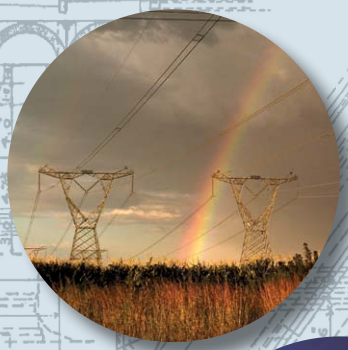

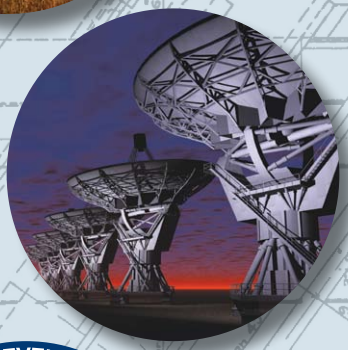

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY
SADC
TOWARDS A COMMON FUTURE

Regional Infrastructure Development Master Plan

Water Sector Plan

August 2012

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List of Abbreviations

AfDB	African Development Bank
AMCOW	African Ministers' Council on Water
AU	African Union
CEN-SAD	The Community of Sahel-Saharan States
COMESA	Common Market for East and Southern Africa
DANIDA	Danish Development Agency
DBSA	Development Bank of Southern Africa
EAC	East African Community
ECCAS	The Economic Community of Central African States
ECOWAS	The Economic Community of West African States
FAO	Food and Agricultural Organization
ICA	Infrastructure Consortium for Africa
IGAD	The Intergovernmental Authority on Development
MDGs	Millennium Development Goals
NEPAD	New Partnership for Africa's Development
NGOs	Non-governmental Organisations
RBOs	River Basin Organisations
RISDP	Regional Infrastructure Strategic Development Plan
SADC	Southern African Development Community
Sida	Swedish Development Agency
RIDMP	SADC Infrastructure Development Master Plan
ToRs	Terms of Reference
UMA	Arab Maghreb Union
UN	United Nations
WB	World Bank
WCD	World Commission on Dams

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Executive Summary

The primary objective of the SADC Regional Infrastructure Development Master Plan (RIDMP) is to define the minimum, but ultimate regional/trans-boundary infrastructure development requirements and conditions to facilitate the implementation and realization by year 2027 of the key infrastructure in the water, energy, transport, tourism, meteorology and telecommunication sectors that will move forward the SADC Agenda and enable the SADC region to realise its goal: The attainment of an integrated regional economy on the basis of balance, equity and mutual benefit for all Member States. The SADC goal is premised on the three key objectives of poverty eradication, food security and economic development.

The key aims of infrastructure development include the following:

- Providing infrastructure support for regional integration within the context of the regional economic integration agenda; and
- Infrastructure provision for poverty eradication through enhanced universal access to water supply and sanitation, transport, secure energy sources, communications and ICT, in order to maximise economic development and attain the MDGs targets, as the SADC region seeks to address its overarching objective of reducing poverty.

The RIDMP also constitutes a key input to the proposed COMESA-EAC-SADC Inter-regional Infrastructure Master Plan and the continental Programme for Infrastructure Development of Africa (PIDA).

The RIDMP is a strategic framework document, which will guide the implementation of efficient, seamless and cost-effective regional/trans-boundary infrastructure networks in an integrated manner in all the sectors (water, energy, transport, tourism, meteorology and telecommunication), which constitute SADC's Regional Infrastructure Development Programme. The RIDMP defines SADC's strategy in terms of content and actions, which constitute a basis for priority setting, strategy implementation as well as the *modus operandi* for implementation of the RIDMP. The RIDMP strategic framework provides both the infrastructure requirements and the implementation roadmap, Vision 2027 Water Sector targets that will be executed over a period of fifteen (15) years planned from 2012 as: short-term to 2017, medium-term to 2022 and long-term to 2027.

The current status of the water resources and related infrastructure development in the SADC region can be summarised as follows:

- Water resources significantly vary in distribution, availability and usage across the SADC region;
- There is an estimated total of 2 300 km^3/year of renewable water resources available to the SADC region's population of 260 million people (Aquastat 2011);
- The current level of abstraction is only 44 km^3/year or 170 m^3/capita/year. Of the 44 km^3/year abstracted, 77% is used for irrigation, 18% for domestic purposes while 5% is used by industry (Aquastat 2008);
- If the storage of the Kariba and Cahora Bassa dams is excluded, only 4% of the total annual renewable water resources in the SADC region is currently stored for various uses, which is very low compared to 70-90% in most industrialised countries (UNEP 2009);
- If the storage of Kariba and Cahora Bassa dams is included, 14% of the total annual renewable water resources in the SADC region is currently stored for various uses;

- There is about 50 million hectares of irrigable land available within the SADC region, of which only 3.4 million hectares (7%) is currently irrigated (SADC 2011);
- The hydropower potential of the SADC region is some 150 GW, of which only 12 GW is installed (SADC 2011); and
- Of SADC's population of 260 million people, 39% has no access to an adequate, safe drinking water supply, while 61% has no access to adequate sanitation services (SADC 2011).

The above statistics are summarised in *Table 1* and *Figure 1,* with comparisons with world averages and the developed world status. It is clear that the SADC region needs to invest in water sector infrastructure in order to develop economically and provide better livelihoods and quality of life for its citizens.

Table 1: Comparison of SADC Water Sector Status with Other World Benchmarks/Indicators

SECTOR	SADC STATUS	WORLD AVERAGES	DEVELOPED WORLD STATUS
Water abstraction	170 m^3/capita/year	570 m^3/capita/year	1 330 m^3/capita/year
Surface water storage	14% of ARWR stored	25% of ARWR stored	70% to 90% of ARWR stored
Irrigated land	7% irrigated of available irrigable land	20% irrigated of available irrigable land	70% irrigated of available irrigable land
Water supply	61% of the SADC population has access to an adequate and safe water supply	87% of the world population (2006) has access to an adequate and safe water supply	100% of the population has access to an adequate and safe water supply
Sanitation	39% of the SADC population has access to an adequate sanitation service	62% of the world population (2006) has access to an adequate sanitation service	100% of the population has access to an adequate sanitation service

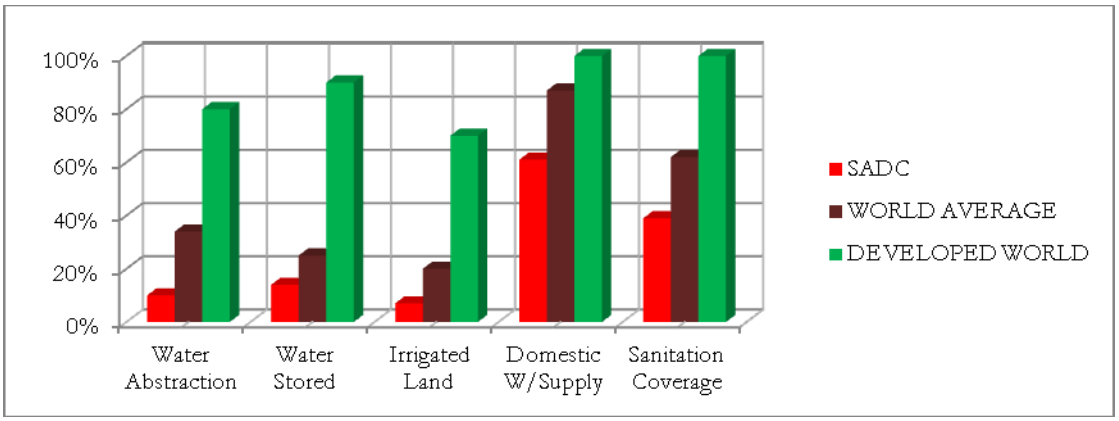

Figure 1: Comparison of SADC Water Sector Status with other World benchmarks/indicators

Using world benchmarks/indicators for socio-economic development and best practice standards, gaps in the current water infrastructure development and service provision sectors were identified, as well as institutional reforms necessary for more efficient infrastructure preparation for financing, development and management. *Table 2* and *Figure 2* give the details in respect of the current infrastructure development and service provision gaps in the SADC water sector.

The water sector part of the RIDMP contains 34 projects prioritised for implementation during the period 2013 to 2021. This is Phase 1 of the implementation of the water sector RIDMP. The 34

projects of Phase 1 will not meet the Vision 2027 water sector targets and hence Phase 2 and 3 projects will need to be identified, prepared and packaged for financing and be implemented during periods 2018 to 2027 and 2023 to 2027 respectively. Other reasons for splitting the implementation of the water sector part of the SADC RIDMP into three phases are to ensure that:

- Appropriate projects aligned to the Vision 2027 Water Sector targets are identified and prepared for implementation;
- The capacity to prepare, market and implement infrastructure projects in the SADC region is fully built and enhanced;
- Adequate time is provided for the SADC regional institutions and Member States to gain confidence and experience in regional infrastructure development; and
- Sufficient time is provided for the investors to gain the confidence and trust to do business with the SADC region.

Table 2: Gap between Current Situation and Vision 2027 targets

SECTOR	CURRENT STATUS	VISION 2027 TARGETS	GAP
Surface water storage	14% of ARWR stored (includes Kariba and Cahora Bassa dams)	25% of ARWR stored. To meet SADC regional demand. Eventual target is 75% stored as best practice is 70-90% of ARWR stored	An additional 11% of ARWR to be stored
Agriculture	3.4 million hectares (7% of potential) irrigated	10 million (20% potential) hectares irrigated. World average is 20%	An additional 6.6 million hectares to be irrigated
Hydropower	12 GW (8% of potential) installed	75 GW (50% of potential) installed to meet SAPP targets and exports to other RECs	An additional 63 GW to be installed
Water Supply	61% of 260 million people served	75% of 350 million people served. Eventual target is 100% served	An additional 14% of 350 million people to be served
Sanitation	39% of 260 million people served	75% of 350 million people served. Eventual target is 100% served	An additional 36% of 350 million people to be served
Water abstraction	44 km^3/year abstracted	264 km^3/year abstracted to meet expected increase in water demand	An increase to 220 km^3/year abstracted

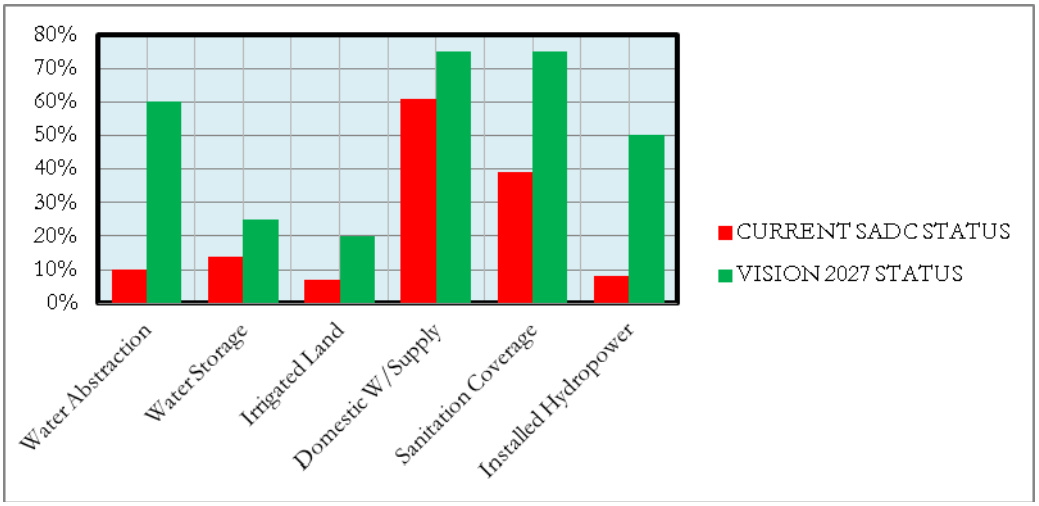

Figure 2: Gap between Current Situation and Vision 2027 targets

Of the 34 Phase 1 projects, three are facilitation projects, four are capacity building projects, and six are studies, while 21 are investment projects. The estimated total cost of all the 34 Phase 1 projects

is US$16 billion.

Figure 3 summarises the Water Sector Implementation Plan, which is divided into three phases. The total estimated cost for all the three phases is US$200 billion (Phase 1: US$16 billion, Phase 2: US$104 billion and Phase 3: US$80 billion). It is expected that at the end of Phase 2 Water Sector RIDMP project implementation, 40% of the Vision 2027 Water Sector targets would have been achieved, while 100% of the Vision 2027 Water Sector targets would be achieved by 2027.

Possible project financing sources and the lead agencies for implementation have been proposed. Three SADC infrastructure investment summits and conferences are proposed in 2012, 2017 and 2022. It is also recommended that a Regional Infrastructure Development Fund be set up, possibly administered by the Development Bank of Southern Africa (DBSA), in conjunction with the African Development Bank (AfDB). Some critical factors for the successful implementation of the Water Sector part of the RIDMP have also been identified, bearing in mind that the SADC Member State national projects should supplement the RIDMP projects so that the Vision 2027 Water Sector targets are easier and quicker to achieve. These SADC Member State national projects should be regularly reported on and be included in the SADC Water Sector database.

The Annexure contains the 34 Water Sector project profiles.

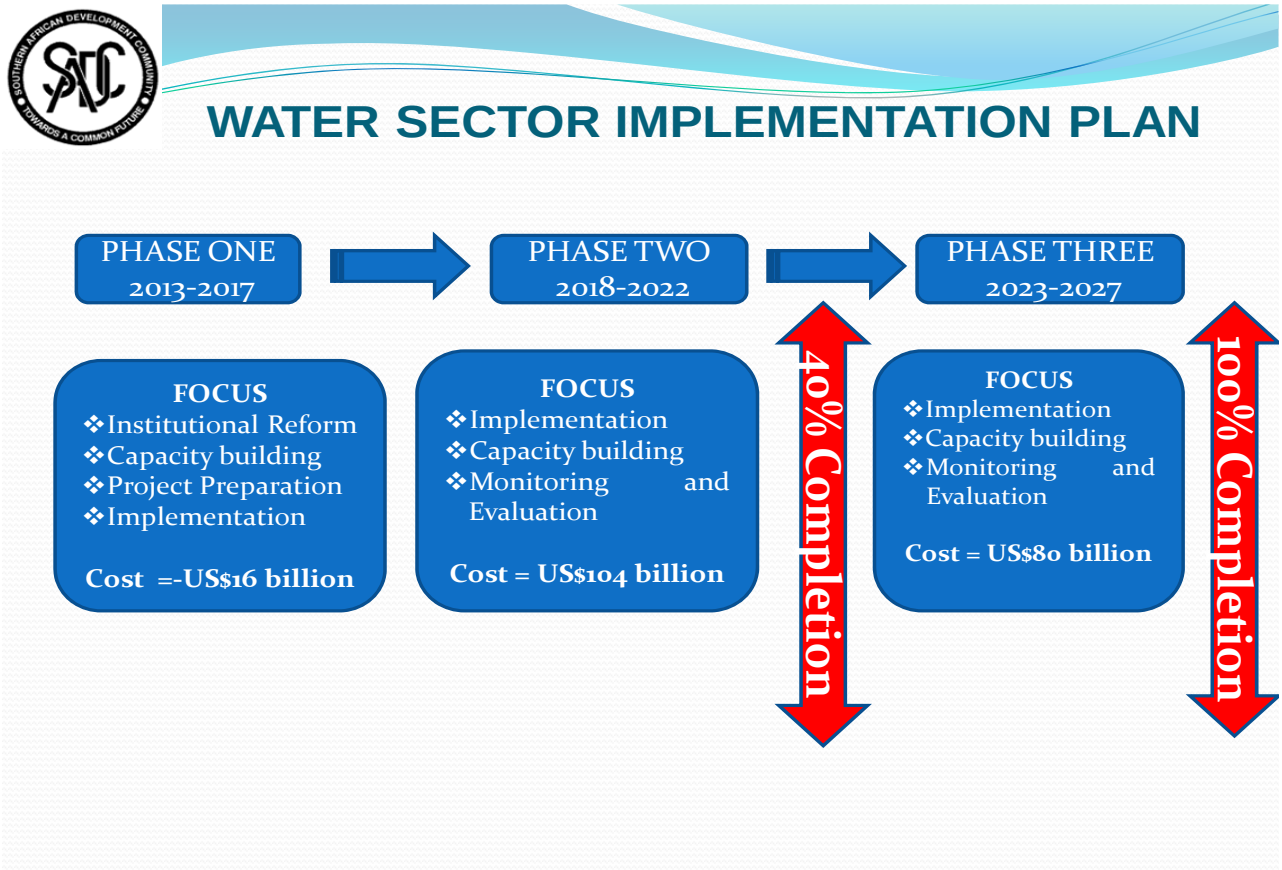

Figure 3: Summary of Water Sector Implementation Plan.

