

**USAID-REGIONAL CENTER FOR SOUTHERN
AFRICA
2004-2010 STRATEGIC PLAN**

**TECHNICAL ANALYSIS FOR PROPOSED WATER
RESOURCE MANAGEMENT STRATEGIC OPTION**

By

**NATHAN
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DRAFT REPORT

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Executive Summary

The Regional Center for Southern Africa (RCSA) is in the process of developing a Strategic Plan for FY 2004 – FY 2010 and the purpose of this document is to provide inputs towards the development of the Water Resources Management Component of the Strategic Plan.

The technical analysis provides a background on the water situation in the region with respect to water importance and supply. The critical factors considered were water scarcity and access resulting from natural phenomena and land use activities. A reflection of how critical the region is in relation to these factors is supported by indicators.

Importance of water to the region

In terms of importance of water supply and water resources it is recognized that the region is heavily dependent of water since it is agro-based and yet the subcontinent is largely water scarce due to climatic variability. Pollution and water demand are also increasing as a result of the general growth in population and the related socio-economic development.

Not only are there water shortages, but access to water also poses a daunting challenge in the region. As a result, poor livelihoods are seldom concerned about protecting the natural environments except as sources of food and other essentials leading to water resource degradation. There is, therefore, a clear link between water resources management and community livelihoods. Unless poverty and overpopulation can be part of the integrated water resources management, any attempts to achieve sustainable water resources management is doomed to fail. Hence water supply strategies that integrate natural resources management with improved lifestyles of rural communities are desirable.

Due to the disparity in water resources availability between river basins, the region has started to depend on inter-basin transfers of water and disagreements on how to utilize water resources in certain river basins are being witnessed among some riparian states.

Other initiatives

Prior to considering some focus areas where the USAID/RCSA water strategy can target, the analysis reviewed the projects being supported by other development agencies, those that SADC is developing and the other emerging frameworks and their objectives to which the RCSA strategy could subscribe.

Considering projects identified by SADC and USAID/RCSA initiatives and those supported by other donors areas that are not being given enough attention are:

- Water quality standards and monitoring;
- Increased reclamation and reuse of waste water;
- Groundwater assessment, monitoring and management programs ;
- Economic pricing of water. Tariffs that reflect true cost of supply and environmental cost are not yet reflected; and
- Water demand assessment, monitoring and forecasting.

Other regional and global initiatives that could influence the strategy are NEPAD and WSSD and the Water and Poverty Initiative whose objectives closely link up with aspects of water resources management and rights to water.

Domains of Strategic Options

Potential water resources management strategic options were analysed in relation to alleviating water scarcity, improving community livelihoods and cross cutting issues related to water resources management.

Strategic options to alleviate water scarcity and access were analysed in the context of integrating surface and groundwater supply options, integrated river basin and natural resource management, and water demand management.

Groundwater stocks are not well known but are important in rural water supply. Groundwater water resources can be part of water supply options for both large scale and community use particularly as part of drought impact mitigation. There is limited data on the status of groundwater resources in almost all of the countries in Southern Africa. A project to address groundwater management in the region has been prepared by the SADC Water Sector Co-ordination Unit (WSCU) and will be funded by the Global Environment Facility (GEF) and further support will be required in various forms e.g. compilation of groundwater resources map in basins and establishment of a regional groundwater information system.

In selecting a **river basin** in the region where the USAID/RCSA activities could be concentrated, a number of basins were considered including the Congo, Zambezi, Limpopo, Orange and the Okavango and a criteria developed for selection. The Okavango and Limpopo were selected as the candidates for river basin support by USAID/RCSA. The advantages of the Okavango basin are that the Okavango Delta is irreplaceable because of its uniqueness and must be preserved. The basin offers immense return for ecosystem management, conservation of resources and community management of natural resources. A basin commission is already formed and functioning, an integrated basin management plan is in place and this is a sensitive basin where conflict aversion needs to be addressed soon.

The Limpopo Basin has most of the variety needed to demonstrate effective river basin management and analysis can be integrated. The basin also provides lessons across the region from arid west to wet east and there is a great opportunity to study flood and drought management impacts and solutions in the same basin.

While both basins offer tremendous opportunities for demonstrating water resources management needed in the region, the final choice between the two basins may however be made on policy considerations which tend to weigh in favour of the Okavango basin.

Water demand management is critical given that the amounts of rain and run-off are not increasing and that the human population continues to increase being inevitable that demand will eventually outstrip supply. Basing on regional population growth, it is estimated that the water demand will nearly double by 2020. This therefore requires the region to shift from a supply-oriented approach to a demand management approach. Water Demand management techniques employed by some regional countries and other best practices should be fully exploited to avoid or postpone investments in water supply and development.

Not all countries have reliable estimates for water demand to support natural ecosystems because there are currently no reliable tools to accurately estimate how much water is required to maintain forests, grasslands, wetlands and all the other ecosystems, so this is an area that requires further work.

With respect to economic activities that affect water quality due to urbanisation e.g. industrial effluents and sewerage return flows, what is lacking are regional effluent discharge standards and established cost-effective technical experiences that can be shared for replication. For instance recycling of such effluents could avail water resources for re-use.

Those options for **improving community livelihoods** were integrated with natural resource/biodiversity management and ecotourism as a way of increasing incomes for communities and hence improving livelihoods. A holistic approach is the ecosystem-based approach that provides for a regulated the use of ecosystems for community benefit while preserving the ecosystems' functions.

A meaningful strategy would be one that has a direct and significant impact on the livelihoods of rural people. In this case a good example of a successful pro-poor strategy presented for community based tourism approach e.g. the NACOBTA (Namibia Community Based Tourism Association) can be considered for replication.

Strategic options should take cognizance of HIV/AIDS, women and other vulnerable groups to ensure complete improvement of community livelihoods.

The **cross-cutting interventions** that are considered are water governing structures, policies and laws, information, planning and investments.

It is also important that the RCSA water resource management component should be aligned with the results areas proposed by SADC WSCU and the activities initiated under the SADC protocol... These SADC structures are the bases for regional water resources management agreements and harmony at regional, basin and government levels. Other platforms e.g. at project level can offer opportunities for sharing experiences and information on best practices of water resources management.

Proposed RCSA Strategy Framework

A criteria was developed for the strategy formulation and a number of result areas for alleviating water scarcity/access and cross-cutting issues are provided below.

The **interventions or strategic options** that have been selected as a result of the technical analysis are grouped as follows:

- **Policy development and dialogue** for water quality management; biodiversity management; water use efficiency; community based management; public-private sector partnerships; and integrating regional and international agreements /protocols/ conventions in national policies and laws.
- **Building and strengthening institutions** for proper water governance at SADC, basin and national level; commissions for basin and natural resources management; creation of information systems, conflict resolution and water financing
- **Information sharing** on best practices for financing and investment in water resources management (WRM); long term biodiversity conservation; basin/catchment management, water demand management; and water data base systems on surface and groundwater resources.
- **Research** on adaptation to withstand impacts of climate change/variability; flood and drought impacts management and mitigation; rain/flood water capture, water supply-demand modelling and planning for all end uses including the environment, community knowledge to improve livelihoods through natural resource management and valuation of wetlands goods and services.
- **Resource allocation** for SADC water strategy, particularly groundwater programs, and centres of excellence on ecosystem approach.

- **Community training and empowerments** for basin/natural resource management, enhancing coping strategies and incomes in water scarce situations for communities, HIV/AIDS circumstances and women; involvement of rural communities in water planning and management; and access to information for improving livelihoods.

The **recommendation** is that USAID/RCSA, selects an appropriate basin where a number of the proposed result areas can be achieved preferably through integrated interventions, thus putting resources to efficient use. Lessons learnt can then be disseminated and replicated in other basins. An example is where basin management institutions, policies, plans, community livelihoods, water supply-demand and ecosystem approach issues can all be addressed in one basin.

Some selected critical interventions that can have the most significant impacts at regional level (e.g. policy related) could also be supported. Such initiatives could take advantage of SADC structures to avoid excessive resource requirements that such regional initiatives would normally require to implement.

Abbreviations and Acronyms

AWIRU	African Water Issues Research Unit
AMCOW	African Ministers Conference on Water
CBD	Convention on BioDiversity
CBNRM	Community Based Natural Resources Management
CBT	Community Based Tourism
CBTE	Community based Tourism Enterprise
CDD	Convention on Desertification
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
COMESA	Common Market for Eastern and Southern Africa
DANIDA	Danish International Development Agency
DFID	Department of Foreign International Development
DRC	Democratic Republic of Congo
EU	European Union
FENATA	Federation of Namibian Tourism Associations
GEF	Global Environmental Facility
GTZ	German Technical Assistance
GWP	Global Water Partnership
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HYCOS	Hydrological Cycles Observation System
ICT	Information and Communications Technology
IUCN-ROSA	International Union of Natural Resources Conservation-Regional Office for Southern Africa
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
LRB	Limpopo River Basin
MCM	Million Cubic Metres
MET	Ministry of Environment and Tourism
NACOBTA	Namibian Community based Tourism Associations
NEPAD	New Partnership for African Development
NGO	Non-Governmental Organisation
NORAD	Norwegian Agency for Development Cooperation
OKACOM	Okavango Commission
OAU	Organisation of African Unity
RSA	Republic of South Africa
RCSA	Regional Center for Southern Africa
SACU	Southern African Customs Union
SADC	Southern African Development Community
SARDC	Southern African Research and Documentation Centre
SIDA	Swedish International Development Agency

UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's (Emergency) Fund
UNFCCC	United Nations Framework Convention on Climate Change
USAID/RCSA	United States Aid for International Development Regional Centre for Southern Africa
WHO	World Health Organisation
WMO	World Meteorological Organisation
WSCU	Water Sector Co-ordinating Unit
WSSD	World Summit on Sustainable Development
WTO	World Trade Organisation
ZAMCOM	ZAMCOM Zambezi River Basin Commission
ZINWA	Zimbabwe National Water Authority

1 Purpose and Framework of Analysis

1.1 Purpose

The United States Agency for International Development- Regional Centre for Southern Africa (USAID/RCSA) is developing its Strategic Plan for the period 2004 to 2010. The overriding strategic goal is to promote equitable sustainable growth in a democratic Southern Africa. Among the challenges USAID/RCSA has identified (Box 1.1.1) is water scarcity as a result of increased competition for water to support communities, agriculture, industry and ecosystems; and access to safe water supplies to the growing urban and rural areas.

Box 1.1.1 Strategic Areas for the USAID/RCSA Plan 2004-2010³.

- *Southern African Competitiveness in Global markets*
- *A more Integrated Regional Market*
- *Improved Democratic Governance and anti-corruption*
- *Enhance Regional Food Security and Rural Livelihood*
- *Water Resources Management*
- *Reduced Regional Impact of HIV/AIDS through Multi-Sector Response*

With cross cutting issues of gender, conflict vulnerability and public- private sector partnerships.

As a strategic alignment, USAID/RCSA is pursuing programs in which it has comparative advantage and which are highly integrated, easily managed and can deliver results that regional stakeholders and partners fully support. It would be best that USAID/RCSA, as a regional center, supports programs that would benefit the whole region or part of it, as national issues can be addressed by the bilateral missions.

On the water strategy, the overriding planned result is increased regional cooperation in water resources management with special focus on freshwater resources that are fundamental to regional development and sustenance of life and that are found in lakes, rivers and underground aquifers that are trans-boundary.

