Irrigation water is payable through a system of irrigation dues. Hydro-power water is not paid for	←→ Donor initiatives low. Lending Agencies participation medium. Institutions can solicit donor/landing agencies' support for infrastructure development, but only with approval of parent Ministry. Financing of dam projects difficult because of high costs.

Instruments								
	Environmental sustainability	Allocation and efficiency		Infrastructure		Stakeholder engagement	Finance	
		Water allocation/ authorisation	Water use efficiency	Development	Operations		Pricing (users);	Sustainable/ adequate finance
Mozambique	EWR recognised in policy and strategy; unclear to what extent implementation has taken place. Need appropriate methodology to meet local needs. Environmental flows determined for some river basin	Decentralized management, ARAs through the Basins Management Units are responsible for authorising & allocating water	Some data is available for urban & rural water supply system, but little on agricultural water use	Some irrigation system are being constructed & rehabilitated, new dams are also planned	Generally the irrigation systems and some potable drinking water infrastructures are not well operated. Need more training on O&M	Improving since GTA (current PNA) was established to developed ENGRH 2007; ARAs planning exercise relies on stakeholders' consultation. The PNA is developing the capacity building plan/needs	Legal instruments approved and in place and specific institutions already created (CRA & ARAs). Need to revise the figures and the mechanisms to enforce payment by users (raw water)	Lack of comprehensive and transparent payback system, especially for raw water.

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Namibia	↑ Environmental Assessment Policy of 1996 in place. Voluntary EIAs for some developments are undertaken. Environmental Management Act of 2007 - not being implemented. Developing supporting regulations. EWR determined for certain rivers.	↑ Water allocation is authorised by DWAF through a permit system. Department of agriculture must be consulted on water allocation for irrigation. Where groundwater management bodies exist they are consulted on all permits.	↑ Several Local Authorities have put in place highly innovative water conservation and demand management interventions over a period of years. Developing a water demand management policy.	↑ Infrastructure for bulk and rural water supply is well advanced. Namibia has a total of 10 major dams. Since before 1990 no new dams have been developed even though some studies on potential dam sites have been done. To date 150 000 boreholes drilled and only 40 000 are in use. Desalination plants being constructed.	↓ There are no official policies/guidelines for operating dams, but there are internal flood management procedures which include releases, allocation and safety issues. Capacity to maintain major water purification schemes is limited. Poorly maintained infrastructure that leads massive losses, outsourcing not practiced.	↑ Limited stakeholder engagement, but extensive participation and awareness. NWP creates a platform where professionals in the water sector share information. At regional level and basin level awareness creation is done through basin management initiatives. Limited political will.	↑ No water pricing and tariff policy in place. No subsidisation and cross subsidisation policy for rural water and informal settlements in towns. Water Supply and Sanitation Policy promotes cost recovery, but implementation poor.	↑ Management capacity inadequate for implementation of IWRM initiatives. Limited funds.

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South Africa	↑ EWR determined for 40% of rivers but implementation is weak.	↑ The NWRS establishes priorities for water use and defines the proportions of total water available in each of the water management areas that fall under the direct control of DWAF.	↑ While national strategies have been developed for the various water use sectors, implementation has been poor. However WC/WDM has been declared a national priority.	↑ Although South Africa has good water resource infrastructure, it often by-passes the poor and dispersed rural population. Nevertheless, a number of infrastructures are being constructed to address the backlog.	↓ The human capacity challenge critically affects the operation of infrastructures.	←→ Stakeholder participation required under legislation for National Water Resources Strategy, establishment of CMAs, etc. Widely implemented. Guidelines developed. Particular focus on reaching marginalized communities. Some stakeholder consultation fatigue seen.	↑ Pricing strategies of raw water and potable water are in place	↑ Sustainable funding for infrastructure and O&M.

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Swaziland	←→ EWR to be quantified through studies currently conducted in some basins	←→ The institutions and instruments are existing, but there is capacity constraints	←→ WC/WDM implemented by Royal Swaziland Sugar Corp and Swaziland Beverages; renewal of water permits is moving from flow-rate to volumetric allocation based on crop water requirement	↑ Irrigation infrastructure development is taking high priority as large dams, reservoir, canals have been developed to support small scale and large scale farmers as well as for domestic water supply	↓ There is problem in operation of irrigation infrastructure, especial on Swazi Nation Land. There are problems with siltation.	↑ The NWA, the RBA and ID have representatives from all water sectors and in that respect stakeholders are engaged in implementation of IWRM plan. However some of the institutions have not been fully established	↑ For domestic water pricing system is reviewed annually. Levies are paid to private suppliers of water for irrigation. NWA to approve levy for bulk water.	←→ Large bulk water supply infrastructure is run by government. Financing is adequate for operation of large scale water projects, but not adequate for projects in Swazi Nation Land

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Zimbabwe	↓	↓	↓	↔	↓	↑	↔	↓
	EWR is there in policy but not well translated into implementation and generally receive low priority	Systems does exist for water allocation and authorisation but the current political climate has eroded the effectiveness of these instruments	Water management in agricultural sector is supply oriented. A few WDM initiatives implemented by individuals or Department of Water e.g. technical measures, water pricing, based on blend pricing and legislative measures but usually uncoordinated.	A number of dams have been developed and exist. Challenges are being faced in completing planed dam and irrigation infrastructure	Challenges on dam safety, underutilised dams, operations and maintenance issues. Siltation and pollution problems.	Stakeholder engagement is principle of Water Act. Stakeholder driven institutions exist at the national, catchment, sub catchment and lower tier levels. However effective participation is limited due to financial constraints.	The blend price formula exist and is cover capital and operational costs and is determined by ZINWA and it has to be approved by the Minister. Each municipality has its own pricing mechanism for treated water	The country is facing financial challenges due to the economic hardships experienced in recent years

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Zambia	↑ EWR not yet achieved. However, EIAs are undertaken on all large water projects	↑ During catchment hearings, demands are reviewed w.r.t other users and available water. Metering, leak detection and tariffs in place for domestic and industrial users.	↑ WDM implemented by Commercial Utilities on Copperbelt, Lusaka and Southern provinces mainly through metering; Mpongwe Wheat Scheme, Nakambala Sugar, Kaleya small-holders irrigation scheme practice WDM	↑	↑	↑ Both FNDP, WRAP, and IWRM/WE process used strong stakeholder participation	↑	↑

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*** others to be filled in when information arrives