1. Introduction

1.1 Purpose and Objectives of the Water Chapter of the RIDMP

The Water Chapter of the RIDMP, among other deliverables, contains a review of the implementation status, mechanisms for enforcement and monitoring of implementation progress of the approved SADC Protocols, policies and strategies in the Water Sector, which identifies the infrastructure implementation challenges and proposes possible solutions that constitute the strategic elements of the RIDMP. The Water Chapter of the RIDMP also contains a review of the current water sector infrastructure development situation in the SADC region and its ability to meet the current needs and those forecasted to 2027 in line with the RSAP III and RISDP objectives.

Consideration has been made of the outcomes of the first SADC Water Infrastructure Investment Conference held in September 2011 in Maseru, Lesotho, as well as the Energy Investment Conferences. These reviews enabled the identification of additional infrastructure development requirements to be addressed in the RIDMP. However, it should be noted here that the SADC Member States have already identified and prioritised 23 projects (Table 3.1) for implementation. The Water Chapter of the RIDMP includes an analysis of whether these 23 projects are fully aligned with the RSAP III and/or the RISDP objectives. In the development of the Water Sector part of the RIDMP, other water infrastructure projects besides these 23 projects have been identified as part of the RIDMP. The Water Chapter focuses on identifying the implementation challenges that these 23 and the other identified projects may face and its possible solutions. The 23 projects may also be viewed as the Water Sector pilot projects for the RIDMP.

A diagnostic study to provide the baseline situation indicating the gaps that needed to be addressed in the water infrastructure development sector was undertaken. The identified gaps covered institutional, policy, financing and regulatory frameworks. Gaps and bottlenecks related to the successful implementation of the 23 selected projects (Table 3.1) were identified and projects to address the gaps are included in the Water Chapter of the RIDMP.

The Water Chapter of the RIDMP also contains the Vision 2027 Water Sector targets.

1.2 Policy/Legal basis guiding the SADC Water Sector

At regional level, the SADC Water Sector is guided by the following key policy and legal provisions, which will be discussed in detail in Section 2 below:

- The SADC Declaration and Treaty (1992);
- The SADC Regional Indicative Strategic Development Plan (2005);
- The SADC Revised Protocol on Shared Watercourses (2000);
- The SADC Regional Water Policy (2006);
- The SADC Regional Water Strategy (2007);
- The Southern African Vision for Water, Life and the Environment in the 21st Century (2006);
- The SADC Regional Awareness and Communication Strategy for the Water Sector (2010);
- Climate Change Adaptation in SADC: a Strategy for the Water Sector (2011);
- The SADC Regional Strategic Action Plans (1999, 2004 and 2010); and
- The SADC Guidelines for Strengthening River Basin Organisations (2010).

At international level, the SADC Water Sector is guided by the following key policy and legal provisions, which will be discussed in detail in Section 2 below:

- The Copenhagen Declaration (1991);
- The Dublin Principles (1992);
- Agenda 21 of the UN Conference on Environment and Development (1992);
- The UN Convention of the Law of Non-navigational Uses of International Watercourses (1997); and
- The MDGs (2000).

2. Water Sector Infrastructure situation analysis

2.1 Current Water Sector Status

The current status of the water resources and related infrastructure development in the SADC region can be summarised as follows and is contained in *Table 1*:

- Water resources significantly vary in distribution (*Figures 2.1 and 2.2*), availability and usage across the SADC region;
- There is an estimated total of 2 300 km^3/year of renewable water resources available to the SADC region's population of 260 million people. The renewable water resource is the long-term average annual flow of rivers and the recharge of aquifers generated from endogenous precipitation. Double counting of surface water and groundwater resources is avoided by deducting the overlap from the sum of the surface water and groundwater resources (Aquastat 2011);
- The current level of abstraction is only 44 km^3/year or 170 m^3/capita/year. Of the 44 km^3/year abstracted, 77% is used for irrigation, 18% for domestic purposes, while 5% is used by industry (Aquastat 2008);
- If the storage of Kariba and Cahora Bassa dams is excluded, only 4% of the total annual renewable water resources in the SADC region is currently stored for various uses, which is very low compared to 70-90% in most industrialised countries (UNEP 2009);
- If the storage of Kariba and Cahora Bassa dams is included, 14% of the total annual renewable water resources in the SADC region is currently stored for various uses;
- There is about 50 million hectares of irrigable land available within the SADC region, of which only 3.4 million hectares (7%) is currently irrigated (SADC 2011);
- The hydropower potential of the SADC region is some 150 GW, of which only 12 GW is installed (SADC 2011); and
- Of SADC's population of 260 million people, 39% has no access to an adequate, safe drinking water supply, while 61% has no access to adequate sanitation services (SADC 2011).

Table 1, *Figure 1* and the above statistics indicate that while there are apparently adequate water resources within the SADC region (8 800 m^3/capita/year on average), there is inadequate water sector infrastructure and storage to make these water resources accessible and available to the SADC citizens to utilise for their economic and social benefit.

Figure 2.3 gives a pictorial view of the surface water storage per capita of selected countries with storage amounts greater than 500 m^3/capita. While some SADC Member States have higher storage per capita amounts than the USA, Australia and China, this storage is primarily for hydropower generation. The SADC average storage amount (excluding Kariba and Cahora Bassa dams) is low at 354 m^3/capita, and 1 220 m^3/capita if the storage of Kariba and Cahora Bassa dams are included (SADC Average (2) and SADC Average (1) in *Figure 2.3* respectively). At world storage per capita averages of 70-90% of the total annual renewable water resources, the SADC average in 2027 should ideally be 4 900 m^3/capita stored.

Table 1: Comparison of SADC Water Sector Status with Other World Benchmarks/Indicators

SECTOR	SADC STATUS	WORLD AVERAGES	DEVELOPED WORLD STATUS
Water abstraction	170 m^3/capita/year	570 m^3/capita/year	1 330 m^3/capita/year
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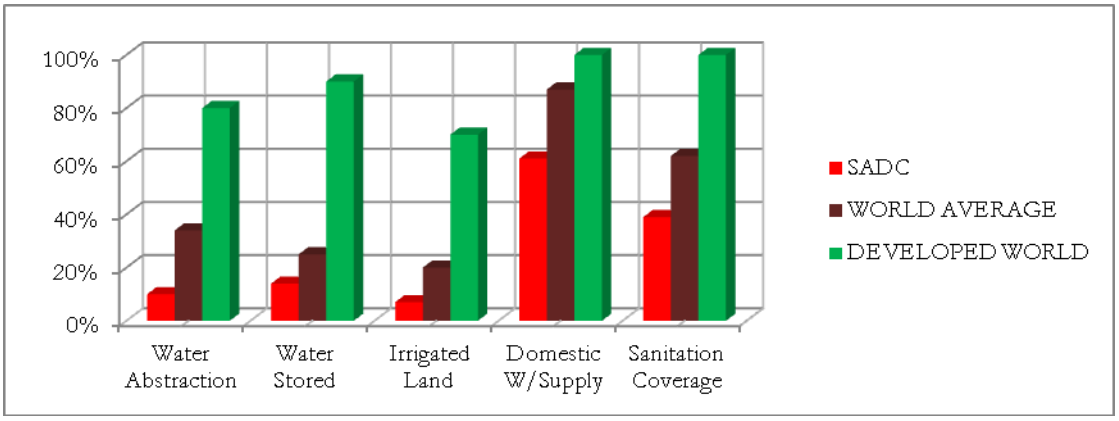

Figure 1: Comparison of SADC Water Sector Status with Other World Benchmarks/Indicators

2.2 Enabling Environment

2.2.1 International Regulatory / Guiding Framework

At international level, the SADC Water Sector is guided by a number of international water laws and declarations, which have greatly influenced the development of the SADC Water Sector's regional regulatory and legal framework. The pertinent international regulatory and guiding framework can be summarised as follows:

2.2.1.1 The Copenhagen Declaration

The Copenhagen Declaration of 1991 on the implementation mechanisms for integrated water resources development and management gives two key principles, which are considered to be prime components of future water resources management, particularly for rural communities. These two key principles are considered appropriate at all levels and state that:

- Water and land resources should be managed at the lowest appropriate levels; and
- Water should be considered as an economic good, with a value reflecting its most valuable potential use.

2.2.1.2 The Dublin Principles

The four Dublin Principles of 1992 state that:

- Water and land must be managed in an integrated way;
- Resource management must be participatory and on the lowest possible level;
- Positive policies must be formulated to address women's needs and empower women; and
- Water should be recognised and treated as an economic entity.

2.2.1.3 Agenda 21 of the United Nations Conference on Environment and Development

Commonly known as the Rio Declaration of 1992, Agenda 21 gives provisions and concepts for environmentally sound management, sustainable development and equitable utilisation of shared watercourses.

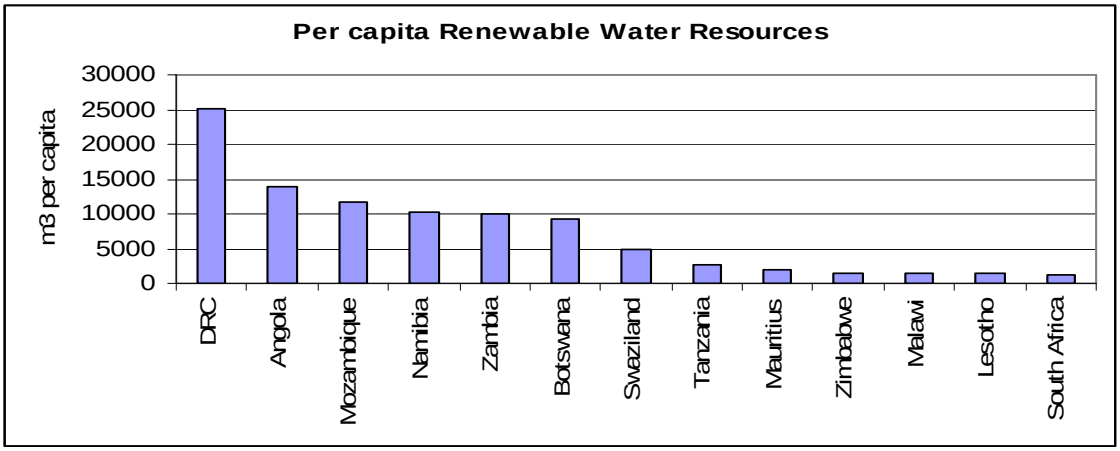

Figure 2.1: Per Capita Renewable Water Resources Source: World Bank (2004)

2.2.1.4 The United Nations Convention on the Law of Non-navigational uses of International Watercourses

The codification of international water law, which was initiated by the Helsinki Rules, was achieved in 1997 when the United Nations (UN) General Assembly adopted the UN Convention on the Law of the Non-navigational Uses of International Watercourses. This adoption by the UN necessitated the revision of the SADC Protocol on Shared Watercourse Systems, which was undergoing its ratification process. The SADC Revised Protocol on Shared Watercourses of 2000 incorporates the key elements of the UN Convention.

2.2.1.5 The Millennium Development Goals (MDGs)

During the United Nations (UN) Summit in September 2000, 189 UN Member States adopted the Millennium Declaration from which emerged the Millennium Development Goals (MDGs). The MDGs form a set of political commitments aimed at tackling the major developmental issues faced by the developed and developing world, which have to be achieved by 2015. While almost all the MDGs can be indirectly linked to water supply and sanitation (WSS) issues, Goal 7 on environmental sustainability addresses them directly. One of the Goal 7 targets, Target 10, is to "halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation".

Although there is progress towards meeting the targets in the MDGs related to water and sanitation, achieving universal access to safe water and improved sanitation will require time and considerable investment in most regions (Konkagul, 2009). It is also recommended that countries should identify or establish an institutional base for water and sanitation, and prioritise investment for it where needs are greatest and the impacts likely to be most substantial, for example in health centres, schools and workplaces. Both financial and human resources are required for water and sanitation, together with more community involvement and an emphasis on low cost technology options (UN, 2006).

2.2.2 SADC Regional Cooperation

Since the creation of SADC and the adoption and coming into force of the SADC Treaty in 1993, the SADC Water Division, which falls under the Directorate of Infrastructure and Services of the SADC Secretariat based in Gaborone, Botswana, has scored significant successes in the promotion and management of the water resources of the SADC region in a sound and environmentally sustainable manner. There is political goodwill within the SADC Member States, which has facilitated the adoption by all Member States of a shared vision and common agenda to work together to achieve the SADC regional goals.

Various documents related to strategies, policy, communication and river basin organisations have thus been produced over the years, through very rigorous stakeholder consultations and participation. These protocols, policies, strategies and information dissemination sharing networks, provide the framework and enabling environment for the conceptualisation and eventual execution of national, regional and inter-regional water infrastructure. *Figure 2.4* gives the relationships between these legal, policy and strategy documents and processes. The following documents, networking and information sharing platforms provide clear policies, strategies and the resultant enabling environment respectively for the management of shared watercourses and the development of water resources infrastructure within the SADC region.

Regulatory / Legal Framework

2.2.2.1 The SADC Declaration and Treaty

The Declaration Towards the Southern African Development Community by the SADC heads of state and governments was adopted in Windhoek, Namibia on 17 August 1992. The SADC Treaty, which governs the regional activities of SADC and its Member States, came into force on 30 September 1993. The original Declaration called upon all the countries and citizens of Southern Africa to develop a vision of a shared future, a future within a regional community that would ensure the economic well-being, improvement of living standards and quality of life, freedom, social justice, peace and security for the citizens of Southern Africa (SADC 2006).

2.2.2.2 The SADC Regional Indicative Strategic Development Plan (RISDP)

Implementation of the SADC Regional Indicative Strategic Development Plan (RISDP) commenced in 2005 and is the blueprint for SADC development. The RISDP outlines the key interventions necessary to deepen regional integration and eradicate poverty on a sustainable basis (SADC 2009). It incorporates crosscutting issues related to combating HIV and AIDS, gender equality and mainstreaming, poverty eradication, environment and sustainable development, private sector development, science and technology, as well as statistics.

2.2.2.3 The SADC Revised Protocol on Shared Watercourses

The overall objective of the SADC Revised Protocol on Shared Watercourses, which came into effect in 2003, is to foster closer cooperation for judicious, sustainable and coordinated management,

protection and utilisation of the fifteen SADC shared watercourses and the advancement of the SADC agenda of regional integration, poverty eradication and economic development (SADC 2003). A key element of this Protocol is the provision for the creation of river basin organisations that would manage and develop the water resources of SADC's shared watercourses in a sound and environmentally sustainable manner.

2.2.2.4 The SADC Regional Water Policy

The SADC Regional Water Policy aims at providing a framework for sustainable, integrated and coordinated development, utilisation, protection and control of national and trans-boundary water resources in the SADC region for the promotion of socio-economic development and regional integration and the improvement in the quality of life of all people in the region (SADC 2006). The Policy structure has nine thematic areas, which address the regional water resources management issues and challenges, while optimising the development opportunities. The Regional Water Policy highlights various opportunities for water management to achieve the SADC goal and objectives, as well as other recognised international and regional targets such as the MDGs, the goals of the AU on water through AMCOW and NEPAD and the Southern African Vision for Water, Life and the Environment (SADC 2007).

2.2.2.5 The Southern African Vision for Water, Life and the Environment in the 21st Century

Southern Africa has a vision for water, life and the environment in the 21st Century, namely the equitable and sustainable utilisation of water for social, environmental justice and economic benefit for present and future generations (SADC 2006). This Vision anchors and expresses the desires and aspirations of the citizens of Southern Africa, and guides the activities and strategies of SADC and its individual Member States towards its achievement. A Framework for Action accompanies the Vision.

2.2.2.6 The SADC Regional Water Strategy

The Regional Water Strategy (RWS) is based on the Regional Water Policy (RWP) and provides the framework for the implementation of the RWP. While the RWP deals with the "What" on regional water issues, the RWS deals with the "How", "Who" and "When" in the implementation of the RWP (SADC 2007).

2.2.2.7 The SADC Regional Awareness and Communication Strategy for the Water Sector

The ultimate goal of the SADC Regional Awareness and Communication Strategy for the Water Sector is to improve awareness and understanding on water issues and initiatives in the SADC region contributing to poverty eradication and regional integration. The Strategy is a broad framework of what needs to be communicated and outlines the possible target audiences, as well as the communication tools. The SADC Regional Awareness and Communication Strategy for the Water Sector has three main target users: the SADC Water Division, the SADC Member States and the regional organisations working in the Water Sector such as RBOs and NGOs (SADC 2010).