The USAID/RCSA has tasked Nathan Associates to make a technical analysis that could contribute to the Water Resources Management strategic plan. The objective of the task was to conduct a review, synthesis, and analysis of literature related to water resource

³ RCSA Concept paper and Strategic Planning Parameters Cable Feb 2003.

management issues in Southern Africa in order to inform the further development of the RCSA strategic plan.

According to the USAID/RCSA Concept paper, the RCSA Working Group on Water identified the following as their focus areas:

1. Integrated River Basin Management as a basis for sustainable natural resources management
2. Improved Rural Livelihoods through natural resource management benefits
3. Urbanization as a water demand and quality driver, and
4. Ecosystem Monitoring and analysis capability

This technical analysis of the water resources management has thus been conducted taking cognisance of these focus areas.

1.2 Framework of Analysis

1.2.1 *Conceptual Framework*

Fig 1.1.1 summarises the conceptual framework adopted in analysing a plausible strategic framework for water resources management in the Southern Africa region. Based on the critical issues already identified of water scarcity and access to water, visa vis the cross-cutting issues that affect water resources management, the USAID/RCSA involvement can be targeted at causes that can be reduced/eliminated or whose impacts can be mitigated by implementing possible solutions and employing tools.

The solutions include sustainable socio-economic development practices and monitoring systems that are supported by effective institutions, policies, laws, information, planning and financing.

The foreseeable interventions/tools include:-

- Institutional strengthening or creation for effective management of the water resources.
- Policy development and dialogue leading to implementable agreements including those on standards, pricing of water, public benefits from natural resource goods and services, gender and vulnerable sensitive.
- Sharing of critical information for decision making and adoption of best practices using available Information and Communication Technologies (ICTs),
- Empowering communities, who are the resident managers of the trans-boundary ecosystems, to manage and benefit from natural resources including water.
- Involvement of private sector in investments that can benefit water development and improvement of livelihoods;

1.2.2 Organisation of paper

The technical analysis that follows presents a background that can assist in verifying the assumptions that the RCSA has already made with respect to the water strategy focus areas. The importance of water in the region is presented visa vie the supply situation and the commonly understood critical water issues. Issues being addressed by other developing agencies or regional/global programs/initiatives have been indicated to show areas that are already supported and those that are not receiving enough attention. Aspects of water scarcity and access are analysed and discussed in the context of the known indicators in the region against which the USAID/RCSA's programs can be evaluated.

Issues of water scarcity are analysed in relation to links with water supply through surface and groundwater resources and river basin management. Considering water scarcity as a result of growing demand and poor environmental management practices, the potential for addressing water demand and quality management are explored with the view of developing programs in this area.

With respect to improved livelihoods, the analysis tackles traditional and current coping methods and reviews some experiences and best practices that can be adopted to improve community performance in managing water resources and improving their livelihood including addressing gender issues and the added impact of HIV/AIDS. This is linked to the required responsible action of the communities to ecosystem management for their benefit.

The report further analyses the current regional water resources management institutions and their state of capacity and performance. Linked to this are requirements for effective water institutions, planning, policies, laws, capacity, technology and financing that would improve performance of the institutions.

Building from the above regional review of the water resources management situation, a USAID/RCSA strategic framework is proposed and recommendations are made on how it can be merged with other regional and global initiatives.

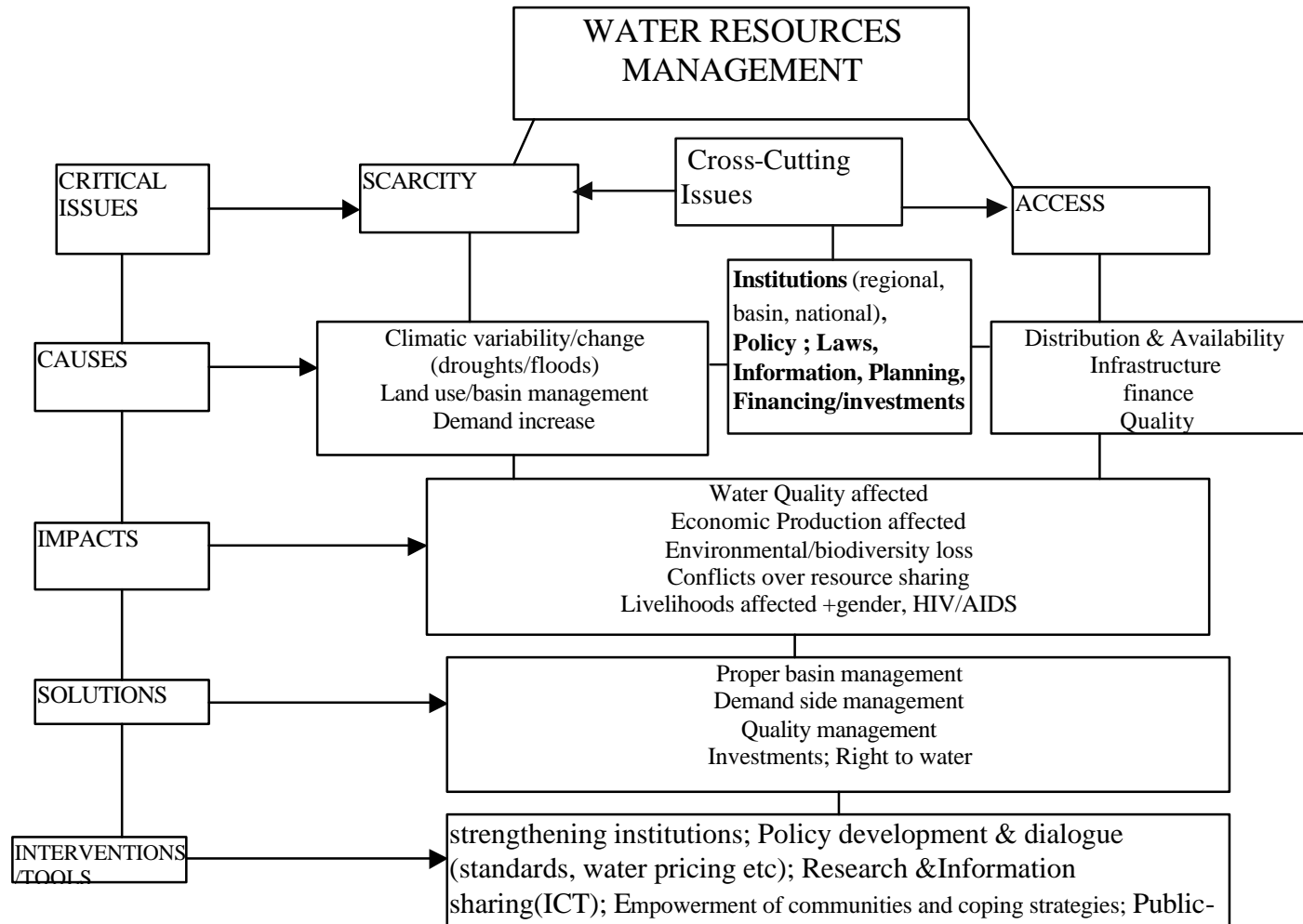


Fig 1.1.1 Conceptual Framework for Development of Strategic Framework for Water Resources Management

2 Background

2.1 Importance of water and supply situation in the region

2.1.1 Importance of Water

Effective development and management of water resources is recognised as essential for both sustainable growth and poverty reduction and averting possible conflicts in Southern Africa

The sustainable development in the region begins with water as it flows through the veins of all regional socio-economic activities (Manzungu, 2002). The regional economy is largely agricultural based in a climate that is predominantly semi arid to arid; hence water plays an important part in ensuring food production and production of cash crops. There is a diversity of other consumptive and non-consumptive uses namely; generation of hydroelectric power, navigation, fishing, tourism, drinking water supplies and industry (including mining which also forms the mainstay of some countries such as Botswana). In addition, water supports wild life and sites of tourist attraction that have become important for foreign currency earning. It is evident that all the water uses are necessary for gross economic development and supporting livelihoods.

The varied water uses are however met from basins that are shared and the competing users and competing uses are a recipe for conflicts. Box 2.1.1 presents some conflicts that have been reported across the region involving some basins.

Box 2.1.1 Examples of cases of potential conflicts involving sharing of water and natural resources

In recent years Zimbabwe and Zambia have been wrangling over construction of Batoka Gorge Dam on Zambezi for hydroelectricity generation.

In east Caprivi region of Namibia, a conflict is escalating between tourism facility operators and fishing communities as more and more land on the river is leased for tourism denying communities fishing grounds.

The Chobe is an area of conflict between Botswana and Namibia over usage of area. In Botswana the area is for tourism while in Namibia, the area is for agriculture.

There is also conflict between wild life and livestock grazing. Namibia and Botswana have had continued disagreements in terms of use of Okavango water, Namibia wanting to abstract water for use in Windhoek while Botswana would like to conserve the water for ecosystem sustenance. The two countries have taken each other to the Hague over Sedudu Island that both countries claimed to be within their borders...

There are many more conflicts that are looming or may occur across the region over water resources management (Matiza-Chiuta, 2000).

It thus goes without saying that in the absence of sustainable water resources management it will be difficult to achieve any socio-economic development in the region. Such management is also important to avoid conflicts in the region and support the overriding strategic goal of equitable sustainable growth in a democratic Southern Africa

2.1.2 Water Supply Situation

Water in the region is derived from natural aquatic ecosystems in form of rivers (e.g. the Zambezi, Congo, Limpopo, the Orange and Cunene), lakes (e.g. Lake Malawi, L. Bangweulu), and wetlands (Okavango delta, Kafue Flood plain). Rivers are the dominant form of aquatic freshwater ecosystems throughout the region, although only a few large ones are perennial. Lakes are sites of abundant and unique biodiversity but suffer from evaporation. Wetlands are particularly crucial for local human populations in that they provide natural resources such as fish, grazing, reeds, medicines and wood products (Day, 1998) and may thus be suited for integration with improvement of rural livelihoods.

Constructed aquatic ecosystems are mainly the dams, among the large ones being Kariba and Cabora Bassa both on the Zambezi River; and the Gariiep and Vanderkloof on the Orange River. There are also abundant smaller dams built to support various urban, mining and farming activities littered in the region. Dams, while a source of water supply, are known to alter the regional hydrology. On a positive note they increase biodiversity of aquatic organisms even in dry lands and are recognised as flood control structures, and the latter has become important as floods occurrence has become prevalent.

Both natural and constructed ecosystems fall within basins that are trans-boundary and shared by two or more states. There are 15 river basins in the region of varying sizes and mean annual run-off that support water requirements (and other goods and services) of the 13 SADC states as presented in Table 2.1.2.

Table 2.1.2 Water Resources Distribution by Major River Basins in the Southern Africa Region

River Basin	Basin Area (Km²)	River Length (Km)	Mean Annual runoff (Mm³/a) at River Mouth	Number of States	Basin States
Buzi	31000	250	2500	2	Zimbabwe, Mozambique
Cunene	106500	1050	5500	2	Angola, Namibia
Cuvelai	100000	430	Ephemeral	2	Angola, Namibia
Incomati	50000	480	3500	3	South Africa, Swaziland, Mozambique
Limpopo	415000	1750	5500	4	Botswana, South Africa, Zimbabwe, Mozambique
Maputo	32000	380	2500	3	South Africa, Swaziland, Mozambique
Nile	2800000	6700	86000	10	Tanzania, Burundi, Rwanda, Kenya, Uganda, Democratic Republic of Congo, Eritrea, Ethiopia, Sudan, Egypt
Okavango	570000	1100	11000	4	Angola, Namibia, Zimbabwe, Botswana
Orange	850000	2300	11500	4	Lesotho, South Africa, Botswana, Namibia
Pungue	32500	300	3000	2	Zimbabwe, Mozambique
Ruvuma	155500	800	15000	3	Tanzania, Malawi, Mozambique
Save	92 500	740	7 000	2	Zimbabwe, Mozambique
Umbeluzi	5 500	200	600	2	Swaziland, Mozambique
Congo	3 800 000	4 700	1 260 000	9	Burundi, Rwanda, Central African Republic, Tanzania, Cameroon, Congo, Democratic Republic of Congo, Zambia, Angola
Zambezi	1 400 000	2 650	94 000	8	Angola, Namibia, Botswana, Zimbabwe, Zambia, Malawi, Tanzania, Mozambique

Source: Adapted from Pallet, J. (Ed.), Sharing Water in Southern Africa, 1997

By size and run-off, the Congo is the largest basin in southern Africa supporting 9 riparian states followed by the Nile, the Zambezi, the Orange, the Okavango and the Limpopo river basins which support 4 or more riparian states. The rest of the basins are of smaller size and support 3 or less states. It is evident that most of the run-off is concentrated in the northern countries of the region where water demand is still low due to slow economic development that has largely been affected by civil strife. The south is characterised by smaller basins of lower run-off and countries with higher economic development, thus water resources distribution mismatch location of demand.

Due to disparity in water resources availability, the region has started to depend on inter-basin transfers of water. Some countries e.g. South Africa and Botswana, have already constructed national inter-basin transfer infrastructure, and the South Africa-Lesotho project is an example of functioning transboundary water transfer in the region (Zhou, 2000; Matlosa, 2000). Other projects that have been considered were transfer of water from the Okavango River to supply Windhoek and from the Zambezi River to supply Western Zimbabwe and then South Africa. These have not gone ahead due to disagreements among riparian states.

It is then apparent that without well-planned regional cooperation of water resources management and sharing, there could be conflicts over inter-basin transfers or over inequitable sharing of water resources in basins shared by more than one nation.

Apart from competing for water resources at a regional level, there are potential conflicts between competing uses in irrigation, hydropower, industrial, municipal and environmental uses that will also need to be resolved at both national and regional level.

It is known that the arid countries of South Africa, Namibia and Botswana could be facing chronic water shortages in the near future. Projected demand in South Africa will exceed supply in 2020. Swaziland, Malawi and Zimbabwe will have a similar supply-demand gap in 2030. Water resources availability in Angola, Tanzania and Zambia is however likely to exceed projected demand (EPI, 1999). Meeting future water demand will thus mostly depend on redistribution of resources in most countries in the region.

2.2 Critical issues of water resource management

Water scarcity and **access of water** pose daunting challenges. Water scarcity in the region is growing accompanied by declining water quality, mounting environmental and social concerns and a climate that has become more variable.

2.2.1 Water scarcity

The critical factors affecting **water scarcity** in the region are climatic variability, impacts of land use on freshwater ecosystems, and excessive use of and growing demand for water.

2.2.1.1 Climatic causes

The subcontinent is a land of contrast, from tropical north to temperate south, from wet east to hyper-arid west. The greater part of the region is semi arid to arid and the majority of countries except Angola, DRC and Zambia experience fresh water scarcity (Mutebwa, 1998).

The region experiences the impact of climatic variability on water resources that has resulted in unpredictable but frequent droughts interspersed by floods. Both drought and floods affect water availability exacerbating poverty and other hardships among regional communities.

Drought conditions result in serious hydrological imbalance, causing crop loss, a shortage of water for people, livestock and wildlife, famine and disease. Drought has had severe impacts on a wide range of environmental and economic activities in the region. For instance, the droughts of 1991-92 and 1994-95 reduced economic production and impaired the quality of life for most people and wildlife. Enhancing the ability of communities to deal with drought from the point of food security and secure livelihoods is a challenge that needs to be understood and promoted.

The region has become more prone to severe flooding which has presented immense suffering on communities who are not prepared or equipped to deal with the type of disaster. Regional countries also lack adaptation frameworks to deal with disasters. From a water perspective, floods cause water pollution and destroy water supply infrastructure. Although floods are accompanied by an overwhelming water flow, there are no means and capacity in the region to capture much of the flow. **A strategic implication is how to promote rain-water harvesting and storage of part of the flood water in order to benefit households and communities and even at a larger scale to support agriculture and industries through the utilisation of large earth dams.** Experiences elsewhere have demonstrated that it is possible to use disused mines to store flood waters. It is estimated that only 10% of the 227 x 10⁹ m³ of storm run-off in the SADC region reach the rivers⁴ and the rest is lost before it can be captured (Onyekakeyah see website below).

⁴ (Onyekakeyah: www.idrc.ca/books/focus/804/chap10.html)

2.2.1.2 Land Use Activities

The most associated issues in relation to land use activities are land degradation that in turn result in soil erosion that alter watercourses and silt water reservoirs resulting in low water holding capacity of these reservoirs. For example, up to 2000t/km² of soil have been annually eroded in Lesotho and deposited in flood plains of major streams /rivers and dams. Watershed erosion is often a result of trees being felled for building materials, opening land for agriculture, for fuelwood harvesting, for carving and grazing livestock, which are all linked to the socio-economic activities of the rural population. Just to show the extent of such impacts, it is estimated that 70% of riparian forest may have been removed from the Namibian section of the floodplain of the Okavango River for similar reasons.

Added to soil siltation, is the problem of water pollution as a result of agricultural chemicals and mining operations as the region depends mostly on these two primary industries. Due to the dry nature of and high evapo-transpiration rates in the region, large water resources are required to irrigate and sustain crop growth. In Zimbabwe and South Africa where irrigation agriculture is practised on a large scale, 90% of the dammed water has been used for irrigation (Onyekakeyah- see website). Although much talked about, the adoption of comparative advantage in growing of food and other crops in the region for trading among countries has not been taken up; hence water resources are sometimes spent irrigating lands that are not the most suited to the crops being grown. Formation of waterweeds is also attributed to the pollution of water bodies from agricultural activities.

Industrial pollution is an issue of concern, although it tends to be localised close to areas of mining and industries.

Impacts of land use activities require integrated solutions by all stakeholders particularly communities whose livelihoods are directly dependent on them, hence the need for integrated water resources management (IWRM). IWRM has been defined as an integrated development of water, land and related resources to maximise socio-economic benefits in an equitable manner without compromising the sustainability of ecosystems. (GWP, 2000; Manzungu, 2002).

In addition, the Dublin Principles, to which most countries subscribe, reaffirm that water resources should be managed holistically and sustainably respecting subsidiarity and ensuring participation of all concerned and treating the resource as an economic good.

Whilst the concept of IWRM and Dublin principles are widely accepted in the region, they are understood differently by stakeholders and decision makers, and not much has yet been realised to date. Today the region still has shortfalls in the following aspects:

- Insufficient progress in integrating environmental and sectoral policies;

- Basic water quality standards are not yet met;
- Prices rarely reflect full economic and environmental costs;
- Most work in improving water use efficiency remains to be done;
- Demand management policies are still little developed; and
- Agricultural water use is still heavily subsidised.

This implies that comprehensive water resources management is inherently difficult and requires protracted strategies to make a difference.

A USAID/RCSA strategic framework option to support the implementation of IWRM in the region and this can be implemented at a basin-wide level or as dissemination of best practices that are being achieved in the region and elsewhere e.g. catchment and sub-catchment experiences that have been gained in Zimbabwe (Manzungu, 2002)

2.2.2 Growing Water Demand

The general growth in population (of people and animals) and related socio-economic development means continued growth in water demand, and future planning to meet that demand is required. **What is clearly lacking are reliable data on water resources stocks and water demand by sectors and region for reliable planning.** Most regional countries have no capacity or financial resources to gather data and published water demand figures are either old or are not reported for some countries. Often, crude estimates are made from growth rates of population. The unequal distribution of water resources and varied water demand growth rates make dependable planning imperative. In the estimation made by Zhou (2002), water demand will outstrip supply in 2020 by 93% in a region without even considering that water availability continues to decline due to droughts.

An added dimension to water demand is the realisation that ecosystems should be sustained at natural water flow level regardless of whether rivers are dammed or not in order to conserve them. This is becoming a requirement in the new Water Acts being developed and that is an added demand to the usual demand forecasts that used to omit this use.

A Strategic USAIS/RCSA option linked to this is the development of reliable water stocks and demand data for planning purposes and to inform policy decisions.

2.2.3 Water Access

With respect to **access to water**, provision of water presupposes that sufficient water as well as financial and other resources are available to develop the necessary infrastructure. Water infrastructure in the region is largely planned to supply a small population that lives in urban areas and the established industrial and agricultural complexes. The rural population is not as well catered for in the water planning and implementation, hence the relegated livelihoods in rural areas and it is women, whose lives are taken up in walking to water points carrying the water containers on their heads; who bear the brunt of poor water supply in rural areas.

As a result of poor livelihoods, poor people are seldom concerned about protecting the natural environments except as sources of food and other essentials. This state of affairs leads to water pollution, land erosion and rapid degradation of natural resources including water. **Unless poverty and overpopulation can be part of the integrated water resources management, any attempts to achieve sustainable water resources management is doomed to fail. Hence water supply strategies that integrate natural resources management with improved lifestyles of rural communities particularly women are desirable.**

2.3 Water scarcity and access indicators

This chapter defines water scarcity *vis a vis* stress and access and shows some indicators of the status of the region.

2.3.1 *Water Scarcity*

A stressed water system is one in which there is a threat to its capacity to continue providing adequate water supply, in quantity and quality, to households, communities, and nations or where degradation is taking place.

An indicator of water scarcity or stress is the per capita water availability.

Table 2.3.1 shows the total annual renewable fresh water available, the year 2000 population and the year 2000 per capita water availability for SADC countries:

The total natural renewable water resources covers both surface water and groundwater, including inflows from neighbouring countries.

Table 2.3.1. Total Renewable freshwater available in the countries of the region

Country	Total annual renewable freshwater available (cu km/yr.)	2000 Population (000)	2000 Per capita water availability (cu m)
Angola	184	13 302	13 832
Botswana	14.7	1 651	8 904
DRC	1 019	50 730	20 087
Lesotho	5.2	2 140	2 430
Malawi	18.7	10 160	1 840
Mozambique	216	17 245	12 525
Namibia	45.5	1 817	25 041
South Africa	50	44 000	1 136
Swaziland	4.5	1 046	4 302
Tanzania	89	32 422	2 745
Zambia	116	10 755	8 275
Zimbabwe	20	13 485	1 483

(Source: SADC, Environmental Sustainability in Water Resources Management in Southern Africa).

From the table it can be seen that Lesotho, Malawi, South Africa, Tanzania and Zimbabwe are the most water stressed countries in SADC, while DRC, Namibia and Angola do not appear to be short of water. However the distribution of water, particularly in Namibia, will prove that country size water balances are not very useful and that shortages should be viewed on a river basin by river basin.