2.2.2.8 The SADC Regional Strategic Action Plans

Since 1998, the Water Sector has had three Regional Strategic Action Plans (RSAPs) as follows:

1. The main objective of the RSAP I (1999 to 2004) was to create an enabling environment for the joint management of regional water resources. The RSAP I was meant to lay the institutional basis for the execution of infrastructure projects and other related development initiatives. The

RSAP I was reviewed in 2004 to provide recommendations for the formulation of RSAP II (2005 to 2010);

2. The major change between RSAP I and RSAP II was the emphasis put on infrastructure development. Under RSAP II, the SADC Water projects were arranged under four clusters, water resources development, water governance, capacity building and infrastructure support. RSAP II was reviewed in late 2009 to assess the progress made with the implementation of the plan. This review resulted in the current RSAP III (2011 to 2015); and
3. The goal of RSAP III is to strengthen the enabling environment for regional water resources governance, management and development through the application of integrated water resources management at the regional, river basin, Member State and community levels. RSAP III rests on three pillars: water governance, infrastructure development and water management. The three pillars are founded on an IWRM base. The RSAP III is the current official SADC programme for the Water Sector and is therefore the *de facto* implementation plan for the Water Sector part of the RIDMP.

2.2.2.9 The SADC Guidelines for Strengthening River Basin Organisations

Published in 2010, the SADC Guidelines for Strengthening River Basin Organisations cover four areas:

1. **Establishment and development:** To propose the procedures that could assist Member States to establish appropriate management institutions for shared watercourses;
2. **Environmental management:** To establish a set of procedures that can assist RBOs with the implementation of environmental management;
3. **Funding and financing:** To establish a set of procedures that can assist RBOs to become financially sustainable; and
4. **Stakeholder participation:** To establish a set of procedures that can assist RBOs with the implementation of participatory approaches.

Figure 2.5 gives a pictorial view of the major river basins of the SADC region.

2.2.2.10 Climate Change Adaptation in SADC: a Strategy for the Water Sector

Published in November 2011, the SADC Climate Change Adaptation Strategy for the Water Sector was launched during the 17th Conference of the Parties (COP 17) to the United Nations Framework Convention on Climate Change (UNFCCC), which was held in Durban, South Africa in November 2011.

The overall goal of the Climate Change Adaptation (CCA) Strategy is to improve climate resilience in Southern Africa through integrated and adapted water resources management at regional, river basin and local levels. The Strategy focuses on the implementation of both no-regret and low-regret measures. The former relate to measures that will prove worthwhile doing, even if no (further) climate changes occur, and the latter to measures that will only require small additional expenditures to cater for the negative effects of climate change.

The Strategy presents measures to be taken over the next 20 years. It is recommended that work on adaptation should be started immediately, as this would benefit the sectors under present climatic conditions. The Strategy calls for the implementation of adaptation measures at different levels, at different stages of the adaptation process and in different areas of interventions. The Strategy is embodied in the SADC Water Adaptation Cube, which was designed to raise awareness and facilitate coordination among stakeholders. Climate Change Adaptation is a building block of climate resilience in Southern Africa (SADC 2011).

Key SADC Water Sector Reports

2.2.2.11 The SADC Infrastructure Development Status Reports for Council and Summit (2009)

The primary purpose of the SADC Infrastructure Development Status Reports for Council and Summit (SADC 2009) is to appraise the Council of Ministers and the heads of state and governments of SADC on the extent and status of implementation of the regional infrastructure projects since the commencement of the execution of the RISDP in 2005. The Reports also synthesise the challenges and achievements in implementation of SADC's regional infrastructure projects and propose the way forward towards the achievement of SADC's goal in the infrastructure cluster (SADC 2009).

2.2.2.12 The SADC Regional Position on the World Commission on Dams and Development Report

Wide consultations were done on matters related to dams and development, following the introduction of the WCD Report at the 10th Meeting of the SADC Water Resources Technical Committee (WRTC) in Mbabane, Swaziland in May 2001. The Report was then presented to the annual meeting of SADC Ministers of Water in June 2001, in Harare, Zimbabwe. In recognition of the importance of dams and development to the region, the ministers called on the Member States to review the WCD Report, assess its usefulness and impact, and establish national positions that would enrich the overall regional position on the document (SADC 2006).

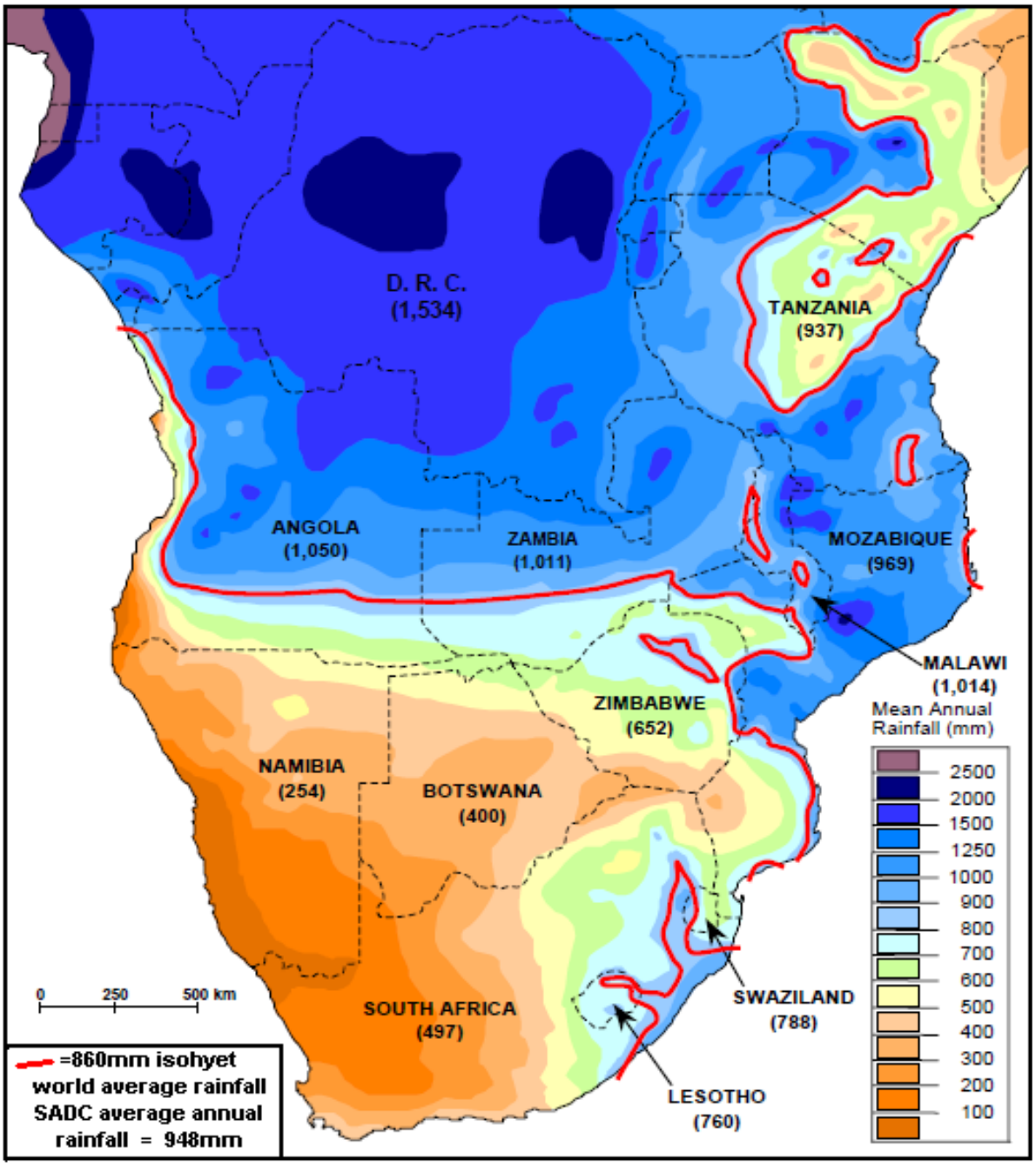

Figure 2.2: Mean Annual Rainfall distribution across the SADC region. Source: SADC 2007

The SADC Water Division, through continued extensive national and regional consultations, undertook this and a position paper was prepared in February 2006, which clearly expresses the views and reservations of SADC to the WCD Report. The SADC position is quite clear and gives guidance to the development of dams and related water infrastructure in the SADC region.

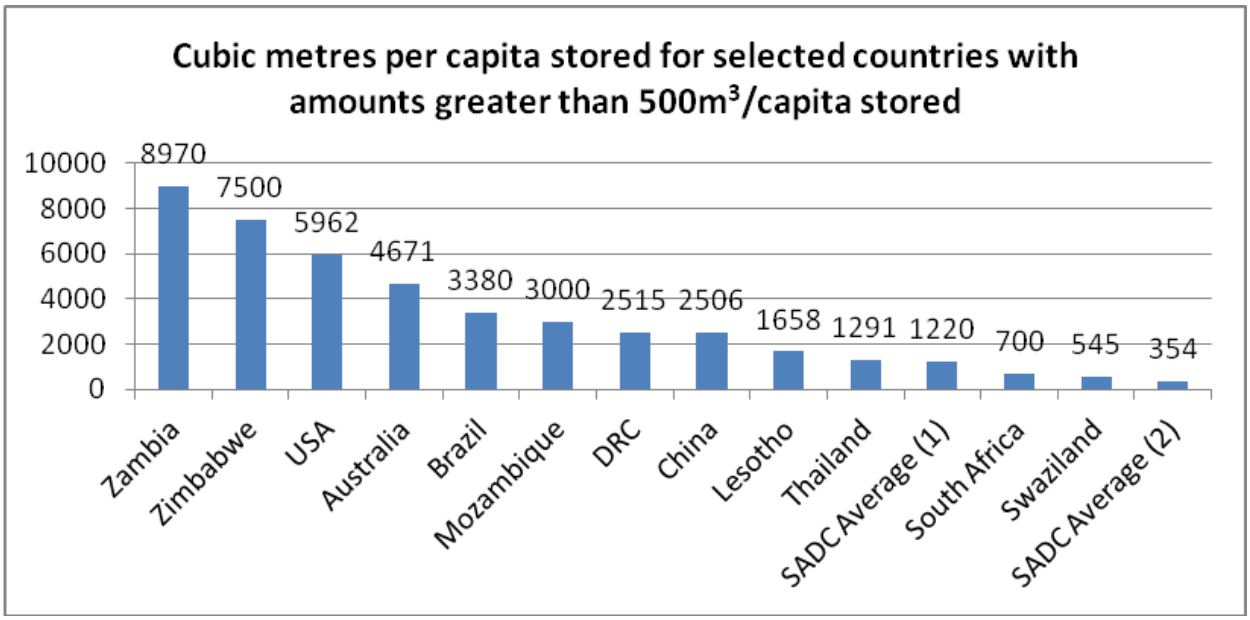

Figure 2.3: Existing Surface Water Storage per Capita for Selected Countries with Storage Greater than 500 m^3/capita (SADC Average (1) Includes Kariba and Cahora Bassa Storage, while SADC Average (2) Excludes Kariba And Cahora Bassa, Data Source: World Bank (2004, 2005))

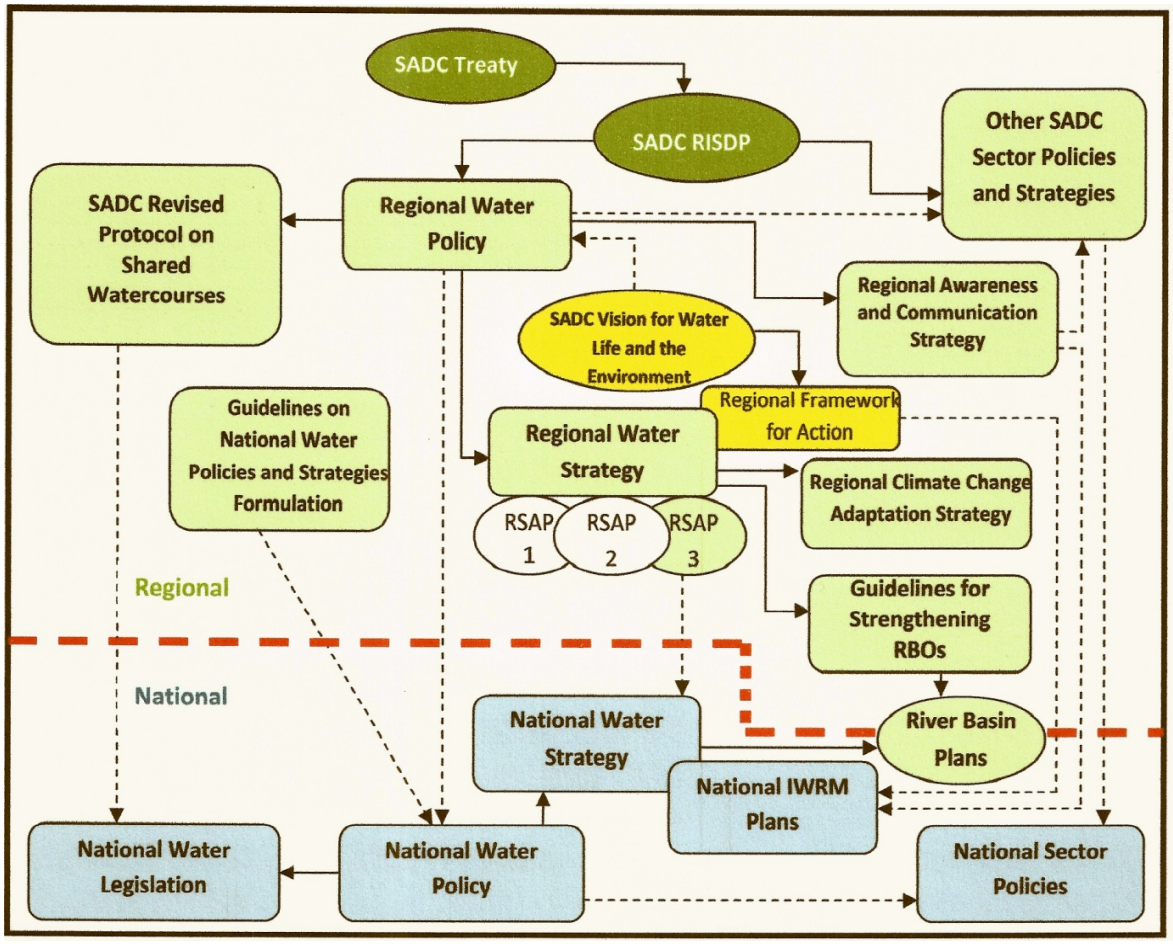

Figure 2.4: Relationships Between the Enabling Environment: Legislation, Policies and Strategies. (Original Source: SADC 2007. Updated and redrawn: December 2011)

SADC Ongoing Water Initiatives

2.2.2.13 The SADC Multi-Stakeholder Water Dialogues

Annually, SADC endeavours to bring together water managers, agronomists, scientists, researchers, hydrologists, the media and its ICPs to discuss various water issues within the region. These multi-stakeholder water dialogues encourage the sharing of contemporary information and knowledge regarding issues around the theme of the water dialogue and are an excellent networking tool.

Five such water dialogues have been held, the last being held in Swaziland in June 2011, under the theme Financing Water for Climate Resilience to Ensure Regional Security.

2.2.2.14 The SADC Water Sector Investor Conference

SADC held its first regional Water Sector Investor Opportunity Conference on strategic water infrastructure in Maseru, Lesotho on 23 September 2011. The Conference brought together SADC ministers responsible for water, RBOs and potential investors, including multi-lateral banks and ICPs among others, to discuss funding for already prioritised strategic water infrastructure projects from SADC Member States.

The Conference aimed at marketing strategic water infrastructure projects that contribute to regional integration and poverty eradication through food security, energy security and safe water supply and sanitation. More importantly, these projects are all geared towards improving resilience of citizens in the SADC region against water related disasters that occur mainly due to the changing climate.

The projects are packaged into three categories, namely regional, cross-border and priority national projects contributing to regional goals. Some of these projects are candidates for grant funding, while others are targeting loan financing. The Conference also aimed at presenting the SADC Regional Water Infrastructure Programme to development partners and ICPs, and presenting strategies for the implementation of the Regional Water Infrastructure Development Programme. The need for the development of water infrastructure is one of the key priorities cited in the SADC Regional Indicative Strategic Development Plan (RISDP), SADC's operational blueprint for regional integration and poverty eradication crafted in line with the Millennium Development Goals (SADC ICP 2011).

2.2.2.15 The SADC River Basin Organisation Conferences/Workshops

The RBOs of the SADC region together with other stakeholders and regional ICPs, meet regularly to share ideas, challenges and best practices. This is another excellent opportunity for networking and sharing experiences in the execution of River Basin Projects and IWRM best practices applied in the various River Basins. At the 4th SADC RBO Workshop held in Gaborone, Botswana in April 2010, the *Guidelines for Strengthening River Basin Organisations* were launched.