A possible USAID/RCSA strategic option is an assessment of per capita water availability by river basins as an indicator of adequate water.

2.3.2 Access to water

The fact that water is available in the resource does not mean that the resource has been developed and that the people have access to water. The indicator of water scarcity is thus not a true reflection of the access that people have to water. The coverage of access to water will depend on a number of factors including the investment in infrastructure, the capacity of water supply institutions and the location of the people relative to the water sources.

A review is required in order to derive a realistic gauge of the coverage of water supply in Southern Africa. Information will probably be available from the most recent census of each of the SADC countries which could be used to draw comparisons of how many people have access to each levels of service.

Typically the level of access to water services can be divided into the following categories:

- Less than adequate for basic health and hygiene;
- Basic level of water services
- Yard connection and house connection.

Basic level of service can be defined at different levels (such as a stand pipe providing water of a potable quality within walking distance). **For inter-basin comparisons a uniform definition of a basic water supply for domestic or household purposes should be agreed taking account of the above categories of indicators.**

3 Existing and Planned Water Programs

3.1 Other Donor Programs

There are number of water resources management activities being funded by various development agencies in the region that may have to be taken into consideration in developing a new water strategy.

Deciding on what could be in the USAID/RCSA's strategic plan, requires rationalisation of what is achievable in the period of the plan, what has been already achieved and what other development agencies have comparative advantage in.

Table 3.1.1 shows Water projects being supported by other development agencies in Southern Africa.

Table 3.1.1. Water Projects Supported by other Development Agencies in Southern Africa.

Water Resources Management Issue	Development Agencies	Scope (Basin/Region)	Implementing agency
Wetlands conservation	CIDA/NORAD	Zambezi	IUCN-ROSA
Basin Management & Plans	Danida/SIDA/UNDP/GEF	Zambezi/Okavango x2/Komati	
Information sharing/Database systems	GTZ/NORAD	Regional/Zambezi	
Monitoring Systems- drought	DFID	Regional	
Land Use Management	DFID	Lesotho Highlands/Orange	
Political, institutional and legal approaches to sustainable equitable sharing of regional water resources	EU/SIDA	Regional	
Water networks- education, training-IWRM	IDGIS/UNESCO/SIDA	Regional	
Ecosystem Data generation & dissemination	SIDA	NKOMATI	
Water & Sanitation	SIDA		IWSD
Institutional support	SIDA	IUCN/LAPC, IWSD	IUCN/LAPC, IWSD
Pollution Control & Protecting Biodiversity	UNDP/GEF	L. Tanganyika ; L. Malawi	
Flood Forecasting	UNDP	Shire (Zambezi)	
Policy Reforms	World Bank	Region/Several	

		countries	
Hydrological Monitoring	WMO	Regional	

Presented below are projects/programmes that have been proposed by the SADC Water Sector Co-ordinating Unit (WSCU) (Box 3.1.1). **The list could also assist the USAID/RCSA to align with some of the projects.**

Box 3.1.1 The Result Areas of Regional Water Projects proposed by SADC WSCU

- Guidelines for water legislation
- Procedures for regulation for water planning, construction, operation and abandonment of dams
- Capacity and procedures for integrated basin plans
- Principles of equitable and reasonable utilisation of water and dispute resolution
- Good health and provision of sufficient water while protecting environment
- Improved management of groundwater resources
- Established information services and websites
- Brochures on river basin boundaries
- Awareness built in decision makers
- Media involvement in awareness of integrated water resources issues
- Trained human resources in negotiations, dispute resolution, confidence building
- Water network
- Guidelines for water policy and review and strategies- national and regional; development and implementation
- Economic accounting of water use
- Expanded private sector participation in water and sanitation
- Assessed surface water resources
- Expansion of HYCOS Project
- Controlled translocation of aquatic weeds
- Enhanced stakeholder participation in water resources management
- Empowered women in development and management of water resources

The projects that are basin /site specific include:-

- Upgraded water monitoring system L. Malawi
- Rehabilitated HYCOS monitoring stations in Angola and Namibia
- Integrated basin management plan for the Okavango River.
- Other projects in L Malawi; Cabora Bassa, Shire, Songwe and Lower Orange.

The USAID/RCSA has contributed to identification of most of the projects above through the Southern Africa Regional Water Sector Assessment (Stanley Consultants, 1995) and RAPID initiatives (1997). Projects identified as part of RAPID project and those that the USAID/RCSA identified in 1999 (Sonderstrom) are presented in the Annex.

Considering projects identified by SADC and USAID/RCSA initiatives and those supported by other donors it is possible to identify areas that are not being given enough attention to date. Among those that have not received much attention are:

- Water quality standards and monitoring;
- Increased reclamation and reuse of waste water;
- Groundwater assessment. Monitoring and management programs ;
- Economic pricing of water. Tariffs that reflect true cost of supply and environmental cost are not yet reflected; and
- Water demand assessment, monitoring and forecasting.

On the water supply side, there are also new paradigms of climate change and flooding that need to be incorporated in water resources management and planning.

On the demand and access side, the new socio-economic problem of a HIV/AIDS in terms of increased sanitation problems, effluent discharged and ability by those infected to fetch water also present new challenges.

In the case of those activities currently being implemented the level of comprehensiveness and information on what is being achieved are obscure.

Interesting and complex areas that need further follow-up are related to the ecosystem approach to water management which can also address most concerns in current basin management such as catchment protection and rehabilitation.

Considering the basins, it is evident that the Limpopo Basin has not received much attention. The Congo Basin has 50% of Africa's water, and with the cessation of hostilities in the DRC, the basin is an interesting candidate for water management strategies. The cessation of hostilities in Angola also presents new challenges to regional water activities in terms of expanding the scope of projects that previously excluded the country.

It is also apparent, that while SADC has a groundwater programme, not much is being subscribed in the projects considered above.

3.2 Other Africa and global initiatives.

The key regional and global initiatives with which the USAID/RCSA strategy can align are:

- The NEPAD vision.
- World Summit on Sustainable Development WSSD (Johannesburg 2002), as well as its preparatory meetings i.e. the Hague Declaration (March 2000) and Bonn Conference (December 2001) leading up to the World Summit; and
- Cognisance should also be taken of the Water and Poverty Initiative.

3.2.1 *NEPAD Vision and Program*

3.2.1.1 **NEPAD Framework**

NEPAD is a vision and a program of action for the redevelopment of the African continent. It is also a vision of partnership between Africa and the rest of the world. Conceived and developed by African leaders under the auspices of the Organisation for African Unity (OAU), it was endorsed by leaders of the G8 countries on 20 July 2001. NEPAD provides a platform for a comprehensive integrated development plan designed to address key social, economic and political issues in a coherent and balanced manner. It is also a commitment by African leaders to African people and to the international community that they have resolved to place Africa on a path of sustainable growth and accelerated integration into the global economy. It is a call for support of African development on the basis of Africa's own agenda and program of action.

The eight priority areas in NEPAD are as follows:

1. Infrastructure
 - a. Information and communication
 - b. Energy
 - c. Transport initiative
 - d. Water and sanitation
2. Human-resources development initiative
3. Health
4. Agriculture
5. Environmental initiative
6. Culture
7. Science and technology initiative

8. Access to the markets of developed countries for African exports

3.2.1.2 Stakeholders' Conference on Water and development, Ghana, April 2002

Water is recognized as a pivotal resource in a number of the NEPAD areas. Accordingly the Africa Task Force was invited to compile an African Position Paper on Water and Sustainable Development in Africa. The positions adopted by the Stakeholders' Conference on Water and development, Ghana, April 2002 are as follows:

1. Water is a cross-cutting issue that should be mainstreamed within NEPAD and other development efforts at national, sub-regional and regional levels in pursuit of sustainable development;

2. The Africa Water Vision and its Framework for Action are endorsed for use at all levels of water development and service provision in Africa; and

3. Policies, strategies, and projects in water resources management and development should be based on the principles of IWRM. To this end, Africa will adopt the following, among others:

- a) Management at the river basin level;
- b) Management at the lowest appropriate level;
- c) Demand-driven approaches;
- d) Ownership and participation by all stakeholders, especially women and the
- e) youth;
- f) Promotion of knowledge and information exchange aimed at institutional
- g) sustainability and conflict prevention;

4. A high priority will be given to the establishment of sustainable and effective mechanisms for providing financial and technical support to meet urgent and critical needs in water resources development, improved access to services for drinking water supply and sanitation, agriculture and food security, and environmental sustainability;

5. Policies for mainstreaming gender balance, poverty reduction, and environmental sustainability in all aspects of water resources development and service provision will be pursued;

6. A high priority will be given to global, regional and sub-regional public goods in water and mechanisms developed to support their achievement;

7. A high priority will be given to the development and implementation of a program for awareness creation among civil society, political leaders and decision-makers about the indispensable role of water in development and poverty reduction;

8. Participation by the private sector in water service provision will be supported, provided that there are adequate safeguards, specifically for the interests of the poor, and generally for the achievement of NEPAD's development goals;

9. Political commitment will be promoted through the mechanism of the African Ministers Conference on Water (AMCOW); and

10. The key areas of focus in the medium term shall be as defined under the priorities for action below.

The proposed priorities for action that could also be supported by the USAID/RCSA strategy are:

- a) Improving water governance at regional, sub-regional, and at transboundary water basin levels;
- b) Establishing sustainable organisations and mechanisms for improved financing and cost-recovery in water resources management, development, allocation, and service delivery;
- c) Promoting improved water resources management and the institutionalisation of integrated land, forestry and water resources management action plans at sub-regional level, trans boundary water basin levels, and at national levels;
- d) Promoting the definition of property and use rights regimes for water within countries and between transboundary water basins;
- e) Improving African capacity for IWRM, focusing on water governance and access to service;
- f) Improving the technical knowledge base at regional and sub-regional levels for water resources management and access to water services;
- g) Improving access to water supply and sanitation services;
- h) Instituting a system for performance monitoring, assessment, and reporting on all aspects of the agreed priorities for action;
- i) Optimising the contribution of water management to food security and agriculture- based trade and development; and
- j) Developing the contribution of water infrastructure to energy generation.

3.2.2 World Summit on Sustainable Development and preparatory meetings

3.2.2.1 Hague Ministerial Declaration of March 2000

The seven challenges agreed in the Hague are as follows:

1. **Meeting Basic Needs** to recognise that access to safe and sufficient water and sanitation are basic human needs and are essential to health and well-being, and to empower people, especially women, through a participatory approach of water management.
2. **Securing the Food Supply** to enhance food security, particularly of the poor and vulnerable, through the more efficient mobilisation and use, and the more equitable allocation of water for food production.
3. **Protecting Ecosystems** to ensure the integrity of ecosystems through sustainable water-resources management.
4. **Sharing Water Resources** to promote peaceful co- operation and develop synergies between different uses of water at all levels, whenever possible, within and, in the case of boundary and trans-boundary water resources, between states concerned, through sustainable river-basin management or other appropriate approaches.
5. **Managing Risks** to provide security from floods, droughts, pollution and water-related hazards.
6. **Valuing Water** to manage water in a way that reflects its economic, social, environmental and cultural values for all its uses, and to move towards pricing water services to reflect the cost of their provision. **This approach should take account of the need for equity and the basic needs of the poor and the vulnerable. Assessing water pricing that takes account of the needs of the poor will be important. The RSA case of allowing free water for basic needs may be a case that requires feasibility and replication.**
7. **Governing Water Wisely** to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources.

3.2.2.2 The Bonn International Conference on Freshwater, December 2001

The Bonn Conference produced the following “keys”:

1. The first key is to meet the water-security needs of the poor.
2. Decentralisation is key in terms of the national policy meeting community needs.
3. The key to better water outreach is new partnerships.
4. The key to long-term harmony with nature and neighbour is co-operative arrangements at the water- basin level, including across waters that touch many shores.
5. The essential key is stronger, better-performing governance arrangements.

3.2.2.3 The World Summit on Sustainable Development, Johannesburg 2002

The structure chosen by the Secretary General’s Panel was:

- Shared values;
- Public/Private nexus;
- Global Governance; and
- Science and Technology.

The key positions are as follows:

Shared values

The recommended targets with respect to shared values are:

- Halving the proportion of people who are unable to reach or to afford safe drinking water resources by 2015.
- Halving the proportion of people who are unable to reach or to afford sanitation by 2015.
- Increasing water productivity in agriculture (rain-fed and irrigated) to enable food security for all people without increasing water diverted for irrigated agriculture over that used in 2000.

The recommended action to achieve the targets is to establish strong, functional links between the World Water Assessment Program of the United Nations to the "Joint Monitoring Program" of the WHO and UNICEF in monitoring progress towards these

targets and report to the Ministerial Conferences associated with the World Water Forum series or the UN's Commission on Sustainable Development.

Public/Private nexus

The recommended target is to have at least 20% of all water infrastructure investments funded by alternative forms of financing by 2015 through building capacity in local governments to assess alternative forms of financing for infrastructure, including **capacity to identify, develop and negotiate sound projects that are financially feasible and environmentally sustainable as alternative solutions to large-scale investments.**

Global Governance

On global governance, the recommended target is to assess virtual water imports and exports through agricultural products for each country, or in other words, **analyse the impact of changes in the subsidies in agriculture and the international system of trade in food and fibre, on national and local water demands by 2015.**

The target is to be achieved through international trade negotiations on agricultural subsidies and trade in agricultural products. The WTO should consider the impact on water use in countries importing and exporting food. **The World Bank or the CGIAR centres should develop tools to assess such impacts and this could be an area to support.**

Science and Technology

The recommended target is to develop, by 2010, an agreed strategy for the use of molecular biology to increase drought tolerance and water productivity of crops to achieve water, food and environmental security. This will be achieved by CGIAR assessing the potential for increased drought tolerance and increased water productivity in agriculture, including the potential of the use of functional genomics and other tools of modern molecular biology.

Water-resources development and management in Africa

Recommended target is to have plans for resource allocation and investments, similar to those adopted for the Nile basin, agreed by the riparian countries for all of Africa's international basins by 2015. The recommended action to achieve the target is to establish an African Water Facility to seed the investments in water-resources development and management to increase capacity to assess and manage water, and prepare an investment strategy for water-resources development in Africa, within the framework of NEPAD. **Although outside of SADC, documentation of the NILE best practice and supporting its replication and supporting development of a funding organ such as the African**

Water facility within Southern Africa could be part of the USAID/RCSA water strategy.

3.2.3 Water and Poverty Initiative

A wide range of stakeholders have joined together to develop the Water and Poverty Initiative, the goal of which is to mainstream a better understanding of the role that water can play in poverty reduction in national and international poverty reduction policies and strategies. The Initiative, led by the Asian Development Bank, includes international organisations, individual governments, NGOs, the private sector, academics and practitioners who are working together to define practical actions that will improve the water security of poor communities. The Initiative is based on a conceptual framework that identifies six key areas of action:

1. Pro-Poor Water Governance.
2. Improved Access to Quality Water Services.
3. Pro-Poor Economic Growth and Livelihood Improvement.
4. Community Capacity Building and Empowerment.
5. Disaster Prevention and Mitigation.
6. Management of the Environment.

These are concepts that can be integrated in the USAID/RCSA's Water Resources Management strategy.

4 Dealing with Water Scarcity

4.1 Integration of surface and ground water resources

Rivers, lakes, wetlands⁵ and dams as the sources of surface water in the region and constitute river basins. Basing on per capita renewable water resources available, Engelman and Leroy (1995) analysed that all SADC countries on the mainland will have their per capita water availability reduced to 50% or less of the 1990 level by 2025.

Table 4.1.1 presents surface water availability for selected countries and indicates that the region has more known surface water resources than groundwater. This may just be a reflection of available data which may be more biased towards surface water than groundwater. Groundwater stocks are not well known. However, groundwater aquifers, some also located within river basins, have been recognised as important sources of water particularly in the semi-arid to arid countries of the west (Botswana, Namibia and South Africa). The population of most of the Orange River (about one-third (1/3) of RSA population) relies largely on groundwater (Day, 1998).

Table 4.1.1 presents surface water availability for selected countries

Country	Per Capita m ³ /yr	Average Surface water Resources km ³ /yr	Total Renewable km ³ /yr**
Southern Africa		534	763.6
Angola	14000	180	184
Mozambique	5000	100	216
Zambia	8700	80	
Botswana	1700	2.9	14.7
Namibia	3500	6.2	116

Source. Africa Environmental Outlook:[www.unep.org/aeo/161,htm](http://www.unep.org/aeo/161.htm)

** From Table 3.1.1

The proportion of water coming from groundwater is small (Chenje, 2000) but is important for rural livelihoods. Groundwater is the main source of water for about 60% of both rural and urban population in Southern Africa since large parts are characterised by

⁵ The broader definition of wetlands however includes all water containing bodies whether permanent or temporary, freshwater and up to 6 m deep of coastal areas (IUCN, 2002).

small towns, small villages and dispersed rural settlements where groundwater is the cost effective supply source.

Groundwater stocks need to be assessed and considered as part of water supply planning for both large scale and community use. There are limited data on the status of groundwater resources in almost all of the countries in Southern Africa. A project to address groundwater management in the region is in preparation by the SADC Water Sector Co-ordination Unit (WSCU), funded by the Global Environment Facility (GEF).

The objective of the SADC project on ground water management is for member states to co-operatively develop a strategic regional approach to support and enhance their capacity in the definition of drought management policies, specifically in relation to the role, availability (magnitude and recharge) and supply potential of groundwater resources. This will reconcile the demands of socio-economic development and those of the principal groundwater-dependent ecosystems.

At regional level, the project seeks to:

- identify transboundary impacts of groundwater development in the various river basins of the region;
- identify priority groundwater resources in drought- prone areas; and
- provide regional management tools such as hydro-geological maps,
- drought vulnerability and water scarcity maps,
- a minimum regional groundwater monitoring network, and
- a regional information system.

At the river basin level, the role of groundwater in proactive drought mitigation will be demonstrated in the semi-arid Limpopo river basin.

The SADC groundwater initiative provides a “quick start” opportunity for involvement by USAID/RCSA in groundwater/surface-water integration. USAID/RCSA can chose to support specific components of the regional initiative, for example the compilation of ground water maps in selected basins as well as the establishment of a regional groundwater information system.

One of the benefits of ground water yield mapping is that its beneficial impact has a “long life” that will continue well beyond the programme, with little direct maintenance support required.

USAID/RCSA may also wish to demonstrate the role of ground water in proactive drought mitigation for communities in parallel to the SADC Limpopo River Basin project.

4.2 River basin management

The protection and management of international watercourses are best accomplished within a regional framework organised at river basin or perhaps incorporating multiple basins on a regional basis. The required regional cooperation is then in institutional mechanisms, economic efficiency, increased opportunities for dialogue and sharing best practices, hence limiting the possibility of political conflict.

4.2.1 *Criteria for selecting a River Basin for Study*

A critical question for the development of the RCSA Water Resource Management strategy is which multinational river basin should be selected to pilot the selected water resource management and rural livelihoods strategies.

Given the purpose of the strategy it is necessary that the following requirements are met:

- The river basin must be in Miombo ecoregion as most river basins of the region are within Miombo ecoregions.
- The river basin should provide the opportunity to show meaningful results within the time frame of this strategy;
- The river basin should be conducive to developing strategies that could be replicated elsewhere. The basin should preferably be able to allow implementation of integrated strategies e.g. basin management, improving livelihoods, ecosystem management and application of water demand management thus answering various policy questions related to water resources management.
- The river basin should provide opportunities for the pilot to have a meaningfully positive impact on the rural poor.

To support these requirements, a number of criteria are proposed:

- The riparian countries should already be discussing water resource matters of mutual interest and there should already be a willingness to cooperate;
- The riparian countries should be politically stable to ensure an ongoing implementation of the strategy for the full duration of the strategy;
- There should be opportunities to enrich the life of the rural poor through tourism or similar industries;
- There should be willingness by the countries to support such an intervention.

River basins that are significant and could be considered for the pilot study and which should be measured against these criteria are:

- The Okavango;

- The Limpopo;
- The Orange/Senqu;
- The Zambezi;
- Congo Basin

The Congo Basin is an attractive basin in terms of being rich in water and biodiversity resources. It is however rather too large and will require teaming up with other development agencies. The civil strife, although promising to end, is not over yet and planning would then be done in atmosphere of uncertainty.

The Zambezi is probably too complex and has too many riparian states to be able to prove a water resource management approach within a 7 year period. The basin has also been oversubscribed by other development agencies; hence impacts of RCSA alone would be difficult to measure. The Basin is however representative of the regional circumstances as it involves many countries and is central to the region. It may however be useful to take resources elsewhere where timely interventions are also needed. When civil strife is completely over in Angola and accessibility improves, the Upper part of the Zambezi would be attractive to support to cater for needs that have been neglected as a result of the civil war.

The Limpopo and the Orange both involve South Africa as a riparian state. The Orange is interesting from the point of supporting large urban centres, and the industrial hub of the region could avail opportunities for incorporating water demand management and pollution control in water resources management. The basin can also provide opportunities to evaluate groundwater resources. The basin is however largely in South Africa that has capacity and resources to address water resources management. Probably donor support would be more beneficial when it could be weighted in favour of the other riparian countries in order to “level the playing field”.

The Limpopo is already receiving US funded support (see the next section below) and this initiative could be extended.

The Okavango Delta is irreplaceable because of its uniqueness and must be preserved. Effort placed in the Okavango will thus have an immense return for ecosystem management. However, the uniqueness of the Okavango is also a problem in that the lessons learned might not all be replicable elsewhere. The lessons will be biased towards conservation of resources and community management of natural resources as CBNRM is already successful there. Parts of the basin may not be that accessible and lessons for water demand management can only be implemented far away in Windhoek that would have required water from the basin- but is not likely to do so. The basin however is important from perspective of averting potential conflicts over water resources sharing. The basin includes Angola that has previously been affected by war and should be strengthened to fully participate in water resources management. A basin plan has also

been developed with GEF support hence making it easier to add incremental value to the basin management.

4.2.2 Typical Elements of a River Basin Study- (Case study of Limpopo Basin)

The joint US – Southern African Research, Education and outreach Project for the Limpopo River Basin, provides a good framework for the elements of an integrated natural resources river basin study, that could be included in the RCSA water resources strategy. The research can serve as a case study for other river basins in Mozambique and in the Southern Africa region.