2.2.2.16 The SADC Water Sector ICP Collaboration Portal

The purpose of the SADC Water Sector ICP Collaboration Portal, a web-based platform, is to promote networking, information and knowledge sharing between SADC, RBOs, SADC's ICPs, and other Water Sector stakeholders. This assists in streamlining ICP efforts in delivery of support to the Water Sector, resulting in avoidance of duplication of effort resulting in increased synergies. It is hoped that channelling collective information into a common pool of knowledge and open dialogue will open the floodgates to a future of collaboration and confluence for the SADC region (SADC Water Sector Collaboration Portal 2011).

2.2.2.17 River Basin Awareness Kits

A River Awareness Kit (RAK) is an information and knowledge management for a river basin, which supports dissemination of information and the management of the environment and resources of that river basin. So far four RAKs have been developed for the:

a) Kunene River Basin (www.kunenerak.org);
b) Orange-Senqu River Basin (www.orangesenqurak.com);
c) Limpopo River Basin (www.limcom.org); and
d) Okavango River Basin (www.okacom.org).

2.2.3 Member States

Table 2.1 shows the SADC Member States, as well as the shared watercourses and institutions in existence. It is clear from *Table 2.1* that the legal and policy reforms are at different levels of development in the SADC Member States. This, therefore, calls for concerted effort by the SADC Member States to move towards common ground in this respect, by harmonising the legal and policy frameworks with those of SADC among themselves, so as to facilitate joint regional infrastructure development projects.

2.3 Water Sector Projections and Trends

The major water uses in the SADC region that need water resources infrastructure development in order to improve productivity, enhance economic development while alleviating poverty in a sustainable manner are:

- Aquaculture;
- Mining;
- Irrigation;
- Domestic and livestock uses;
- Manufacturing;
- Hydro- and thermal power generation;
- Navigation; and
- Recreation and environmental flows.

In the planning horizon of 2013 to 2027 (15 years), the Water Sector infrastructure development interventions should target three main water user areas, namely agriculture, hydropower generation and water supply and sanitation services in line with the SADC goal and RISDP objectives. The agriculture and hydropower generation sub-sectors are the main catalysts or drivers for food security, poverty eradication and economic development, while water supply and sanitation services not only ensure poverty eradication and healthier citizens, but should also be considered a human right.

The other Water Sector users such as aquaculture, navigation, recreation and environmental flows will also benefit from the provision of infrastructure of the three main user areas. The population of the SADC region is currently estimated at 260 million people (Aquastat 2008). At an average population growth rate of 2.1% per annum (SADC 2008), the SADC region's population will reach 350 million by 2027.

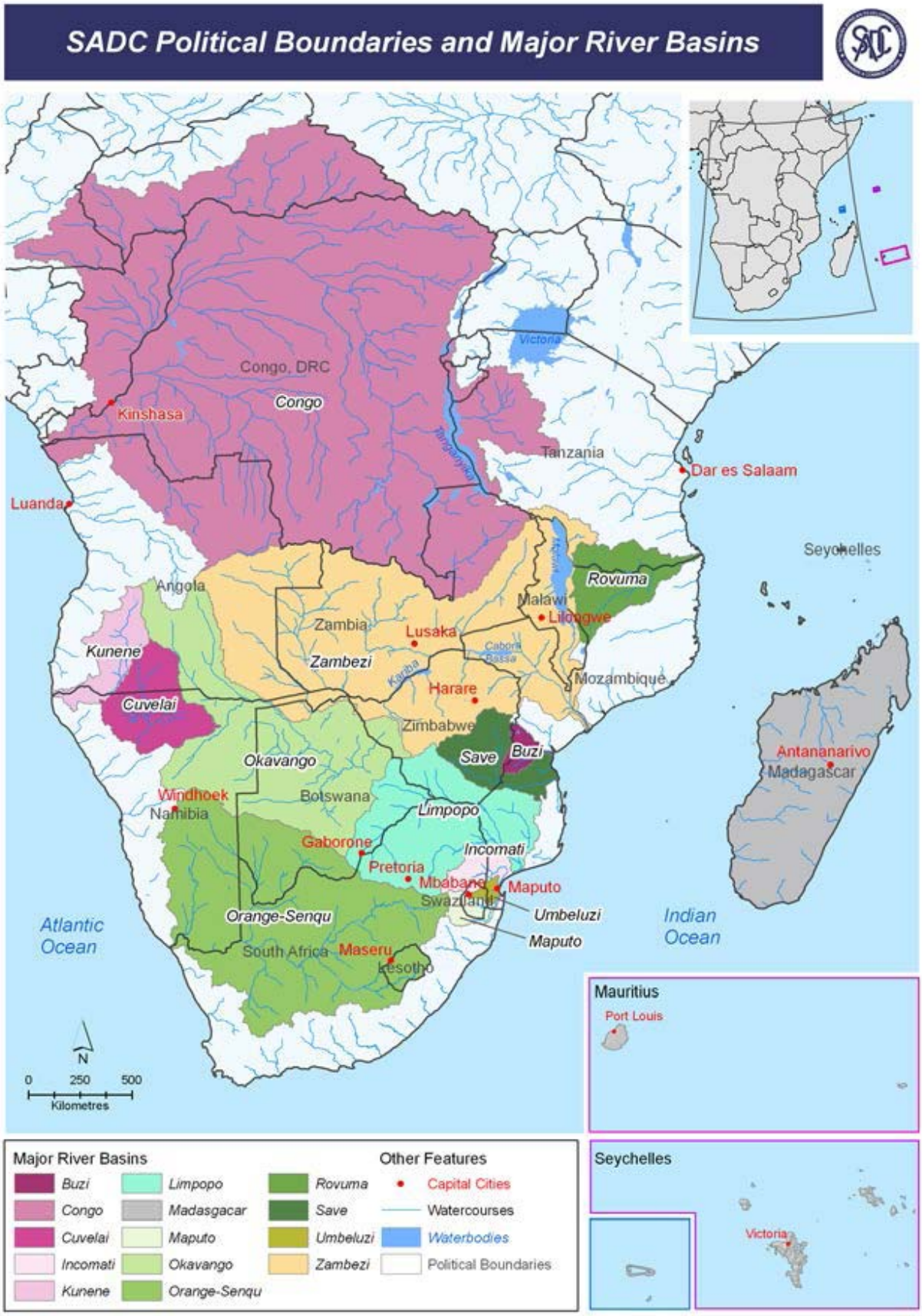

Figure 2.5: SADC Political Boundaries and Major River Basins. Source: SADC 2011

SOFRECO (2011) states that a 6% growth rate for Africa is above recent performance (the AfDB projects a growth rate of 5.2% for Africa in 2011), and implies that in 30 years time, the GDP of African countries will on average be multiplied six fold. The requirements for additional infrastructure will be of the same magnitude and sometimes larger (for instance in power).

Water resources significantly vary in distribution, availability and usage across the SADC region. There will be need for inter-basin water transfers, primarily from the north of the SADC region to the drier south and west. There is an estimated total of 2 300 km^3/year of renewable water resources available. The current level of abstraction is only 44 km^3/year or 170 m^3/capita/year. At the estimated population growth rate of 2.1% and at current water usage rates, the abstraction will increase to a mere 60 km^3/year by 2027.

It is expected that agriculture will continue to be the biggest user, abstracting at the current average rate of 77% of the renewable water resource, followed by domestic purposes (18%) and industry (5%). *Figure 2.6* illustrates the water use in the SADC region by these three main sectors.

If the storage of Kariba and Cahora Bassa dams is excluded, only 4% of the total annual renewable water resources in the SADC region are currently stored. If the storage of Kariba and Cahora Bassa dams is included, 14% of the total annual renewable water resources in the SADC region are currently stored. The surface water storage ratio will have to increase to at least 25% (inclusive of Kariba and Cahora Bassa dams) of the total annual renewable water resource of the SADC region for the region to match the demands for economic growth, meeting the MDG targets and the SADC agenda of regional integration, poverty eradication and economic development.

2.4 Assessment of Gap between Current Situation and 2027 Requirements

The main challenges of the Water Sector in Africa remain the low development and use of the potential water resources due to the deficiency of water infrastructure, the critically deficient agricultural water management, the missing water services and institutional platforms, the inadequate access to markets, the lack of financing and capacity of institutions, and the weak government budgetary commitments. These issues are detrimental to a sector that is otherwise in a unique position to reduce exposure to food crisis and to deliver pro-poor growth among rural households (Bahri 2011). This summary of the challenges of Africa is relevant and applies to the SADC region as a whole. These challenges will help in the identification of the actions required to mitigate them.

There has been very minimal investment in large hydraulic infrastructure in the past 15 years in the SADC region. *Table 2.2* shows some selected large hydraulic infrastructure of the SADC region built at least 15 years ago, while *Figure 2.7* gives the number of large dams in each SADC Member State. Some of the main challenges resulting in this lack of water infrastructure investment in the SADC region can be summarised as follows:

- Climate resilient water projects, be they for hydropower generation, agriculture or flood and drought mitigation, are usually large in size and thus need long lead times for their planning and execution, which requires staying power in governments and implementing institutions to see them through;
- The charging of non-cost-reflective water tariffs from existing water infrastructure results in very low revenue streams for maintenance and new investments;
- The availability of funds to finance climate resilient water infrastructure;
- Lack of water sector reforms to promote, attract and retain private sector investments;

- Lack of clear strategies for implementation of priority projects through well prepared infrastructure development master plans;
- Water sector infrastructure developmental projects are becoming more expensive and technically more challenging to conceive and implement, as the cheaper and less technically challenging projects have been implemented over the years;
- Environmental concerns and issues are now better understood than in the past and this has reduced the number of technically viable and cheaper water sector infrastructure projects or have made those that pass the EIAs more expensive to implement due to the mitigatory measures required;
- Legacies of previous bi-national projects, such as the Kariba Dam, have continued to frustrate some new bi-national water infrastructure projects;
- The socio-economic conditions of the SADC Member States vary considerably, and implementing joint water projects in such an environment is a challenge; and
- The processes for large dam infrastructure development, advocated by the World Commission on Dams and other anti-dam development campaigns, have slowed down the pace of large water infrastructure development.

Table 2.1: The Water Sector Legal and Policy Reforms/RBOs in the SADC Member States

COUNTRY	MAIN WATER SECTOR LEGAL INSTRUMENTS AND POLICIES	SHARED WATERCOURSES/INSTITUTIONS
Angola	1. Environment Act (1998) 2. Water Act (2002) 3. National Water Resources Management Policy (2003)	1. Cunene/Permanent Joint Technical Commission 2 Okavango/OKACOM 3. Zambezi/ZAMCOM
Botswana	1. Boreholes Act (1956) 2. Water Act (1968) 3. Water Utilities Corporation Act (1970) 4. Public Health Act (1981) 5. National Water Conservation Policy (2004) 6. Environmental Impact Act as amended (2011) 7. National Water Master Plan Review (2006) 8. Water Management Act (Ch. 65: 06) 9. Water Works Act (Ch. 34: 03) 10. National Water Policy (Drafting in progress)	1. Okavango/OKACOM 2. Zambezi/ZAMCOM 3. Orange-Senqu/ORASECOM 4. Limpopo/LIMCOM
DRC	1. A draft Water Code (legislation) exists, but there is no overall national strategy guiding the sector 2. National Policy for Water Resources Management (1998)	1. Congo/CICOS 2. Lake Tanganyika/Convention for Management of Lake Tanganyika (CMLT) 3. Nile/NBI
Lesotho	1. Water Resources Act (1978) 2. Water Resources Management Policy (1999) 3. Water and Sanitation Policy (2007) 4. Water Act (2008)	1. Orange-Senqu/ORASECOM
Malawi	1. Water Resources Act (1969) 2. Water Works Act (1995) 3. Environmental Management Act (1996) 4. Irrigation Act (2001) 5. Public Health Act (2004) 6. National Water Policy (2005)	1. Zambezi/ZAMCOM 2. Songwe/Malawi-Tanzania Joint Technical Committee
Mauritius	1. Central Water Authority Act (2000) 2. Water Management Authority Act (2000) 3. Irrigation Act (1979) 4. Ground Water Act (1970) 5. Environmental Protection Act (2002)	
Mozambique	1. Water Act (1919) 2. Water Act (1991), repealing the 1919 Water Act 3. Water Tariff Policy (1998)	1. Zambezi/ZAMCOM 2. Zambezi/ARA Zambezi 3. Limpopo/LIMCOM

	4. National Water Policy (2007) 5. National Water Resources Management Strategy (2007)	4. Pungwe/Pungwe Basin Commission 5. Ruvuma/Ruvuma Joint Water Commission 6. Inkomati-Maputo/Inco-Maputo Tripartite Permanent Technical Committee
Namibia	1. Water Act (1956) 2. Water Supply and Sanitation Policy (2008) 3. Water Bill (In progress)	1. Zambezi/ZAMCOM 2. Orange-Senqu/ORASECOM 3. Okavango/OKACOM 4. Cunene/Permanent Joint Technical Commission
Seychelles	1. Public Utilities Corporation Act (1985)	
South Africa	1. Water Act (1998) 2. Policy on Free Basic Water (2001) 3. National Water Resources Strategy (2004)	1. Orange-Senqu/ORASECOM 2. Limpopo/LIMCOM 3. Inkomati/KOBWA 4. Maputo/Inco-Maputo Tripartite Permanent Technical Committee
Swaziland	1. Water Act (2003) 2. Water Resources Management Strategy (2003)	1. Inkomati/ KOBWA 2. Maputo/Inco-Maputo Tripartite Permanent Technical Committee 3. Umbuluzi/Umbuluzi Joint Water Commission
Tanzania	1. Water Utilisation Act (1974) 2. National Water Policy (2002) 3. Environmental Management Act (2004) 4. Water Supply Development Strategy (2006-2015) 5. Water Resources Management Act (2009) 6. Water Supply and Sanitation Act (2009)	1. Ruvuma/Ruvuma Joint Water Commission 2. Nile/NBI 3. Zambezi/ZAMCOM 4. Lake Tanganyika/Convention for Management of Lake Tanganyika
Zambia	1. Water Act (1948) 2. Bureau of Standards Act (1982) 3. Zambezi River Authority Act (1987) 4. Environment Protection and Pollution Control Act (1990) 5. Local Government Act (1991) 6. Public Health Act (1995) 7. Water Supply and Sanitation Act (1997) 8. Draft Water Bill (2006), to repeal the 1948 Water Act 9. Draft National Water Policy (2007)	1. Zambezi/ZAMCOM 2. Lake Tanganyika/Convention for Management of Lake Tanganyika (CMLT) 3. Zambezi/ZRA
Zimbabwe	1. Water Act (1976) 2. Zambezi River Authority Act (1987) 3. Water Act (1998), repealing the 1976 Water Act 4. ZINWA Act (2000) 5. National Water Policy (2000) 6. Environmental Management Act (2002) 7. Environmental Management Agency Act (2003) 8. Strategy to Accelerate Access to Sanitation and Hygiene for MDGs 2011-2015 (2010)	1. Zambezi/ZAMCOM 2. Zambezi/ZRA 3. Pungwe/Pungwe Basin Commission 4. Limpopo/LIMCOM

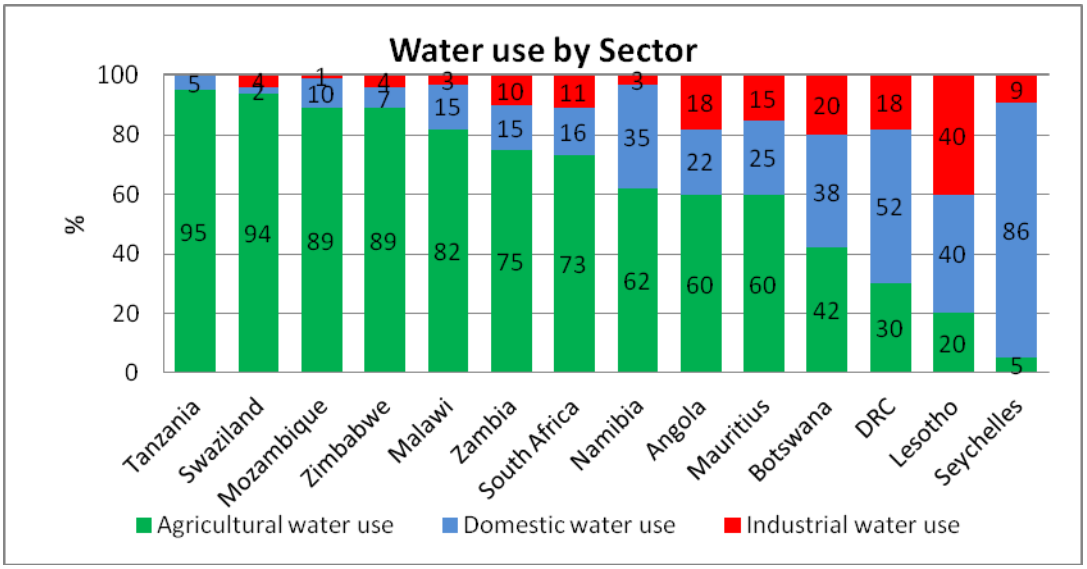

Figure 2.6: Water use by economic sector. Data Source: Aquastat (2008), Gibb (2011)

The following summarises the current and 2027 water resource and infrastructure development requirements in the SADC region (this is also summarised in *Tables 1 and 2.3*):

- There is about 50 million hectares of irrigable land available within the SADC region, of which only 3.4 million hectares (7%) is currently irrigated (SADC 2011). The irrigated area has to increase at least three fold to 10 million hectares by 2027, bringing it to the world's average of 20% of irrigable land under cultivation;
- The hydropower potential of the SADC region is some 150 GW, of which only 12 GW is installed (SADC 2011). Hydropower installation also has to increase six fold by 2027 to at least 75 GW. This target is feasible if both Inga and Batoka are implemented by 2027. This increase would be in line with the SAPP targets;
- Of SADC's population of 260 million people, 39% has no access to an adequate safe drinking water supply, while 61% has no access to adequate sanitation services (SADC 2011). As the population grows to 350 million by 2027, more people will have no access to both adequate safe drinking water and sanitation services, unless investments in this sector are also increased such that by 2027, 75% of SADC's population has access to adequate safe drinking water and sanitation services. This coverage would be in line with the MDG target for water supply and sanitation for the region, albeit, achieved after the target date of 2015; and
- To facilitate and cater for the above expansions and water demands, the annual water abstraction will have to increase six fold from the current 44 km^3/year or 170 m^3/capita/year to 264 km^3/year or 750 m^3/capita/year by year 2027. This would represent about 11% of the total annual renewable water resources in the SADC region stored. This ties up with the proposed increase in storage from the current 14% of annual renewable water resources of the SADC region to 25%.