The project combines research activities, modelling and assessments, and interaction with interested and affected parties in order to improve ecosystem sustainability and livelihoods within the Limpopo River Basin in Southern Africa. The project is a partnership between Mozambique, South Africa, Zimbabwe and Botswana Universities and Institutions in collaboration with various American Universities.

The project aims to provide an integrated analysis of natural resources within the Limpopo River Basin (LRB). The project will combine data collection and analysis, field and laboratory experiments and modelling studies concerning ecosystem processes and interactions as well as impacts of different practices and policies on natural resources and people's welfare. Tools including integrated models will be developed and continuously refined to describe and analyse relationships between the human-ecological and economic systems.

The project seeks to achieve the following:

- Establish a framework for data collection, and create a data-base of physical, ecological and socio-economic attributes and indicators for the Limpopo River Basin;
- Develop models that would be used to analyse and propose sustainable management and policy options within the river basin;
- Promote sustainable agriculture;
- Develop models to contribute to transboundary decision making on water use and "partition" among the 4 countries;
- Demonstrate the tools and approaches for management and analysis of natural resources using the river basin as an integrated unit of management;
- Generate capacity (human and methodological) within the region to conduct research and decision making regarding natural resources management;

The research components will initially concentrate on issues related to the interplay between:

- Climate variability and water supply;
- Land use within the basin and water yields;
- Land use activities and water quality;
- Impacts of agriculture on water quality, salinization due to irrigation, water pollution due to chemical use);
- Impacts of land use on runoff and flooding;
- Subsequent impact on coastal ecosystem and;
- Issues related to the social and economics of the local communities within the basin.

The RCSA strategy could consider supporting selected elements of this project.

The USAID/RCSA has a choice. They can either expand community based natural resource management in the Okavango or support the current academically driven initiative in the Limpopo.

The advantages of the Okavango basin are that the Okavango Delta is irreplaceable because of its uniqueness and must be preserved. Effort placed in the Okavango will thus have an immense return for ecosystem management, conservation of resources and community management of natural resources. A basin commission is already formed and functioning, an integrated basin management plan is in place and this is a sensitive basin where conflict aversion needs to be addressed soon.

The advantages of the Limpopo Basin is that the current projects have most of the variety needed to demonstrate effective river basin management and analysis can be integrated. The basin also provides lessons across the region from arid west to wet east and there is a great opportunity to study flood and drought management impacts and solutions in the same basin.

Both basins offer tremendous opportunities for demonstrating water resources management needed in the region. The final choice between the two basins may however be made on policy considerations which tend to weigh in favour of the Okavango basin.

4.3 Demand side management

4.3.1 *Water demand and environmental management*

Given that the amounts of rain and run-off are not increasing and that the human population continues to increase, it is inevitable that demand will eventually outstrip

supply. This therefore calls for water demand management (controlling consumption rather than supply-oriented approach). Water Demand management (WDM) is being instituted in a number of regional countries e.g. Namibia and South Africa (Day, 1998); the concept has not however yet been fully exploited to make an impact on water supply and development.

Current water use by different sectors is summarised in Table 4.2.1 and it is evident that irrigation accounted for about 60% of total regional water demand in 1995, the rest, i.e. domestic and industrial use, stock, mining, and nature accounted for 40%. Not all countries have reliable estimates for water demand to support natural ecosystems because **there are currently no reliable tools to accurately estimate how much water is required to maintain forests, grasslands, wetlands and all the other ecosystems, so this is an area that requires further work and could be an option for USAID/RCSA.**

That agriculture accounted for the bulk of the demand may also be reflective of poor water pricing and water rights.

Table 4.2.1 Human Population (Million) and Sectoral Water Demands in Southern Africa 1995 (MCM)

Countries	Population	Domestic and industry	Stock	Mining and energy*	Irrigation	Nature	Total
Angola	11.5	1,720	272	15	750	-	2,757
Botswana	1.5	175	44	65	47	6	150
Lesotho	2.1	84	19	5	160	-	268
Malawi	11.1	730	23	5	1,820	-	2,578
Mozambique	17.9	135	65	10	3,000	-	3,210
Namibia	2.5	200	70	15	248	5	538
South Africa	41.5	10,397	368	1,937	12,764	4,702	30,168
Swaziland	1.2	25	13	2	331	140	511
Tanzania	32.5	1,690	70	10	10,450	-	12,220
Zambia	10	532	60	20	1,580	-	2,192
Zimbabwe	11.3	697	30	30	4,980	-	5,737
Total	144.2	16,385	1,034	2,113	36,130	4,853	60,515

Source SADC/IUCN/SARDC (1996)

Given the estimated rate of increase of the region's population of between 2 and 3.2%, water demand for domestic use, water to produce food, and the volume of waste that would compromise water quality through pollution is unquestionably going to increase. Basing on regional population growth, it is estimated that the water demand will nearly double by 2020 (Zhou, 2002). It should be accepted that water demand estimated from population growth rates determined in the past will not be that reliable considering the impact of HIV/AIDS. New water demand forecasts should be assessed considering the

2001/2002 population census results that most SADC countries have accomplished as they are likely to have included HIV/AIDS impact in population growth.

In view of the projected rise in demand, the major challenge is how the region will meet this demand. Sherbinin (1998) described the relationship between water and population dynamics as reciprocal, location-specific, transcending national boundaries and varying over time. For example as human population increases, demand for water increases while supply is reduced. When water supply is low, however, it may cause reduction in human populations – often in a drastic manner such as famine. The ability of the wetlands and related ecosystems to continue to provide goods and services is also another challenge because apart from the large water demand to be met, future water supplies are likely to be impacted on by changes in global climate.

Water demand management that incorporates technical aspects and market forces can stretch the availability of water resources. The technique has proved successful in a number of urban centres in the region. In Namibia, water savings in excess of 20% were realised between 1993 and 1995. The city of Windhoek was meeting 50% of its water demand from reclaimed water by 1997 (Zhou, 2000; WTC, 1997). Tapping water savings from the various consumptive uses could avail a significant source of water. For instance while South Africa will have demand exceeding supply in 2020, its water losses are estimated to be 20% of current consumption. In a few cases, countries in the region have employed fiscal measures like water pricing and demand management tools, e.g. prepaid meters as done in some parts of South Africa. There is a need, therefore, to evaluate possibilities for increasing efficient use of water and curb any rise in unnecessary demand by assessing its potential among the large water users such as irrigation. The isolated cases of best practices of water demand management in the region should be replicated. It would, therefore, be useful to know how refined and documented these water demand measures are for purposes of further adoption in the region and to what extent water demand management could contribute to meeting future water demand.

With respect to economic activities that affect water quality due to urbanisation e.g. industrial effluents and sewerage return flows, what is lacking are regional effluent discharge standards and established cost-effective technical experiences that can be shared for replication. For instance recycling of such effluents could avail water resources for re-use.

5 Improving Rural Livelihoods through Ecosystem Management Approach

5.1 Communities and private sector involvement water resources management and improved livelihoods

5.1.1 Ecosystem management

Improving livelihoods can be addressed by a holistic approach to catchment basin management through an ecosystem approach. The principles of ecosystem-based approach are presented below (Box 5.1.1).

Box 5.1.1: Principles of the Ecosystem-based Approach

Principle 1:	The objectives of management of land, water and living resources are a matter of societal choice.
Principle 2:	Management should be decentralised to the lowest appropriate level.
Principle 3:	Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
Principle 4:	Recognising potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: Reduce those market distortions that adversely affect biological diversity; align incentives to promote biodiversity conservation and sustainable use; internalise costs and benefits in the given ecosystem to the extent feasible.
Principle 5:	Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
Principle 6:	Ecosystems must be managed within the limits of their functioning.
Principle 7:	The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
Principle 8:	Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.
Principle 9:	Management must recognise that change is inevitable.
Principle 10:	The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
Principle 11:	The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
Principle 12:	The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Source: Masundire, 2000

The approach would need to be developed such that water and other wetland goods and services (Table 5.1.2) assume a profitable value. When the value of goods and services are known then even private sector investment/participation is realised. Private sector investment has been provided by Safari Companies in CBNRM projects when they realised the value of wild life management.

Table 5.1.2 Values of Wetland Ecosystems in Southern Africa

Use Values			Non-use Values
Direct “goods”	Indirect “services”	Option “services”	Existence “services”
Fish	Nutrient retention	Potential future use	Biodiversity
Timber	Pollution abatement	Research sites	Cultural heritage
Fuelwood	Flood control		Uniqueness aura
Recreation	Groundwater recharge		Religious shrines
Transport	Ecosystem support		Ecosystem maintenance
Tourism	Sediment trapping		Wilderness aura
Thatch grass	Shore-line stabilisation		Habitat
Wildlife	Micro-climate maintenance		
Medicines	Aesthetic beauty		
Hydro power			
Pasture			
Domestic Water supply			
Irrigation Water supply			
Industrial Water supply			
Wastewater Discharge			
Sand			
Croplands			
Minerals			
Peat			

Modified from Barbier *et al.* (1997)

Institutions that are engaged in development of ecosystem approach are already active in the region. IUCN has carried out projects e.g. in the Zambezi Basin from which lessons can be learnt and replication made in the region and IUCN continues to pursue projects in this area.

A successful ecosystem approach should address elements of safe drinking water, sanitation and productivity. Where land is so marginal that crop agriculture cannot be sustained, other wetlands goods and services can generate income that can be used to buy food. Tourism is an example which can be promoted as an alternative income generating activity learning from successful cases of CBNRM projects. Another example of

generating employment and incomes among the poorest of communities has been in the Working for Water Programme launched in SA in 1995 to control alien plants (Chenje, 2000).

In built in the approach should be the right of communities to water, food, health and other essentials that regional governments should not ignore in terms of policy and legislation. Enhancement of coping strategies by families and communities faced with HIV/AIDS impacts are part of the rights that governments should incorporate in their laws- and such laws when harmonised will have a similar impact in the region.

It is when communities are empowered to influence policy decision that they can observe national and regional protocols. **Such empowerment becomes part of a strategy on water resources management, ensuring opportunities for women to participate in environmental decision making, facilitating and increasing their access to information to enhance their knowledge and skills to enhance their status of livelihoods.**

The success that has been scored using CBNRM for wild life in terms of generation of income and management of resources needs to be integrated with water resources management as most goods are tied to water availability (Box 5.1.2).

Box 5.1.2 Extract on documented success of CBNRM in the region

A related approach that is considered effective for natural resources management is the community based natural resources management (CBNRM), which is known to have functioned well for wildlife management in the region (IUCN, 2001). What remains to be seen, however, is whether or not it can be effective for water and wetlands management. This being the case, there is a need for dialogue firstly to ascertain if CBNRM should be the route for water and wetlands resources management. Secondly, it is necessary to find out if communities have the necessary skills to apply this approach. If communities are to be involved in water and wetlands resource management, then they will need skills for resource conservation and entrepreneurship and past CBNRM activities reveal that skills in these areas are lacking.

Zhou, 2002 Climate Change, Water and Wetlands. IUCN-ROSA

A possible USAID/RCSA strategy in this case would be to support those institutions that can carry out research and projects on ecosystem management for improved livelihoods such as the IUCN. Establishing procedures for incorporating gender perspective in policy development, planning, monitoring and evaluation of integrated water resources management could be another part of the strategy to consider.

5.2 HIV/AIDS and Its Impact on Communities

HIV/AIDS initially viewed as a serious health problem is now recognised globally as an absolute crisis for human development.

At the end of 2000, Sub-Saharan African countries had 25.3 million of all the adults and children living with HIV/AIDS in the world and higher infections are noticed amongst women than men. Peak levels of infection are in the age group 18 to 40 which is the economic active segment of population. In 8 out of 12 mainland SADC countries at least 15% of all adults are infected. Tables and statistics provided for 1999/2000 show percentages of population affected in selected regional countries.

- Botswana 35.8%
- Swaziland 25.3%
- Zimbabwe 25.1%
- Lesotho 23.6%
- South Africa 22.6%
- Namibia 20%
- Zambia 20%
- Angola and DRC inaccurate.

Statistics however show lack of correlation between poor SADC countries and rich SADC countries.

Implications for water resource management are that:

- Inaccurate estimates of population growth rates and mortality rates lead to incorrect estimates of water demand;
- Changes in the socio-economic profiles of communities lead to difficulties in paying for services;
- Loss of key skilled and semi-skilled staff leads to increased staff turnover and requirements for increased training of new staff;
- Staff members infected with HIV/AIDS show a dramatic decline in productivity as disease progresses;
- Increased health risks to individuals with compromised immune systems if water quality decreases;

There is some risk that ground water resources may be contaminated if graveyards are in unsuitable locations. This does not mean that aids can be spread by groundwater but rather that bacteriological loading could be a problem.

5.3 Pro-poor and livelihood improvement strategies

A good example of a successful pro-poor strategy is the community based tourism approach followed by NACOBTA (Namibia Community Based Tourism Association).

NACOBTA set the following criteria for membership, which would also be applicable criteria for selecting pro-poor community based initiatives in a basin:

- The initiative must significantly benefit disadvantaged communities;
- The members or individuals must have limited access to financial resources and skills necessary to develop their enterprises;
- The initiative must be owned and operated by a community, community-based organization or by a resident individual who is a member of the local community; this excludes privately controlled enterprises;
- There should be clear evidence of a community benefit fund or other form of community benefit coming from the initiative??
- The proposed initiative should be viable

The four main pro-poor level strategies (used by NACOBTA) can be adopted in a river basin strategy:

1. **Micro-level** – assisting individual community based tourism enterprises (CBTEs) get off the ground and succeed;
2. **Private sector level** – integration of community based tourism into mainstream tourism industry;
3. **Macro-level** – lobbying and advocating for a policy and planning framework that is Pro Poor Tourism; **Assisting countries develop their CBNRM policies could be supporting this endeavour.**
4. **Institutional level** – institutional development of a representative body of community based tourism enterprises (in this case NACOBTA – which could just as well be Okavango Community Based Tourism Association).

Box 5.3.1 in Annex details the NACOBTA activities that can also be adopted/adapted and replicated to benefit communities elsewhere in the region.

6 Water Resources Management Cross Cutting Issues

6.1 Water Resources Management Institutions

The core of water resources management at the regional level is founded on the SADC's Revised Protocol on Shared Water courses building on SADC's key objectives of integrated economy with result areas as poverty alleviation, food security and industrial development.

To that end, the objective of the Revised Protocol of Shared Watercourses is to “foster cooperation for judicious, sustainable and co-ordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation. The protocol seeks to achieve its objective through a strategy in Box 6.1.1

Box 6.1.1 What the SADC Revised Protocol on Shared Watercourses seeks to achieve

- The protocol seeks to achieve the following with respect to shared water courses:
- Agreements and institutions for management;
- Sustainable, equitable and reasonable utilisation
- Co-ordinated and integrated environmental sound development and management
- Harmonisation and monitoring of legislation and policies for planning, development, conservation, protection of the courses, and allocation of the resources
- Research and technology development, information exchange, capacity building and application of appropriate technologies in management.

Institutions have been established around the implementation of the water sector objectives. In the past, Lesotho held the responsibility for water through the Water Sector Co-ordinating Unit from which water sector policy and operational issues have been directed. With the restructuring of SADC, the Directorate of Infrastructure will be taking that responsibility emphasizing on policy, planning and strategic functions. Some efforts have gone into building capacity of the WSCU and experience has been gained in developing and supporting projects funded by development agencies. The SADC Water structures have acquired experience in working with development agencies on projects.

The Protocol calls for establishment of a system of river basin management institutions to facilitate regional cooperation and collaboration as well as basin-level and national level implementation. The organisation framework for these institutions includes river basin commissions comprising the riparian states of each basin and river authorities or boards at the national level in each drainage basin. The objectives of the basin management institutions are to: develop an implementation and monitoring policy for shared

watercourse systems, formulate strategies for development and monitor execution of integrated water resources development (Box 6.1.2).

Box 6.1.2 Objectives of River Basin Institutions

River Basin institutions' roles in achieving the objectives are to:

- Provide recommendations to riparian countries to enable them to harmonise national laws and policies
- Assist states in the collection and analysis of data, review national development plans, design and conduct studies for environmentally sound development and management, and stimulate public awareness
- Recommend regulation of flow and drainage
- Promote flood and drought mitigation
- Recommend management measures
- Monitor water usage
- Promote pollution prevention
- Establish a list of substances that should be controlled
- Promote Environmental Impact Assessment
- Promote assessment of effects of navigation on environmental quality; and
- Promote hydro meteorological programmes in consultation with SADC

EPI, 1999

These river basin institutions are to carry an important responsibility in water resources management at basin level. However not many of these institutions have been formed to date. The Okavango basin commission has been established (OKACOM) and the ones for the Zambezi basin (ZAMCOM) and Orange basin are under way. The Limpopo Basin is managed by a Joint Committee of the riparian states. These commissions have been formulated by Governments of the riparian states to the basins to manage and direct equitable sharing of basin resources. OKACOM has initiated the development of an integrated basin management plan through the GEF support.

The formation of such basin commissions is fully supported by the SADC and there is collaboration between the two systems of institutions.

There are also joint management bodies such as the Zambezi River Authority that manages the Zambezi and plan hydropower resources for Zambia and Zimbabwe. Beyond that, water is managed at a national level but there is scope to involve country stakeholders in the SADC structures in determining the course of water management.

Some countries have already formulated national water boards or authorities e.g. the Zimbabwe National Water Authority (ZINWA) and also catchment councils/boards.

A good entry point for a USAID/RCSA water resources management strategy would therefore be to contribute to or compliment the SADC Water strategy. That would be fulfilling a stakeholder driven strategy. Supporting any of the basin

commissions/institutions would also be in line with supporting the region-wide objectives.

Although COMESA and SACU exist, there are largely trade oriented organizations and are therefore not directly linked to water management.

Since some of the basin institutions are not yet formed and also do not have their own strategies, this would be an area for the USAID/RCSA strategy to support.

Other platforms for water resources management are through NGOs, e.g. IUCN and international organisations such as the Global Water Partnership. These institutions could also be vehicles that can be supported to achieve regional water resources management objectives.

There is however a need to co-ordinate actions through existing and emerging regional organisations and partnership structures.

6.2 Cross-Cutting Interventions for Water Resources Management.

Existing policies, legal instruments and institutional frameworks remain a major stumbling block to sustainable management of natural resources such as water (IUCN-ROSA, 2001). Policies often fail to address social and economic aspirations of communities. Policies of the past also did not incorporate environmental aspects and hence require revision.

A number of activities are on-going that are intended to contribute to sustainable water resources management in terms of ‘soft’ interventions such as laws, policy, information etc.

6.2.1 Water Policies and Laws

There is a SADC initiative to harmonise water policies and laws by member states. A water vision for the region has been put forward e.g. in line with Southern Africa Water partnership – *“Equitable and sustainable development and utilisation of water for social and environmental justice, regional integration and economic benefit for present and future generations”*

Some regional countries have also revised their water acts to reflect environmental considerations. Water Acts, in the past, ignored allocation of water to the environment and this will particularly become important if ecosystem management approach is to succeed.

The right to water and other essentials by communities are lacking in policies and laws of member states of the SADC.

The numerous transboundary river basins meanwhile also have complex water rights that may result in conflict if not harmoniously addressed.

Table 6.2.1 shows what has been accomplished in terms of adopting national and international policies and laws.

Table 6.2.1 Some Aspects of Water Resources and Wetlands Management Statutes in Southern Africa

Country	National Water Law	National Water Policy	National Water Master Plan	Responsible Authority	Ramsar Convention	National Wetlands Policy
Angola	No	No	No	National Directorate of Water	No	No
Botswana	No	No	Yes	Department of Water Affairs	Yes, 1997	Being formed
Lesotho	No*	No		Department of Water Affairs	No	No
Malawi	Yes	Yes	Yes	Water Resources Board	Yes, 1997	No
Mozambique	Yes	Yes	No	National Directorate of Water		No
Namibia	Yes	Yes	No	Department of Water Affairs	Yes, 1995	No
South Africa	Yes	Yes	Yes	Department of Water Affairs and Forestry	Yes, 1975	No
Swaziland	No	No	No	Ministry of Natural Resources and Energy	No	No
Tanzania	No	Yes	No	Directorate of Rural Water Supply, Directorate of Urban Water Supply	Yes, 2000	No
Zambia	No	Yes	No	Department of water Affairs	Yes, 1991	No
Zimbabwe	No	No	No	National Water Authority	No	No

Source: Zhou, 2002.* being revised

In 2002 none of the regional countries had a wetland policy. Similarly for water, 6 have national water policies and only 3 have water master plans a situation that has compromised water resources management in the region.

Policies also need to be revised to take into consideration the Water Protocols and other international conventions. Among the relevant international conventions and protocol to incorporate in water and wetlands resources management are the Ramsar Convention on wetlands, United Nations Framework Convention on Climate Change (UNFCCC) change, Convention on Biodiversity (CBD) and Convention on desertification. Regional states need assistance to integrate regional and international agreements into national policies and legislation.

A policy issue of interest in relation to water is that of pricing and cost recovery. Ideally, prices for water, including rural water supply, should reflect the true cost of supply including that of environmental costs. **To what extent such a policy would deprive those who are already deprived can be ascertained through implementation of a pilot activity. An interesting USAID/RCSA research question could emerge in this area.**

Where policies and legislation exist, modalities of effective implementation can be explored and promoted.

6.2.2 Institutional Strength

Revised policies and laws are accompanied by new institutional challenges that require re-orientation and strengthening. In some instances new institutions are required. Emerging institutions related to implementation of trans-boundary water resources management are the basin commissions and catchment boards and councils (Manzungu, 2002). The challenge is to develop institutional frameworks that implement IWRM at both national and regional levels considering that water in the regional countries is managed by fragmented institutions in different ministries that fail to coordinate activities effectively.

The experience so far gained in inter-basin transfer for instance shows the importance of having appropriate institutional arrangements to avert conflicts (Box 6.2.2).

Box 6.2.2 Example of Necessity for Effective Institutions

Like all state relationships which are usually driven by national interests, there are possible areas of conflict between South Africa and Lesotho. Some of the possible conflict is minor while others are substantial and may threaten the entire project if not well managed.

Fortunately, there is already an institutional arrangement which is meant inter alia to manage such conflicts, Besides, other conflicts involving state and non-state actors have to be well managed in order to make sure all stakeholders (including NGOs) are taken on board as the project progresses.