Table 2.2: Some selected Major Storage Reservoirs of the SADC region (capacity > 1 km^3)

DAM	CAPACITY (x10^9 m^3)	COMPLETION YEAR
Mutirikwe (Zimbabwe)	1.5	1970
Katse (Lesotho)	2	1996
Itezhi-Tezhi (Zambia)	5	1978
Gariep (South Africa)	6	1972

Cahora Bassa (Mozambique)	52	1974
Kariba (Zambia/Zimbabwe)	185	1959

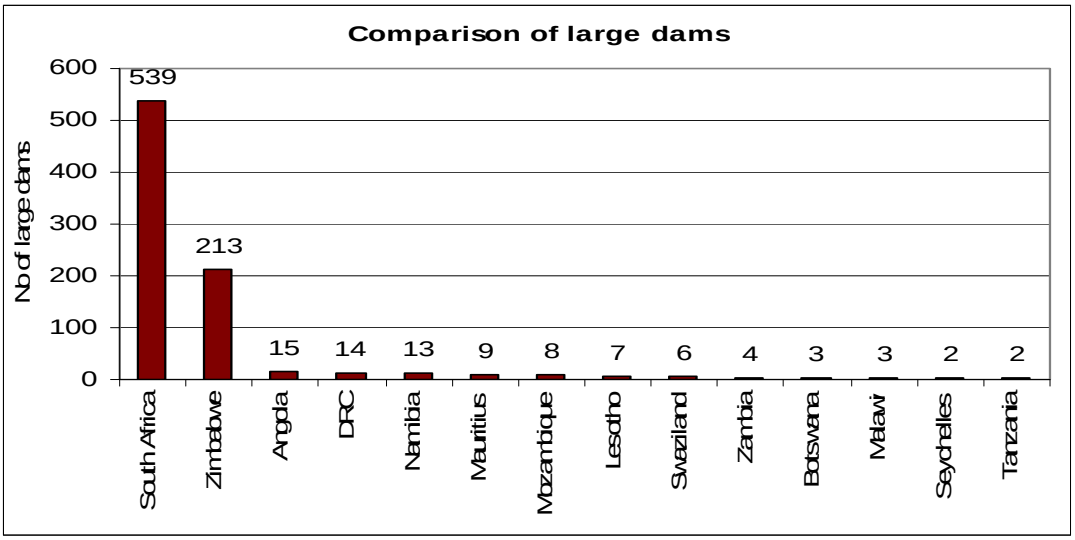

Figure 2.7: Number of Large Dams (capacity > 3 million m3), by SADC Country (Source: World Bank, 2004)

The SADC Secretariat organised a RIDMP Workshop on 6-7 December 2011, which was attended by representatives from the SADC Member States invited from the Water, ICT, Transport, Tourism, Energy and Meteorological sectors to discuss the Diagnostic Reports from the RIDMP sector experts.

The SADC Member State Water Sector representatives discussed and validated the contents and targets of Table 2.3 and agreed that the Vision 2027 targets stipulated therein were achievable and should constitute the core of the Water Sector RIDMP strategy and be considered as the Water Sector's Vision 2027 targets.

From *Table 2.3*, the gap between the current situation and desired 2027 situation for the six Vision 2027 Water Sector targets of surface water storage, irrigated land, hydropower development, domestic water supply, sanitation services and water abstracted, was derived. *Table 2.4* thus summarises the gap, which exists between the current situation and the Vision 2027 Water Sector targets. The Water Sector SADC RIDMP should thus concentrate on addressing the infrastructure and service gaps identified and tabulated in *Table 2.4*, which forms the basis of the RIDMP for the Water Sector.

3. Strategic Framework

3.1 Strategy for Addressing Gaps and Expected Results by 2027

3.1.1 Significance of the Water Sector and the Prioritised Goals

Water is recognised across all infrastructure development sectors as a key driver for achieving economic growth and improved social conditions of any community. The adage "Water is Life" can be appropriately used here to describe the importance of water to the wellbeing of all living creatures and the environment in general. Water is necessary for the socio-economic development and is the core resource that will contribute the most towards SADC's attainment of its goal, the attainment of an integrated regional economy on the basis of balance, equity and mutual benefit for all Member States. If water resources are prudently and sustainably managed, they will contribute and support SADC's objectives of poverty eradication, food security, energy security and industrial development, as well as promote peace and cooperation among the SADC Member States.

Unfortunately, the returns on investment in the Water Sector, such as in domestic water supply and sanitation, do not show themselves in respect of financial returns as usually depicted in balance sheets. If investments are put in the domestic water supply and sanitation sectors, they will only show financial returns or manifest themselves in other sectors such as health, industry and education, as the nation becomes healthier with minimal health budgets, minimum absenteeism at the work place and in schools. It is also difficult to obtain finances to implement domestic water supply and sanitation projects, as such projects usually do not show high rates of return since the tariffs are usually controlled by governments, or if subsidised by the same governments, do not provide sufficient revenue for growth. It is however necessary that the resultant social benefits are converted and reported in financial terms.

Table 2.3: Water Sector Vision 2027 targets

SECTOR	CURRENT STATUS	VISION 2027 TARGETS
Surface water storage	14% of ARWR stored (includes Kariba and Cahora Bassa dams)	25% of ARWR stored to meet SADC regional demand. Eventual target is 75% stored, as world benchmark is 70-90% of ARWR stored
Agriculture	3.4 million hectares (7% of potential) irrigated	10 million (20% potential) hectares irrigated. World average is 20%
Hydropower	12 GW (8% of potential) installed	75 GW (50% of potential) installed to meet SAPP targets and exports to other RECs
Water supply	61% of 260 million people served	75% of 350 million people served. Eventual target is 100% served
Sanitation	39% of 260 million people served	75% of 350 million people served. Eventual target is 100% served
Water abstraction	44 km^3/year abstracted	264 km^3/year abstracted to meet expected increase in water demand.

As a result of a growing SADC regional population and economic development, the demand for clean and safe water is increasing. This increase in demand is heightened by the challenges associated with global warming and the resulting climate change, necessitating a change in the management approach of the available water resource and its provision.

Table 2.4: Gap between Current Situation and Vision 2027 targets

SECTOR	CURRENT STATUS	VISION 2027 TARGETS	GAP
Surface water storage	14% of ARWR stored (includes Kariba & Cahora Bassa dams)	25% of ARWR stored to meet SADC regional demand. Eventual target is 75% stored, as best practice is 70-90% of ARWR stored	An additional 11% of ARWR to be stored
Agriculture	3.4 million hectares (7% of potential) irrigated	10 million (20% potential) hectares irrigated. World average is 20%	An additional 6.6 million hectares to be irrigated
Hydropower	12 GW (8% of potential) installed	75 GW (50% of potential) installed to meet SAPP targets and exports to other RECs	An additional 63 GW to be installed
Water supply	61% of 260 million people served	75% of 350 million people served. Eventual target is 100% served	An additional 14% of 350 million people to be served
Sanitation	39% of 260 million people served	75% of 350 million people served. Eventual target is 100% served	An additional 36% of 350 million people to be served
Water abstraction	44 km^3/year abstracted	264 km^3/year abstracted to meet expected increase in water demand	An increase to 220 km^3/year abstracted

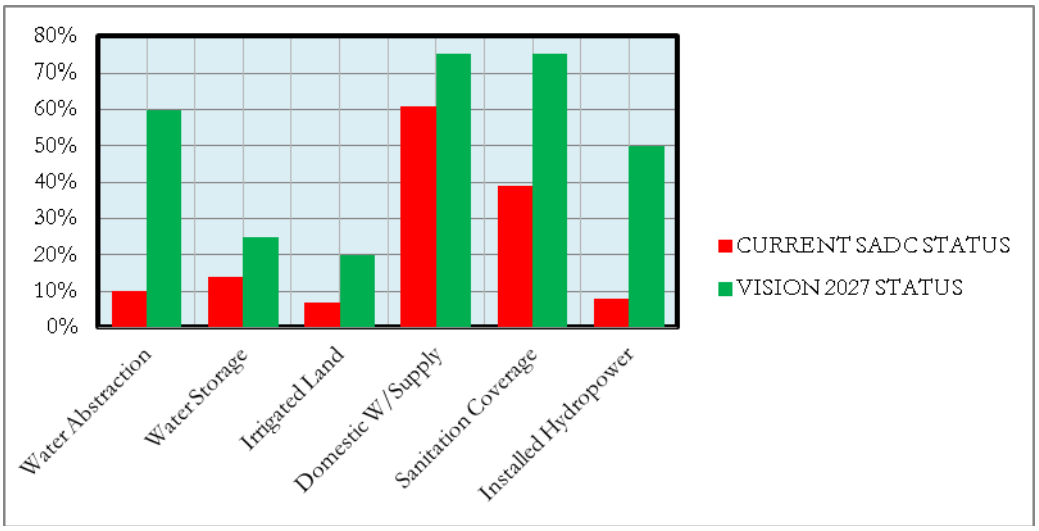

Figure 2.8: Gap between Current Situation and Vision 2027 targets

The Vision 2027 Water Sector targets prioritise five goals, which are world benchmarks and indicators for socio-economic development:

1. Increasing surface water storage with respect to the ARWR of the SADC region;
2. Increasing irrigated land for food security;
3. Increasing hydropower generation for energy security, improved livelihoods and economic development;
4. Increasing the coverage of safe drinking water supply to the SADC citizens; and
5. Increased coverage of improved and better sanitation services to SADC citizens.

The above will result in an increase in the abstraction and usage of the water resources of the SADC region, which will require:

- A conducive, enabling environment to attract investment into the region;
- A massive injection of funds for infrastructure development; and
- Sufficiently capacitated institutions to prepare, package, market, implement, manage and efficiently operate these investments.

If the five prioritised goals are achieved by 2027, the SADC region will be on track to meeting its overall objectives of poverty eradication, regional integration and economic development, and will be on par with most of the world average service provision levels for energy, water supply and sanitation services for its citizens, while ensuring food security through increased and efficient agricultural output.

3.1.2 Policy and Regulatory Framework

A brief review of the legal, policy and regulatory framework, which essentially provide the enabling environment for economic and infrastructure development, anchored on sound and sustainable water infrastructure development, was undertaken. Some deficiencies were identified and the Water Sector RIDMP includes projects that, if successfully implemented, will address the deficiencies highlighted in the following findings:

- While protocols and policies for the management of shared water resources and watercourses have been adopted at regional level, these are not yet domesticated at national level in all SADC Member States, creating challenges for implementation and enforcement among Member States. The Water Sector laws, policies and regulations in the SADC Member States are not harmonised between each other's or those of the SADC region (Project GP-2);
- While some RBOs have been established and are functional in some of the 15 SADC's shared watercourses, they are not fully mandated and capacitated to plan, market and implement large water sector infrastructure projects. The current focus of these RBOs is more towards planning and determining overall management systems for the river basins, than infrastructure development (Project GP-3);
- There is a policy and management framework gap that precludes the conjunctive use of surface and underground water. There are also inadequate policies and institutional frameworks for the management of the shared aquifers of the SADC region (Project GP-5); and
- There is inadequate policy and regulatory framework that facilitates and encourages the synchronised and conjunctive operation of water resource infrastructure at river basin level for more efficient operations, improved livelihoods and better flood and drought mitigation. (Project GP-10).

3.1.3 Institutional Arrangements

Figure 3.1 summarises the SADC Water Sector regional institutional arrangements, bearing in mind that the SADC Water Division falls under the SADC Infrastructure and Services Directorate of the SADC Secretariat.

The Committee of Water Ministers is the highest policy body in the regional Water Sector. The Committee, which reports to the SADC Council of Ministers, normally meets on an annual basis. Senior officials responsible for water in SADC Member States meet annually to receive reports from

the Water Recourses Technical Committee (WRTC) that usually comprises directors of water or other senior technical persons from Water Departments in the SADC Member States. WRTC, working with the SADC Water Division, prepares the agenda and other reports for the Committee of Water Ministers. The WRTC also works very closely with the SADC Water Division and gives technical inputs into policy issues, which eventually end up for consideration with the Committee of Water Ministers. This institutional framework is clearly provided for in Article 5 (1), while the functions are stipulated in Article 5 (2) of the Revised Protocol on Shared Watercourses (SADC 2000). There is therefore an adequate regional platform for policy and decision-making in the Water Sector.

River Basin Organisations (RBOs) can be set up as commissions, authorities or boards as provided for in Article 5 (3) of the Revised Protocol on Shared Watercourses (SADC 2000), and their functions, while alluded to in the said provision, are determined by the watercourse states that have ratified the Watercourse Management Agreement. An analysis by RBOs of the existing institutional arrangements regarding the planning, marketing and execution of water sector infrastructure reveals that:

- There is a lack of mandate in RBOs and water authorities to plan, source financing and implement water resource infrastructure independent of the watercourse states. This has the disadvantage in that instead of investors dealing directly with the watercourse institution, pulling on guarantees or assurances that the watercourse states as a whole might give if necessary, have to wait for the approval of all the watercourse states to proceed with the infrastructure investment. Such approvals take time to be received, if at all, in some cases.
- There is lack of capacity in RBOs and water authorities to prepare, package and market projects for external funding and efficiently implement funded projects.

Instead of setting up RBOs and water authorities with generic functions such as knowledge acquisition, capacity building and environmental management, there is a need to set up project-specific institutions that are capacitated to plan, develop, market, implement and operate water resource infrastructure at either national, bi-national or multi-national levels. Examples are the Zambezi River Authority (ZRA), the Lesotho Highlands Development Authority (LHDA), the Lesotho Highlands Water Commission (LHWC) and the Inkomati Basin Water Authority (KOBWA). This is provided for in Article 6 (4) of the SADC Revised Protocol on Shared Watercourses, and is of paramount importance for any regional approach to infrastructure development. An institutional reform project has been included as part of the prioritised projects of the Water Sector RIDMP to facilitate changes/reforms in the mandate of the RBOs, to enable them takes on infrastructure development responsibilities.

The SADC Water Division interacts with both the Water Strategy Reference Group (WSRG), which is a coordinating body for International Cooperating Partners (ICPs) in the Water Sector in SADC. The WSRG provides strategic advice and mobilises financial and technical resources to implement the SADC Regional Water Sector Programme. The WSRG is thus a key partner in the execution of the RIDMP.

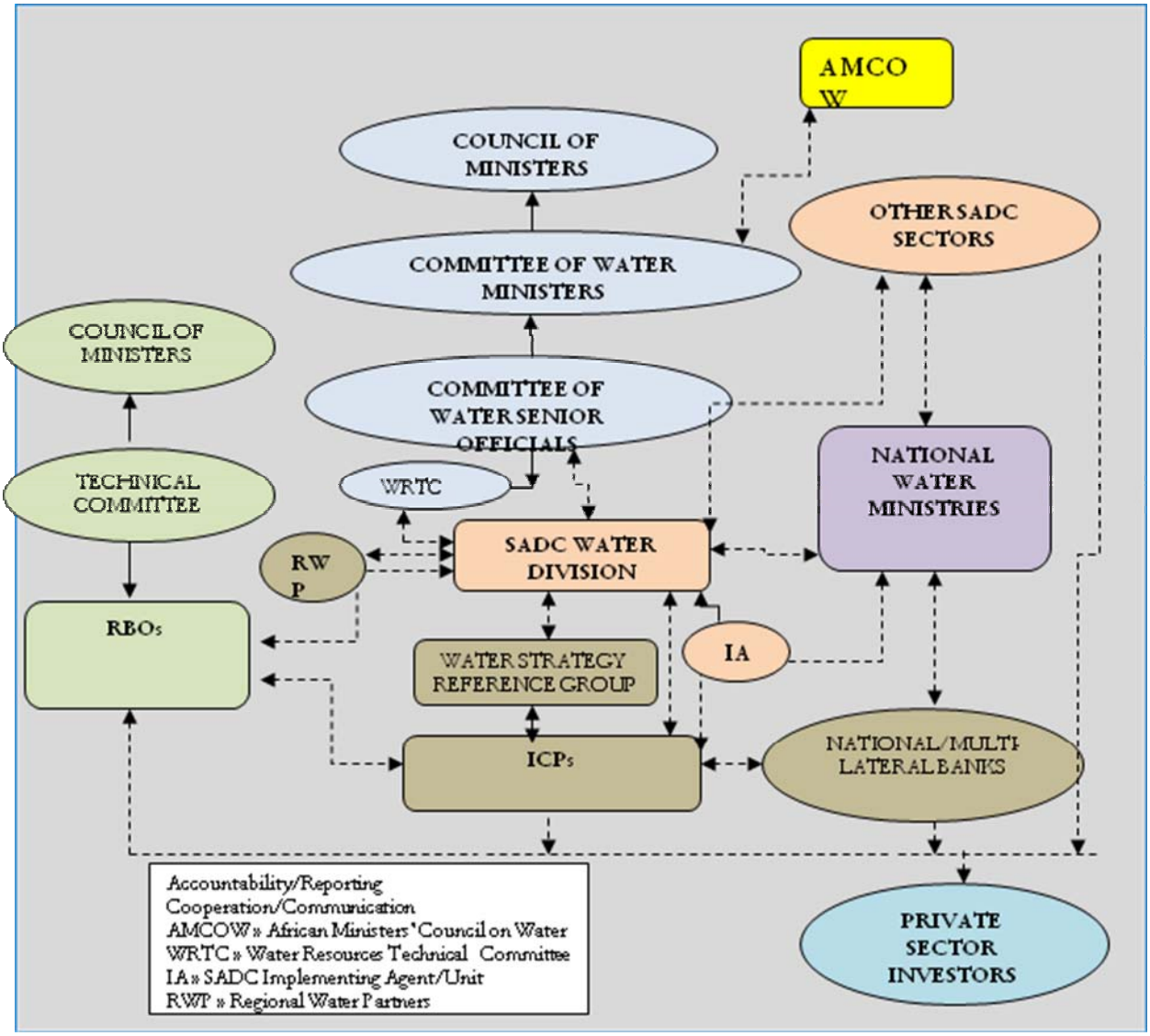

Figure 3.1: SADC Water Sector Organs and Institutional Arrangements

In 2002, the ministers responsible for water from 41 African countries met in Abuja, Nigeria and decided to form the African Ministers' Council on Water (AMCOW) to promote cooperation, security, socio-economic development and poverty eradication through the management of water resources and provision of water supply services. AMCOW's mission is to provide political leadership, policy direction and advocacy in the provision, use and management of water resources for sustainable social and economic development and maintenance of African ecosystems (African Regional Coverage, 2011). Members of the SADC Committee of Water Ministers, the highest policy body in the regional Water Sector, are members of AMCOW, and there is therefore direct linkage and synergy regarding policy and decision-making at continental and regional level. Regional initiatives can thus be transformed to continental initiatives and vice-versa.

The SADC Water Division has regional water partnerships with some organisations that are neither ICPs nor Member States, but that work with ICPs and SADC Member States with linkages at grassroot level. One such regional water partner is the Global Water Partnership – Southern Africa (GWP-SA). Such partners provide avenues for the dissemination of the SADC Water Sector's initiatives and outputs, and usually partner the SADC Water Division in key stakeholder conferences, workshops and dialogues that promote communication among the stakeholders, while providing the necessary

platform for exchange of ideas and networking.

From time-to-time, the SADC Water Division engages project implementing agents or institutions to supervise or carry out SADC Water Division projects on behalf of the SADC Member States. While the SADC Water Division is the project manager and is responsible for sourcing the financial and human resources required to implement the projects, the actual day-to-day implementation and execution of the projects is undertaken by the project implementing agent or institution, which inevitably, accounts to the SADC Water Division. Examples of such project implementing agents or institutions are ZRA for the Zambezi Action Programme 6 and WaterNet for the regional Masters Degree course in IWRM. Such arrangements have been cost-effective and have produced tangible results. Some of the RIDMP Water Sector projects will be executed using such arrangements.

Private sector investors will play a key role in the execution of the Water Sector RIDMP projects by directly investing in these projects, or through partnerships with the relevant SADC Member States. An enabling environment, conducive to private sector participation in infrastructure development in the SADC region, has to be built.

When making policies and strategies, there is need for strong beneficiary participation so that there is beneficiary buy-in when implementing such policies and strategies. The same principle of beneficiary participation should apply in the selection of projects. Projects should be selected and prioritised with strong beneficiary participation at national level to ensure the acceptance and sustainability of the implemented projects.

The investors usually want bankable and profit-making projects, which will give them a return on their investments. However, due to the current level of poverty in the SADC region, the poor members of society will never afford the cost reflective tariffs and their living standards will never improve, unless governments subsidise the cost reflective electricity, water and sanitation tariffs.

3.1.4 Prioritised Projects and Interventions

The RSWIDP Phase 1 (2005-2015) has two priority intervention targets from the RISDP being:

- Halve the proportion of people without access to safe drinking water and sanitation services by 2015; and
- Develop water resources infrastructure needed to double land under irrigation for food security by 2015.

At the SADC Water Sector Infrastructure Investment Conference held in September 2011 in Maseru, Lesotho, 23 projects were identified out of a total of 66 SADC Member States' priority projects (SADC 2011). Of the 23 adopted projects for implementation (Table 3.1 and Figure 3.2), four were classified as regional projects that impacts on several SADC Member States, five were classified as cross-border projects shared between two or more SADC Member States and 14 were SADC Member States' first priority projects. The 23 projects cut across and serve other sectors as well: three are primarily for the agricultural sector, two are for hydropower, nine are for the water supply and sanitation sector, three are for river basin development and four relate to industry, while the remaining two are specifically related to demand management and climate change resilience. *Table 3.1* and *Figure 3.2* give the details of these projects, which were identified through extensive consultations with the SADC Member States. These projects form the basis and portfolio of the RIDMP Water Sector projects for the short and medium terms.

Table 3.1: Water Sector Projects, Prioritised by the Maseru Investment Conference (Source SADC 2011)

1	**REGIONAL PROJECTS**	
RG-1	Inga III Hydropower	DRC, electric power shared regionally
RG-2	Lesotho Highlands Phase II	Lesotho, South Africa
RG-3	Batoka Gorge Hydropower Scheme	Zambia, Zimbabwe
RG-4	Songwe River Basin Development Project	Malawi, Tanzania
2	**CROSS-BORDER PROJECTS**	
XB-1	Upper Okavango Food Security	Angola, Namibia
XB-2	Vaal-Gamagara Water Supply	Botswana, South Africa
XB-3	Ressano Garcia Weir	Mozambique, South Africa
XB-4	Lomahasha-Namaacha Water Supply	Swaziland, Mozambique
XB-5	Water Supply and Sanitation to 12 Locations	Angola, Botswana, DRC, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe
3	**NATIONAL PRIORITY PROJECTS**	
P1-1	Water Supply and Sanitation – Lubango Phase 2	Angola
P1-2	Limpopo Basin Water Monitoring	Botswana
P1-3	Water Supply and Sanitation – Kinshasa	DRC
P1-4	Lesotho Lowlands Water Supply Scheme – Zone 1	Lesotho
P1-5	Mombezi Multi-purpose Dam	Malawi
P1-6	Water Supply – 13 Housing Estates	Mauritius
P1-7	Movene Dam	Mozambique
P1-8	Artificial Recharge of Windhoek Aquifer – Phases 2B and 3	Namibia
P1-9	Reducing Non-Revenue Water and Increasing Use Efficiency	Seychelles
P1-10	Demand Management in 62 Urban Centres	South Africa
P1-11	Nodvo Dam	Swaziland
P1-12	Ruhuhu Valley Irrigation Scheme	Tanzania
P1-13	Climate Change Adaptation to drought – Agro-ecological Region I	Zambia
P1-14	Bulawayo-Zambezi Water Supply Scheme	Zimbabwe

It should be noted, however, that the 23 Maseru prioritised projects are at varying stages of development. Some are at conceptual stage, while others are at advanced stages of project preparation. Some of the projects, such as the Water Supply and Sanitation at 12 Locations Project (Project XB-5), need further detailed investigation, especially to assess their cross-border nature. At the time of compiling the report for the Investor Conference in Maseru, consultations on the cross-border projects have not been completed with all the potential participating countries, and more follow-up action is required to bring all potential participating countries together for consensus on the projects. However, the majority of the 23 projects were selected on the basis of their readiness for implementation, rather than for their contribution towards the Vision 2027 Water Sector targets. The Water Sector RIDMP projects are fully described in the Annexure.

The RISDP outlines the key interventions necessary to deepen regional integration and eradicate poverty on a sustainable basis. It incorporates crosscutting issues related to combating HIV and AIDS, gender equality and mainstreaming, poverty eradication, environment and sustainable development, private sector development, science and technology, as well as statistics. All SADC projects therefore need to be structured such that they become part of the strategy in achieving the objectives of the RISDP. At the same time, the goal of the RSAP III is to strengthen the enabling environment for regional water resources governance, management and development through the application of integrated water resources management at the regional, river basin, Member State and community levels.

Figure 3.3 shows the three pillars of the RSAP III conceptual framework, namely water governance, infrastructure development and water management. The three pillars are founded on an IWRM base. At the same time, the RSAP III Programme focuses on three action areas: food security, water supply and sanitation and energy security.

The 23 Maseru prioritised projects were interrogated to see where they fall in the RISDP objectives and RSAP III pillars and Programme strategic areas. This is because the RSAP III is the current official SADC programme for the Water Sector, and is therefore the *de facto* implementation plan for the Water Sector part of the RIDMP. *Table 3.2* takes this approach in analysing the 23 Maseru prioritised projects. It is clear that none of the 23 Maseru prioritised projects lie in the water governance pillar framework of the RSAP III.

Bearing in mind that the SADC Water Sector RISDP is premised on poverty eradication, regional integration and economic development, the RSAP III outlining three strategic action areas (water governance, infrastructure development and water management) and the 23 projects already prioritised, an analysis was done with respect to the enabling, implementation and future operation and maintenance environment with the following findings.

The resultant 11 projects are considered as Gap Projects (GP) and have been numbered as GP-1 to GP-11 as follows:

Water Governance and Institutional Reforms

The following projects have been included as part of the Water Sector RIDMP, as they are deemed necessary for the successful implementation of the 23 Maseru prioritised projects:

- Institutional reforms to address operational inefficiencies of municipal water service providers (staffing structures, cost reflective tariffs, billing) (Project GP-1);
- Domestication and harmonisation of the SADC protocols, policies and strategies with those of the Member States and between watercourse states (Project GP-2); and
- Reforms mandating or granting executive powers to existing RBOs to be the project developers, marketers, implementers, owners and operators of water sector infrastructure in the respective river basins (Project GP-3).

Figure 3.2: Locations of the 23 Water Sector Priority Projects (Source: SADC 2011)

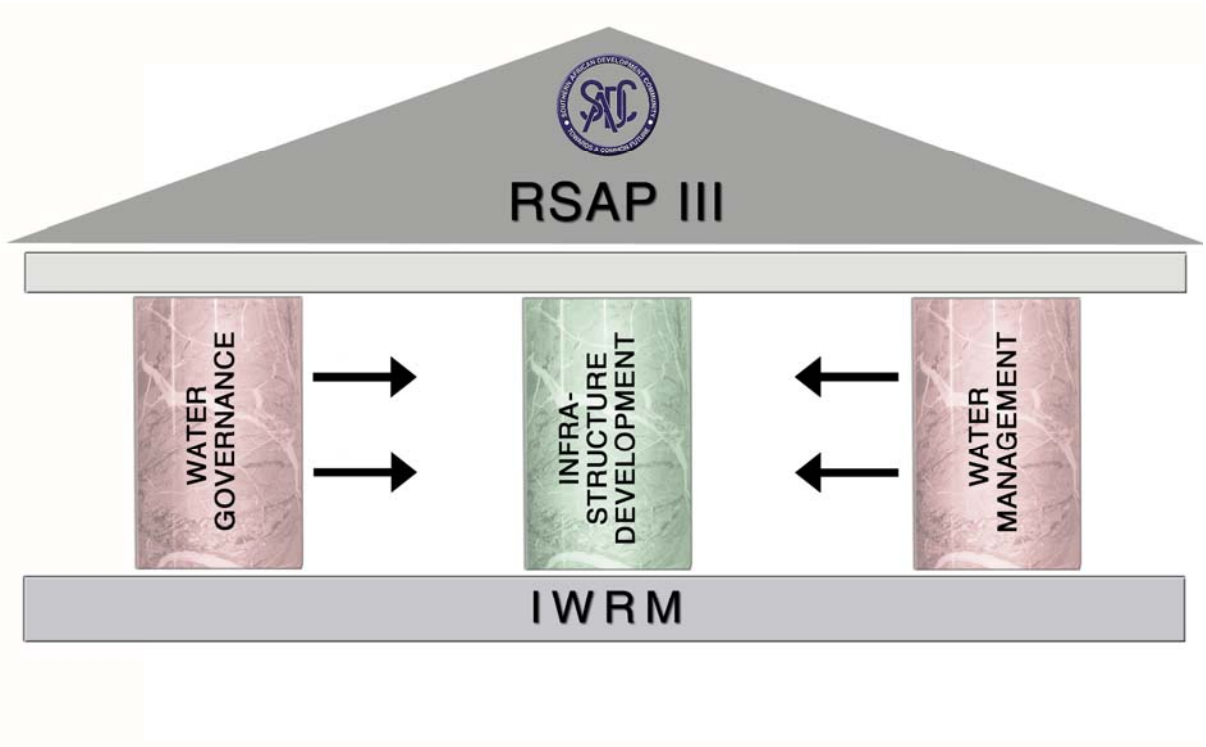

Figure 3.3: The Three Pillars of the RSAP III

Infrastructure Development

- Under the RSAP III Programmes, Programmes 7, 8 and 9 (Infrastructure Project Preparation, Resource Mobilisation for Infrastructure Development and Infrastructure Piloting respectively) should be given urgent priority and rolled out to all the SADC regional/RBO/national institutions that are going to implement the new Water Sector infrastructure (Project GP-4).
- There is only one underground water project (P1-8) among the 23 projects selected , and yet very little is known in the SADC region regarding underground water and its interaction with surface water. It is suggested that a pilot project be formulated and implemented, which will inform the region and which can be replicated (Project GP-5).
- There is only one climate change resilience related project (P1-13) among the 23 projects selected, and yet there is great need for flood and drought mitigation in this climate change/variability era. It is thus important that project P1-13 have a strong monitoring component, especially for lessons to be learnt in its implementation and applicability for replication in the SADC region (Project GP-6).

Water Management

The following water management projects are proposed, as they increase the return on already financed projects and the resultant profits can be utilised to co-finance new projects or ploughed back to improve services and livelihoods:

- Additional projects are required to improve agricultural water application efficiencies, so that the same quantity of water produces more crops, as only one project, XB-1, deals this aspect (Project GP-7);
- Additional projects related to the reduction of water losses in municipal water supplies in line with the economic accounting of water in SADC provisions are required, as only one project, P1-10, deals with this aspect (Project GP-8);

- Additional projects to monitor water pollution in reservoirs and rivers are required, as only project, P1-2, deals with this aspect (Project GP-9);
- Piloting synchronised and conjunctive operation of dams for flood and drought mitigation, improved energy generation and livelihoods and provision of water for the environment is a necessary project, which will inform the SADC region with possibilities for replication (Project GP-10); and
- Virtual water (also known as embedded water, embodied water, or hidden water) refers, in the context of trade, to the water used in the production of goods or services. For instance, it takes 1 300 m^3 of water on average to produce one metric tonne of wheat. The precise volume can be more or less, depending on climatic conditions and agricultural practices. A project that brings better understanding to the implications of virtual water among Member States of SADC and between SADC and the other African RECs, should be undertaken (Project GP-11).