Apart from the institutions themselves being established and strengthened, the issues they need to deal with also need to be defined. Whilst consideration would be made on the traditional problems such as watershed/land degradation, water pollution, equitable allocation to water uses, there are new crises and disasters such as floods that basin institutions will have to contend with. **A possible USAID/RCSA Strategic option is to make a systematic assessment and establishment of activities that a basin institution can address- learning by doing in a selected river basin.**

Tied to the development of sound policy for water resources management is the participation of stakeholders, particularly women, who have to bear the brunt of fetching water and look after the local environment. In recent years there has been growing drive for participatory policy development processes and new reforms of partnerships between Governments, civil society and private sector (IUCN-ROSA, 2001) and these could be exploited to involve women in decision making on water resources management and natural resource management in general.

6.2.3 Information Sharing, Planning and Investments

Information sharing on agreed management of water resources within the Water Protocol, experiences of basin institutions, best practices of water demand management and ecosystem management- but to name a few –is of critical importance. Technologies for increased productivity could also be channelled through the ICTs. **The various databases established under other initiatives can be supported to be more effective and increase scope.**

Planning data that is lacking e.g. for water demand forecasting need to be collected, monitored and evaluated. **Hydrological data being collected for supply estimation will have to be extended particularly to new areas of the region that were previously in accessible.**

New money for investment either for new water delivery infrastructure or into ecosystem management can only come from the private sector as the majority of regional governments are near bankruptcy. **Promotion of public-private partnerships learning from sectors where the model has worked would be a strategic option to consider.**

7 Proposed USAID/RCSA Water Resources Management Strategic Framework

7.1 Basis of the Framework

Basing on the overall strategic goal, the criteria to consider in terms of the water strategic framework can be guided by the following:

- Working with a manageable size/number of stakeholders
- Stakeholder driven strategy
- Political stability of area
- Working in new areas of the regions that have opened up as a result of cessation of hostilities.
- Environments where the USAID/RCSA are able to measure its impacts i.e. where few other development agencies are involved or not involved.
- In areas of the regions where strategic focus areas can be integrated e.g. basin management that improves community livelihoods achieves ecosystem management and create opportunities for water demand management practices.
- A water strategic framework that compliments other strategic objectives of the whole USAID/RCSA Strategic Plan e.g. meeting food security
- Complimentarity in strategic options selected.
- Replicability of programmes to other parts of the region.
- The strategic framework should incorporate challenges of new paradigms such as dealing with impacts of climate change, HIV/AIDS, globalization etc.
- The strategic framework that directly or indirectly dovetails into other regional initiatives particularly those of regional entities particularly SADC, COMESA and SACU.
- A Strategic Framework that builds on past experience- e.g. natural resources management.
- Where resolutions are most wanted to avert conflict

The strategic framework should preferably take into account the possible dynamics of regional development and politics and be flexible enough to accommodate the changes without much amendment.

The strategic framework has to take cognisance of what support USAID/RCSA is able to provide to achieve the results. In the past, emphasis has been on promoting policy dialogue, capacity building, empowerment of communities in NRM and information sharing. Promotion of public- private partnerships is an added dimension and this could

be promoted through policies that are conducive for private sector to participate and also protecting the rights of the poor.

7.2 The Framework

Deriving from the previous chapters and other insights, a number of focus areas and projects/ programmes are presented in Table 7.2.1. Result areas, projects/programmes are derived from bold statements within the previous chapters and the proposed interventions are related to the conceptual framework in Fig 1.1.1.

The proposed strategy has been based on a number of water scarcity and access needs and the related cross cutting issues that need to be addressed to achieve sound water resources management in the region. The categories of strategic options are at regional level, river basin level, community level and ecosystem level. Water supply and demand options are separated as a standalone category to emphasize the needs in that area.

In **Conclusion**, the interventions or strategic options are also grouped as follows:

Policy development and dialogue for water quality management; biodiversity management; water use efficiency; community based management and public-private sector partnerships; integrating regional and international agreements/protocols/conventions in national policies and laws.

Building and strengthening institutions for proper water governance at SADC, basin and national level; commissions for basin and natural resources management; creation of information systems, conflict resolution and water financing

Information sharing on best practices for Financing and investment in water resources management (WRM); long term biodiversity conservation; basin/catchment management, water demand management; water data base systems on surface and groundwater resources.

Research on adaptation to withstand impacts of climate change/variability; flood and drought impacts management mitigation; rain/flood water capture, water supply-demand modelling and planning for all end uses including the environment, community knowledge to improve livelihoods through natural resource management and valuation of wetlands goods and services.

Resource allocation for SADC water strategy, particularly groundwater programs, and centres of excellence on ecosystem approach.

Community training and empowerments for basin/natural resource management, enhancing coping strategies and incomes in water scarce situations for communities,

HIV/AIDS circumstances and women; involvement of rural communities in water planning and management; and access to information for improving livelihoods.

The **recommendation** is that USAID/RCSA, selects an appropriate basin where a number of the proposed result areas can be achieved preferably through integrated interventions, thus putting resources to efficient use. Lessons learnt can then be disseminated and replicated in other basins. Example is where basin management institutions, policies, plans, community livelihoods, water supply-demand and ecosystem approach issues can all be addressed in one basin.

Some selected critical interventions that can have the largest impacts at regional level (e.g. policy related) could also be supported. Such initiatives could take advantage of SADC structures to avoid excessive resource requirements that such regional initiatives would require to implement.

**7.2.1 Proposed Water Strategic Framework for USAID/RCSA
(Currently possible areas for consideration)**

REGION-WIDE WATER STRATEGIC OPTIONS			
CRITICAL FOCUS AREA	RESULT AREAS (avoided causes/impacts Or Solutions)	APPROACHES/TASKS	INTERVENTIONS/TOOLS
CROSS CUTTING	Region wide water resources management objectives achieved and conflicts avoided	Contribute to or compliment the SADC Water strategy - entry point for regional level activities	Resource allocation/Financing
	Conflicts on sharing water avoided	Improving water governance at regional, sub-regional, and at transboundary water basin levels.	Institutional Strengthening and information sharing
	Financing and Investment solutions	Documentation and replication of the best practice for developing a funding organ such as the African Water Facility for Nile Basin.	Research and information dissemination Support
	Water quality maintained	Support integration of environmental and sectoral policies.	Policy Development and dialogue
	Water quality maintained	Basic water and effluent quality standards+ Right to clean water in region	Policy Development and Dialogue

	Water stocks availability determined	Support the SADC groundwater initiative through the compilation of ground water maps in selected basins as well as the establishment of a basin groundwater information system.	Resource Allocation and information sharing
	Reduced biodiversity loss	Policies and legislation for long term biodiversity conservation and linkages with livelihoods.	Policy and legal framework development and dialogue
	Conflict on water resource sharing avoided	Regional water scarcity vulnerability assessment.	Research and information sharing
	Reduced environmental damage	Adaptation framework that can withstand negative impacts of climate change/variability on management of water and wetlands.	Research and information sharing, dialogue
RIVER BASIN LEVEL STRATEGIC OPTIONS			
WATER SCARCITY/ACCESS/CROSS CUTTING	Proper basin and natural resource management achieved	Installing a comprehensive River Basin management plan applicable to Miombo ecological zones	Systems, Institutional & policy development/strengthening; dialogue Community empowerment Public-put. partnerships (PPP)
	Proper basin and natural resource management achieved	Strengthen capacity to identify, develop and negotiate sound projects that are financially feasible and environmentally sustainable as alternative solutions to large-scale investments.	Institutional and human resources development
	Flood and drought impacts mitigation	Study flood and drought impacts and management solutions.	Research and information sharing, pilot

	Conflict resolution framework	Building regional cooperation in inter-basin transfers and equitable distribution of water resources.	Dialogue and agreements
	Proper basin and natural resource management	Dissemination of best practices in region on basin and catchment management	Information sharing
WATER SUPPLY-DEMAND STRATEGIC OPTIONS			
WATER SCARCITY/ACCESS	Capacity for rain/flood water capture	Skills in rain-water harvesting and flood water to benefit households and communities and even at a larger scale to support agriculture and industries where large earth dams can be utilised.	Research, training, pilot projects and information dissemination
	Water availability & Reliable demand forecasting and water use management	Development of reliable water stocks and demand data for planning purposes and to inform policy decisions.	Research, training and information sharing
	Reduced biodiversity loss and Water demand for ecosystem maintenance	Reliable tools to accurately estimate how much water is required to maintain forests, grasslands, wetlands and other ecosystems.	Research and information sharing
	Water availability	The various databases established under other initiatives can be supported to be more effective and to increase their scope.	Institutional strengthening and Information dissemination (ICTs)
	Water availability	Hydrological data being collected for supply estimation extended particularly to new areas of the region that were previously in accessible.	Planning information development and sharing

	Water availability	Groundwater assessment, monitoring and management programs.	Research and information sharing, investment in monitoring equipment
	Water use efficiency and cost recovery (water demand management)	Regional Water Pricing Regime.	Policy Development and Dialogue
	Water demand management & economic production enhanced	Analyse the impact of changes in the subsidies in agriculture and the international system of trade in food and fibre, on national and local water demands.	Research and information dissemination Support
	Water planning tool	Establish regional Water- Balance modelling.	Research, information analysis and sharing
COMMUNITY LIVELIHOODS STRATEGIC OPTIONS			
ACCESS	Established community natural resource management framework- Livelihoods improved	Support countries develop their Community Based Natural Resource Management (CBNRM) policies and water supply strategies that integrate natural resources management with improved lifestyles of rural communities particularly women.	Policy development and dialogue
	Skilled communities to manage natural resources + water-reduced environmental /biodiversity loss	CBNRM capacity building strategy for ecosystem management.	Institutional and Human Resource training and community empowerment
	Private sector investment in projects with public benefits	Promotion of public-private partnerships in ecotourism learning from sectors where the model has worked.	Dialogue-public and pvt. institutions

	Drought impacts mitigation strategy	Demonstrate the role of ground water in proactive drought mitigation for communities.	Research, Pilot projects, information sharing
	Vulnerability mitigation	Enhancement of Coping Methods for HIV/AIDS cases and other vulnerable groups	Community empowerment Information sharing
	Gender sensitive resource management	Special income enhancement programs for women	Women/community empowerment
	Skilled communities for integrated improved livelihoods and natural resource management	Empower communities to influence policy decisions so that they can observe national and regional protocols while ensuring opportunities for women to participate in environmental decision making.	Dialogue with communities, training and community empowerment
	Skilled communities for integrated improved livelihoods and natural resource management	Facilitating and increasing communities access to information to enhance their knowledge and skills to enhance their status of livelihoods.	Information sharing, training & community empowerment
	Procedures for incorporating gender perspective in policy development, planning, monitoring and evaluation of integrated water resources management	Public participation/ Improved livelihoods	
ECOSYSTEM MANAGEMENT APPROACH STRATEGIC OPTIONS			
	Sustainable Ecosystem Management, monitoring and analysis capacity- enhanced biodiversity/environmental	Support those institutions that can carry out research and projects on ecosystem management for improved livelihoods such as the IUCN.	Resource allocation, Research, case studies and information sharing

	management		
	Importance of natural resources to livelihoods promoted and private sector investment in this area	Valuation of goods and services provided by wetlands as a means of boosting community involvement in water management and attracting private sector investment.	Research and information sharing
	reduced environmental/biodiversity loss	Establish resilience of ecosystems and social systems to withstand impact of water scarcity and increase incomes hence improving livelihoods.	Research and information sharing

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