The above projects are summarised in *Table 3.3,* and will be discussed in detail together with the other 23 Maseru prioritised projects contained in *Table 3.1*.

The 23 Maseru prioritised projects and the 11 gap projects were reclassified under the following categories, and will thereafter be referred to accordingly (The projects will maintain their numbering for cross referencing purposes):

- **Facilitation projects:** Establishing policy, regulatory and institutional frameworks to create a suitable environment for investment and efficient operations. These projects take precedence over the other projects and should commence early in 2013;
- **Capacity building projects:** Launching initiatives to empower the implementing institutions to perform their mandates;
- **Studies:** Preparing future projects; and
- **Investment projects:** Investing in physical and capital projects.

Tables 3.4 and 4.2 show all 34 projects classified in these four categories.

ICA (2006) developed a guide for preparing infrastructure projects for Africa. ICA identifies the six phases of project development as:

- Phase 1: Enabling environment;
- Phase 2: Project definition;
- Phase 3: Project feasibility;
- Phase 4: Project structuring;
- Phase 5: Transaction support; and
- Phase 6: Post-implementation support.

Under each phase, a number of activities are described that require consideration as given in *Table 3.5*. It is important to note that project preparation activities do not always, in practice, follow sequentially from one phase to the next.

Pertinent to the development of the RIDMP, is the application of this guide to the identified RIDMP projects. Using the ICA Guide, each identified project was interrogated to find out in which phase it was. This enables the project developer to identify what kind of assistance to solicit, and from what likely source (*Table 3.6*) to enable the project to move forward.

Table 3.6 provides an overview of available support from the facilities listed in the ICA Guide. It should be noted that if *Table 3.6* suggests availability of support in a particular phase, the support may be very limited and the facility's entry should be reviewed for further details.

RIDMP Water Sector Projects

It can never be over-emphasised that the poverty-stricken SADC region cannot be removed from the virtual poverty cycle without, among other interventions:

- The creation of new jobs: Infrastructure development projects, be they for agriculture, hydropower, tourism, transportation, ICT, domestic water supply or sanitation services, create sustainable jobs and employment;
- The provision of opportunities for economic development: The rural poor, in particular, should be empowered, for example, through being given title to the land that they live on so that they can also be economically viable to borrow development funds from banks and other such institutions;
- The collective closing of ranks against poverty by all the SADC Member States, as no individual country can efficiently do it alone in an integrated region;
- Motivating and engaging the private sector to work with the SADC Member State governments. This could be achieved through various regional incentive schemes for infrastructure development with attendant legal, policy and regulatory frameworks that guarantee the investors' returns;
- Establishing efficient, well capacitated and mandated national, river basin and regional infrastructure development and management institutions; and
- Overall, the self-belief and conviction among the SADC Member States and its citizens that "yes we can".

In short, the SADC region should actively attend to and finance the three pillars of the RSAP III so as to fast-track the achievement of the overall SADC goal of poverty eradication, economic development and regional integration.

Table 2.4 gives a summary of the current and desired status in 2027 of the SADC region and the resultant gap with respect to surface water storage, land under irrigated agriculture, hydropower generation, water abstraction and coverage of the water supply and sanitation services. *Table 3.4* gives details of the 34 projects and their contributions towards achieving the gaps identified, which need to be filled in order to achieve the Vision 2027 Water Sector targets. The sources of finance proposed for each project are purely based on:

- The previous project involvement of the funding agency in previous studies such as feasibility studies;
- Information given by Member States in their project profiles;
- ICA suggested facility providers as given in *Table 3.6*; or
- Known funding preferences of the proposed funding agencies.

Table 3.2: RSAP III Categorisation of the 23 Selected Projects

RSAP III STRATEGIC AREA	PROJECT	TYPE	RSAP III PROGRAMMEME AREA	RISDP INTERVENTION AREA
Infrastructure development	Rg-1	Electric power	Energy security	Economic development
	Rg-2	Water supply/hydropower	Water supply/energy	Economic development
	Rg-3	Hydropower	Energy	Economic development
	Rg-4	Irrigation/water supply and sanitation/energy	Food security/water supply and sanitation/energy	Poverty eradication/economic development
	Xb-1	Irrigation	Food security	Poverty eradication/economic development/food security
	Xb-2	Water supply	Water supply	Poverty eradication
	Xb-3	Water supply	Water supply	Poverty eradication
	Xb-4	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	Xb-5	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	P1-1	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	P1-3	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	P1-4	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	P1-6	Water supply/irrigation/fisheries	Water supply/food security	Poverty eradication
	P1-7	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	P1-8	Water supply/irrigation	Water supply and sanitation	Poverty eradication
	P1-12	Water supply and sanitation	Water supply and sanitation	Poverty eradication
	P1-13	Irrigation	Food security	Poverty eradication/food security
	P1-15	Water supply and sanitation	Water supply and sanitation	Poverty eradication

Water management	Xb-1	Improve water use efficiency and management in irrigation	Food security	Poverty eradication/economic development
	Xb-3	Hydrological monitoring	Water supply and sanitation	Economic development
	P1-2	Water quality monitoring and allocation	Water supply and sanitation	Economic development
	P1-9	Artificial recharge of aquifer	Water supply and sanitation	Poverty eradication
	P1-10	Reduce non-revenue water and improve water use efficiency	Water supply and sanitation	Economic development
	P1-11	Water demand management	Water supply and sanitation	Economic development
	P1-14	Climate change adaptation	Food security	Poverty eradication

Facilitation Projects

There are three SADC facilitation projects, which have been included in the Water Sector RIDMP, namely institutional reforms in municipal water supply service, domestication and harmonisation of SADC protocols and institutional reforms in RBOs and river/water authorities of the SADC region.

Institutional reforms to reduce operational inefficiencies of municipal water service providers in the capital cities of the SADC Member States (Project GP-1)

The majority of the capital cities of the SADC region experience high levels of water and revenue losses as a result of inefficient staffing structures, poor billing systems, poor maintenance, non-cost reflective tariffs, aging infrastructure and illegal connections. The poor revenue collection and high levels of water losses have resulted in poor financial sustainability of service provision for most of these municipal service providers. Poor revenue collection for water services remains a major challenge that impacts negatively on sustainable service delivery. In many cases, the government controls the water tariffs, which is usually politically motivated, resulting in poor service delivery and insufficient investments in maintenance.

Illegal water connections result in water theft and reduced revenue. It is thus important that while focusing on developing new sources of water, the optimisation of existing water sources, usage and efficient operation and maintenance of existing infrastructure, are also given priority. As an example, purified sewage effluent can be used to water golf courses, parks and sports grounds.

There is therefore need for a project that will assess the institutional reforms necessary to address operational inefficiencies of municipal water service providers of the capital cities of the SADC region to address issues such as staffing structures, cost reflective tariffs, billing, illegal water connections etc., so that revenue streams and the management of the municipal water service providers is improved with resultant improved infrastructure maintenance.

This would be a pre-investment project with the SADC Water Division being the proponent and the municipal water service providers of the SADC capital cities being the lead agencies. It is estimated that it will cost on average US$2 million per city for the project giving a total cost of US$30 million. The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy work in 2013 and execution of the project in 2014. Project profiles for each city would then be produced for the mitigatory policy changes, works and costs thereof.

Possible project financiers are DBSA, GEF and the AfDB. The project can be considered to be in Phase 4 of the ICA Project Development Phases.

The major project challenge foreseen is timely sourcing of project finances.

Table 3.3: Summary of Infrastructure Gap Projects

RSAP III STRATEGIC AREA	PROJECT	TYPE	CHALLENGES BEING ADDRESSED	RISDP INTERVENTION AREA
Water governance and institutional reforms	GP-1	Institutional reforms in municipal water supply service providers	Poor operation and maintenance of existing infrastructure	Economic development
	GP-2	Water governance at regional/national levels	Bottlenecks in trans-boundary project implementation	Regional integration
	GP-3	Institutional reforms at RBO/bi-national/national levels	Inadequacies in institutional project implementation	Economic development
Infrastructure development	GP-4	Institutional capacitation at RBO/bi-national/national levels	Inadequacies in institutional project implementation	Economic development
	GP-5	Research and development at regional/bi-national levels	Inadequate water infrastructure	Economic development
	GP-6	Research and development at regional/bi-national levels	Vulnerability to vagaries of climate extremes	Poverty eradication
Water management	GP-7	Institutional reforms at RBO/bi-national/national levels	Poor operation and maintenance of existing infrastructure	Poverty eradication/economic development
	GP-8	Institutional reforms at national level	Poor operation and maintenance of existing infrastructure	Poverty eradication/economic development
	GP-9	Research and development at regional level	Water pollution	Poverty eradication/economic development/regional integration
	GP-10	Institutional reforms at regional/RBO/bi-national/national levels	Vulnerability to vagaries of climate extremes	Poverty eradication/economic development/regional integration
	GP-11	Research and development at regional level	Implications of virtual water related to water demand for the agricultural and industrial sectors	Poverty eradication/economic development/regional integration

Table 3.4: Summary of the Contributions of the Prioritised Phase 1 Projects Towards the Vision 2027 Water Sector Targets

NO.	PROJECT NAME	LOCATION	WATER STORED (x 10^6 m^3)	IRRIGATED AREA (ha)	HYDROPOWER GENERATED (MW)	DOMESTIC WATER BENEFICIARIES (persons)	SANITATION BENEFICIARIES (persons)	TOTAL COST (US$ x 10^6)
FACILITATION PROJECTS								
GP-1	Institutional reforms in municipal water supply service	All SADC Member State capital cities	-	-	-	Enhanced operational and management capacity		30
GP-2	Domestication and harmonisation of SADC protocols	SADC Member States	Enabling environment					2.4
GP-3	Institutional reforms in RBOs and river/water authorities	SADC RBOs and river/water authorities	Enabling environment and enhanced mandate for infrastructure development					0.1
CAPACITY BUILDING PROJECTS								
XB-1	Upper Okavango food security	Angola, Namibia	-	Enhanced capacity	-	-	-	66
P1-10	Demand management in 62 urban centres	South Africa	Water management			1 860 000	1 860 000	62
GP-4	Project preparation, resource mobilisation and piloting	SADC RBOs and river/water authorities	Enhanced capacity for infrastructure development					1
GP-8	Reduction in non-revenue water and water losses	All SADC Member State capital cities	-	-	-	Additional customers and increased revenue		15
STUDIES								
P1-2	Limpopo Basin water monitoring	Botswana	Safeguard the water resources of the Limpopo River Basin from pollution with resultant economic benefits					1
GP-5	Assessment of the groundwater resources potential	All SADC Member States	Enhanced knowledge for resource planning and infrastructure development					15
GP-6	Monitoring climate change adaptation to drought	Zambia	Enhanced knowledge for replication of climate change adaptation projects in the SADC region					0.5
GP-9	Monitor water pollution in reservoirs and rivers	All SADC Member States	Safeguard the water resources of the SADC region from pollution with resultant economic benefits					15
GP-10	Piloting synchronised and conjunctive operation of dams	Zambezi River Basin	Flood and drought mitigation, improved livelihoods and provision of water for the environment					7
GP-11	Implications of virtual water trading in water resources development and usage in the SADC region	SADC Member States	Enhanced knowledge for planning and managing water resources development in the SADC region					1

INVESTMENT PROJECTS								
RG-1	Inga III Hydropower	DRC	-	-	4 320	-	-	8 000
RG-2	Lesotho Highlands Phase II	Lesotho, South Africa	2.2	-	1 200	17 000	17 000	1 001
RG-3	Batoka Gorge Hydropower Scheme	Zambia, Zimbabwe	1 680	-	1 600	100 000	100 000	4 000
RG-4	Songwe River Basin Development Project	Malawi, Tanzania	10	200	153	250 000	250 000	328
XB-2	Vaal-Gamagara water supply	Botswana, South Africa	-	-	-	50 000	50 000	175
XB-3	Ressano Garcia Weir	Mozambique, South Africa	0.2	-	-	20 000	20 000	6
XB-4	Lomahasha/Namaacha water supply	Swaziland, Mozambique	300	1 000	-	100 000	100 000	31
XB-5	Water supply and sanitation at 12 locations	Angola, Botswana, DRC, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe	-	-	-	1 390 000	3 250 000	165
P1-1	Water supply and sanitation – Lubango Phase 2	Angola	-	-	-	1 200 000	1 200 000	120
P1-3	Water supply and sanitation – Kinshasa	DRC	-	-	-	10 000 000	10 000 000	220
P1-4	Lesotho Lowlands Water Supply Scheme – Zone 1	Lesotho	100	-	-	127 000	127 000	78
P1-5	Mombezi Multipurpose Dam	Malawi	69.5	500	-	100 000	100 000	210
P1-6	Water supply and sanitation – 13 housing estates	Mauritius	22.2	-	-	15 000	15 000	11
P1-7	Movene Dam	Mozambique	50	300	10	50 000	50 000	11
P1-8	Artificial recharge of Windhoek Aquifer Phases 2B and 3	Namibia	8	-	-	-	-	55
P1-9	Reducing non-revenue water and increasing use efficiency	Seychelles	-	-	-	25 000	25 000	26
P1-11	Nondvo Multipurpose Dam	Swaziland	150	-	50	100 000	100 000	150
P1-12	Ruhuhu Valley Irrigation Scheme	Tanzania	25	3 100	-	15 000	15 000	13
P1-13	Climate change adaptation to drought – Agro Region I	Zambia	250	3 000	-	45 000	45 000	80
P1-14	Bulawayo-Zambezi Water Supply Scheme	Zimbabwe	634	6 500	20	1 000 000	1 000 000	600
GP-7	Improved agricultural water application efficiencies	All SADC Member States	Improved and more efficient irrigation systems introduced for improved crop and income yields					11.5
TOTALS			**3 201.1**	**14 600**	**7 353**	**16 454 000**	**18 324 000**	**15 672.5**

Table 3.5: Project Development Phases. Source: ICA, 2006.

PHASE	DESCRIPTION	ACTIVITIES
1	Enabling environment	• Designing regulatory approaches • Project-relevant institutional reforms • Capacity building to support projects • Consensus building for projects
2	Project definition	• Identification of desired outputs • Prioritisation versus other projects • Identification of project champions • Action planning (Torso, etc.) • Pre-feasibility studies
3	Project feasibility	• Organisational/administrative • Financial/financial modelling • Economic • Social • Technical/engineering • Environmental studies
4	Project structuring	• Public/private options assessment • Technical/engineering • Project finance • Legal structuring
5	Transaction support	• Project finance • Technical/engineering • Legal structuring • Procurement • Negotiation • Post-signing financial agreements
6	Post implementation support	• Monitoring • Evaluation • Renegotiation/refinancing

Table 3.6: Available Support for Infrastructure Development. Source: ICA, 2006

FACILITY	PROJECT DEVELOPMENT PHASES					
	1	2	3	4	5	6
ACP-EC Energy Facility						
African Capacity Building Foundation						
African Catalytic Growth Fund						
African Water Facility						
DBSA Development Fund						

DEVCO						
FEMIP Support Fund						
FEMIP Trust Fund						
Fund For African Private Sector Assistance						
Global Environmental Facility						
Global Partnership for Output-based Aid						
Islamic Development Bank TAF						
IFC Advisory Services						
IFC Advisory Services						
Nepad IPPF						
Nepad PPFS						
Nigerian Technical Cooperation Fund						
PHRD Technical Assistance Grant Programme						
PIDG Technical Assistance Fund						
Public Private Infrastructure Advisory Facility						
SEFI Transaction Support Facility						
Slum Upgrading Facility						
Water and Sanitation Programme						

Domestication and Harmonisation of the SADC Protocols, Policies and Strategies (Project GP-2)

The RSAP III goal is to strengthen the enabling environment for regional water resources governance, management and development through the application of integrated water resources management at the regional, river basin, Member State and community levels (SADC 2011). There is a generally recognised need to promote harmonisation between the national water policies, legislation and management strategies of the SADC Member States, in the interests of managing shared watercourses and achieving regional integration and poverty eradication. It is likely that the need for and value of harmonisation will increase over time, as the development and utilisation of shared watercourses increases (SADC 2011). The need for policy harmonisation was first captured under RSAP II as project WG3, Promotion of Implementation of Regional Water Policy and Strategy. As this was not fully achieved under RSAP II, Programme 2 of the RSAP III captures the need for policy harmonisation to be effected. The objective of Programme 2 of the RSAP III is to strengthen the enabling environment for the coordinated management and development of water resources in the SADC region. Priority intervention 2.3 of Programme 2 of the RSAP III deals with policy harmonisation. The essence is that national water policies dealing with issues of trans-boundary cooperation should be harmonised between Member States using the SADC regional Water Policy as a benchmark.

Member States must ensure that national legislation provides the means for the implementation of international law that is binding on that country. Harmonisation of national law with relevant international laws (such as the SADC Revised Protocol on Shared Watercourses) is the most effective tool for this. On a regional level, this process contributes to the alignment of national policies and legislation. While most Member States recognise and have endorsed the concept of harmonisation, this may not be prioritised in terms of human/ financial resources made available at a national level, due to limited political awareness and support (SADC 2011). This is exacerbated by:

- The highly uneven development of policy, legislation and strategy between Member States (*Table 2.1*); and
- Inadequate institutional capacity and governance arrangements, particularly for the implementation of policy, legislation and strategies.

The objectives of this project would thus be:

- To assess the SADC Member States' national water policies and/or legislation in terms of compliance with the Regional Water Policy;
- To promote the harmonisation of Member States' national water policies, legislation and strategies with those of other Member States, the Regional Policy and Strategy and relevant international conventions and protocols;
- Provide technical and financial support to the SADC Member States to effect the harmonisation of their national water legislation, policies and strategies within SADC; and
- Create an enabling environment for the implementation of national, bi-national and regional water infrastructure within the SADC region.

The project proponent is the SADC Water Division, which will appoint a suitable consultant to carry out the assessment on the SADC Member States' national water policies and/or legislation compliance with the Regional Water Policy. The ToR and appointment of the consultant can be done in early 2013 for completion of the assessment by mid-2013. SADC Member States can then seek the technical and financial assistance through the SADC Water Division according to their needs soon thereafter. The estimated total cost for the project, which includes the estimated technical and financial requirements of the SADC Member States to harmonise their policies, is US$2.4 million.

Possible project financiers are Sida, DANIDA and GIZ. The project can be considered to be in Phase 3 of the ICA Project Development Phases.

The major project challenges foreseen are the timely sourcing of project finances and the reluctance of Member States to harmonise their policies due to sovereignty egos.

Institutional Reforms for RBOs, River/Water Authorities and Utilities (Project GP-3)
Part of the overall objective of the SADC Revised Protocol on Shared Watercourses is to advance the agenda of regional integration and poverty eradication. In order to achieve this, the Protocol seeks to promote and facilitate the establishment of shared watercourse agreements and shared watercourse institutions for the management of shared watercourses. In Article 1 of the Protocol (SADC 2000), the management of a shared watercourse means:

- Planning the sustainable development of a shared watercourse and providing for the implementation of any plans adopted; and
- Otherwise promoting the rational, equitable and optimal utilisation, protection and control of the watercourse.

It can be premised that the intentions of the Protocol are for shared watercourse institutions to be sufficiently empowered to manage the shared watercourse, bearing in mind the definition of managing a shared watercourse, which has both provisions for infrastructure development, operation and management, and for protecting the watercourse's biodiversity. Currently, all the RBOs in the SADC region are not focused on infrastructure development. Instead, they have an

investigative and advisory mandate with the emphasis being more on determining an overall management system for the basin that balances socio-economic development needs with the need for protecting the basin's biodiversity (OKACOM, ORASECOM, LIMCOM and ZAMCOM). The SADC institutions that have a mandate for infrastructure development, management and operation were created as Special Project Vehicles (SPVs) to execute particular projects (KOBWA, ZRA, LHDA). Against this background, it is recommended that in the river basins where there is a significant development potential, the core business of the RBOs should be oriented towards the preparation, development, implementation, management and operation of the SADC's Water Sector RIDMP projects. Such RBOs should have legal and financial capacity to raise financing independent of the watercourse states.

If the RBOs are mandated to develop, implement, manage and operate joint infrastructure, this would generate the necessary political and social motivation for developing stronger cooperation agreements and institutions, and further generate additional financial resources to develop the capacity of the RBOs. It should be noted, however, that capacity building projects, data collection and knowledge generation activities should continue in parallel with infrastructure development. While making the case for SADC's RBOs to have executive powers, it is acknowledged that a change of mandate for an RBO often requires a change of the founding agreement, which takes time to achieve. A change of mandate towards infrastructure development would also entail a change in the staffing structure, as well as other additional enabling resources necessary to capacitate the RBO for project preparation and infrastructure development.

This project's objective is to study the pros and cons of changing the mandates of existing RBOs to gear them for joint infrastructure development, or for SPVs to be set up for planning, developing, managing and operating joint infrastructure in the SADC region. The project proponent is the SADC Water Division, which will appoint a suitable consultant. The ToR and appointment of the consultant can be done in early 2013, in time for recommendations to be submitted by mid-2013 for decisions to be appropriately made by the end of 2013. The estimated total cost for the project is US$0.1 million.

Possible project financiers are Sida, DANIDA and GIZ. The project can be considered to be in Phase 3 of the ICA Project Development Phases.

The major project challenges foreseen are the timely sourcing of project finances and resistance to change from existing RBOs and their principals.

Capacity Building Projects

There are four SADC capacity building projects which have been included in the Water Sector RIDMP: Upper Okavango food security, demand management in 62 urban centres, capacity enhancement in project preparation, resource mobilisation and piloting and reduction in non-revenue water and water losses.

Upper Okavango Food Security Project (Project XB-1)
The principal purpose of this project is to identify and disseminate technical knowledge of improved approaches to water management and agricultural production, including livestock and aquaculture, and market access for smallholder farmers within the project area. The second purpose of this project will focus on ensuring sustainable management of natural resources within the project area, with particular attention to efficient water resource utilisation. The third component of this project will focus on creating and strengthening local capacity and social capital for sustainable economic development and increasing food security. The fourth component of this project will focus on

infrastructure development and rehabilitation within the project area. The project will cover only the most urgent agriculture-related needs, but can also identify and prepare proposals for further infrastructure investment, particularly for roads and bridges. The last component of the project entails regional coordination and management. A project implementation unit will be established in each country with the Ministry of Agriculture in each country leading such implementation. A Coordination Committee will be hosted by OKACOM with representatives from the AfDB, FAO, Angola, Namibia and Botswana.

Initially, this is more of a capacity enhancement project, with minimal water sector developmental infrastructure, which would be developed later. The project, however, fits in well within the RSAP III Pillars, as it aims to improve water management within the project area with overall goals of improving livelihoods and poverty eradication.

The project proponents are the Ministry of Agriculture in Angola and the Ministry of Agriculture, Water and Forestry in Namibia. The next project development stage is a pre-feasibility study to be completed in 2012. Thereafter, feasibility studies will be carried out from 2013 to 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed in 2019. The estimated total project costs are US$66 million. US$1.5 million is required to undertake the feasibility studies and will likely be financed by the AfDB and FAO. The project can be considered to be in Phase 2 of the ICA Project Development Phases.

No major challenges in the implementation of the project are foreseen at this stage. OKACOM can be capacitated to spearhead and implement this project.

Water Demand Management in 62 urban centres (Project P1-10)

The objectives of this project are to reduce the water demand of water users by reducing water losses and non-revenue water (NRW), achieve greater water use efficiency, increased water re-use and use of appropriate metering, monitoring and data analysis methods to document volumes delivered/provided and used. The resultant water savings can be used to supply new consumers. The management of the water situation in South Africa can be improved by applying water demand management (WDM) principles in major metros and municipalities. Activities such as pipe leakage repair, pressure reduction, re-use of water and metering with commensurate data analysis can be introduced with good results, and resultant benefits to the communities being serviced. Numerous studies have shown that water conservation and water demand management measures provide cost-effective means of reducing water demands in the long run, by minimising losses and wastage and by so doing, delaying the need to construct additional infrastructure, usually at higher capital cost.

Assuming on average that 30 000 people per urban centre will be served from the water saved through demand management and reduction of water losses, a total of 1 860 000 people will benefit from this project.

The project proponent is the Department of Water Affairs. Pre-feasibility studies need to be completed by 2013 for the 62 urban centres yet to be identified. Feasibility studies would then follow in 2014. Detailed designs and tendering for project implementation will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed by 2020. Assuming a cost of US$1 million per urban centre for the studies and implementation costs, the estimated total project costs for the 62 urban centres are US$62 million. The project can be considered to be in Phase 1 of the ICA Project Development Phases.

Possible project financiers are DBSA and the African Water Facility.

The major project challenges are the timely sourcing of project finances, achieving consensus on the selection of the 62 urban centres that will benefit and the capability/capacity of some of the selected urban centres to successfully implement their component of the project. There will be a need for enhancing capacity in such urban centres.

Capacity Enhancement in Infrastructure Project Preparation, Resource Mobilisation and Piloting (Project GP-4)

Under the RSAP III Programmes, Programmes 7, 8 and 9 (Infrastructure Project Preparation, Resource Mobilisation for Infrastructure Development and Infrastructure Piloting respectively) should be given urgent priority and rolled out to all the SADC regional/RBO/national institutions that are going to implement the new Water Sector infrastructure. The objectives of this capacity enhancement project is to enable the SADC national/bi-national/RBOs to be fully capacitated so as to be able to develop, prepare and package bankable water infrastructure projects that can be submitted to international financial institutions.

Prior to implementation of the proposed capacity enhancement in infrastructure project preparation, resource mobilisation and piloting project, the following should be undertaken through the SADC Water Division:

- Existing training manuals are promoted and new manuals are developed to assist policy-makers, decision-makers and professionals with issues around the sustainable development of large water infrastructure; and
- A training manual is developed that documents the different stages and requirements of project preparation; from the description of the enabling environment, to project definition, project feasibility, resource mobilisation and post-implementation support.

There will thus be two phases to this project: preparation of training manuals and the training itself. It is estimated that the cost of preparing the training manuals would be US$0.25 million and the cost of the training would be US$0.75 million, giving a total cost for the project of US$1 million. The project would start with the preparation of the training manuals in early 2013 and end with the conclusion of training in 2014.

Possible project financiers are GIZ and DBSA. The project can be considered to be in Phase 3 of the ICA Project Development Phases.

The major project challenge foreseen is timely sourcing of project finances.

Reduction in Non-revenue Water and Water Losses in the Capital Cities of the SADC Member States (Project GP-8)

The project proponents are the SADC Member States with the water utilities for each capital city being the implementing agency. This is an investment opportunity study. The objectives of this proposed project are similar to those of Projects P1-9 and P1-10, which are to reduce the water demand of water users by reducing water losses and NRW, achieve greater water use efficiency and use of appropriate metering, monitoring and data analysis methods to document volumes delivered/provided and used. The resultant water savings can then be used to supply new consumers. The management of the water situation in all the 15 capital cities of the SADC Member States can be improved by applying WDM principles. Activities such as pipe leakage repair, pressure reduction, re-use of water and metering with commensurate data analysis can be introduced, with good results and resultant benefits to the consumers being serviced. Water conservation and water demand management measures provide cost-effective means of reducing water demands in the long

run by minimising losses and wastage and by so doing, delaying the need to construct additional infrastructure, usually at higher capital cost. In any event, why build new infrastructure when similar old infrastructure cannot be efficiently managed?

This project will assess the level of NRW, water losses and water re-use in all the 15 capital cities of the SADC Member States, and recommend appropriate actions to be taken for each city. The water eventually saved from the applied measures would be used to supply new consumers. Revenue streams would improve, as the water supply systems would also be more efficient. It is estimated that it will cost US$1 million per city for the study, giving a total cost for all 15 cities of US$15 million. The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy work in 2013 and execution of the project in 2014. Project profiles for each city would be produced for the mitigatory works and associated costs.

Possible project financiers are DBSA, GEF and the AfDB. The project can be considered to be in Phase 4 of the ICA Project Development Phases.

The major project challenge foreseen is timely sourcing of project finances.

Studies

There are six SADC studies which have been included in the Water Sector RIDMP: Limpopo Basin Water Monitoring, Assessment of the Groundwater Resources Potential of the SADC Region, Monitoring Climate Change Adaptation to Drought, Monitoring Water Pollution in Reservoirs and Rivers, Piloting Synchronised and Conjunctive Operation of Dams and Implications of Virtual Water Trading in Water Resources Development and Usage in the SADC Region.

Limpopo River Basin Water Monitoring Project (Project P1-2)
The Upper and Middle Limpopo River Basin has witnessed increased development with numerous large-scale irrigation developments having been implemented in the basin in recent years. This has occurred with little or no coordination among stakeholders in Botswana, Mozambique, South Africa and Zimbabwe in the planning and implementation of these projects, resulting in uncoordinated drawdowns on the water resources in the basin. The four countries have also never jointly addressed the concomitant environmental impacts characterised by increasing levels of water pollution.

While this proposed project is not an infrastructure development project *per se*, it is an initiative that will inform the extent to which the development and utilisation of water resources linked infrastructure will have on the basin. The data collected on water resources management and pollution will also be of great importance in the debates on equitable water allocation across all user sectors in the basin. The stakeholders in the basin consider this to be an important initiative, given the paucity of water resources in the basin. Critical aspects to be monitored and reported on include water pollution, soil loss and sustainable development. Data sharing across all four countries will be imperative if sustainable water resources management is to be achieved in the Limpopo River Basin.

The project proponent is the Government of Botswana, which has to collaborate with the other project riparian states of South Africa, Zimbabwe and Mozambique. Feasibility studies should be completed in 2013. Detailed designs and tendering for construction of monitoring works will be done in 2014. Procurement of equipment and instruments and the construction of the monitoring stations would start in 2015 and be completed by 2016. The estimated total project costs are US$1 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases.

Possible project financiers are Sida.

The major project challenges are the timely sourcing of project finances, as well as achieving consensus on the project with the project riparian states.

Assessment of the Groundwater Resources Potential of the SADC Region (Project GP-5)

The project proponent is the SADC Groundwater and Drought Management Project, with the SADC Member States Water Sector Ministries as the lead agencies. Groundwater is of critical importance in the SADC region, as it is the main source of water for at least 70% of the population. However, very little is known in the SADC region regarding underground water in general, and its interaction with surface water in particular. Groundwater usually provides a secure and cost-effective water supply solution, requiring little or no treatment in arid regions where surface water is seasonal, in rural areas with dispersed populations, for stock watering and for small town water supplies. Groundwater provides a cushion against droughts, and many boreholes and protected wells have been drilled and sunk during droughts.

A pilot SADC regional project with the following objectives should be formulated and implemented which will inform the SADC region:

- Create awareness of the importance of and the critical role that groundwater plays in providing water to at least 70% of the SADC region's population;
- Assess the groundwater capacity, abstraction rates and recharge capabilities of aquifer systems of the SADC region, bearing in mind that most of these aquifer systems are fossil waters and not renewable;
- Produce a comprehensive SADC regional hydro-geological map;
- Ensure, through the project, that provisions on groundwater management are included in shared watercourse agreements, particularly for trans-boundary aquifers;
- Improve groundwater modelling; and
- Improve the understanding of the protection and recharge mechanisms of groundwater resources.

The knowledge gained from this project will assist in the planning and development of water resources and related infrastructure developments. It is estimated that the total cost of the project would be US$15 million spent over eight years. The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy work in 2013 and commencement of execution of the project in 2014, ending in 2020.

Possible project financiers are UNEP, GEF and the AfDB. The project can be considered to be in Phase 2 of the ICA Project Development Phases.

The major project challenge foreseen is timely sourcing of project finances.

Monitoring Climate Change Adaptation to Drought - Agro-ecological Region I, Zambia (Project GP-6)

The overall objective of the Climate Change Adaptation to Drought Project (P1-13) is to reduce the vulnerability of those depending on rain-fed agricultural practices to anticipate rainfall shortages in the face of climate change/variability. Agro-ecological Region (AER) I covers the western and southern parts of Zambia, and receives less than 800 mm of rain annually. Project P1-13 will focus on the introduction of irrigation and water management systems, training, capacity building of farmers on water management practices, support to marketing and provision of finance credit facilities. It will also support the introduction of drought resistant crops such as cassava, beans, sorghum, millet,

potatoes, vegetables and fruit trees. The project entails the construction of five dams at five selected areas in AER I, eight fish ponds per site and irrigation schemes at these five separate locations.

It is important that project P1-13 has a strong monitoring component, especially for lessons to be learnt in its implementation and applicability for replication in the SADC region. This project will independently monitor project P1-13 to facilitate replication in similar areas of the SADC region. The monitoring project, as part of the other outputs, will recommend other areas in the SADC region where the project can be replicated with appropriate project profiles being developed.

The project proponent is the SADC Water Division, which will appoint a suitable consultant or implementing agent such as the ZAMCOM Secretariat. The ToR and appointment of the consultant can be done in 2014, in time to start monitoring Project P1-13 in 2014 till 2017, as Project P1-13 will be concluded in 2016. The estimated total cost for the project monitoring over the four years is US$0.5 million.

Possible project financiers are UNDP and the FAO. The project can be considered to be in Phase 3 of the ICA Project Development Phases.

The major project challenge foreseen is timely sourcing of project finances.

Monitor Water Pollution in Reservoirs and Rivers of Shared SADC Watercourses (Project Gp-9)
The SADC region has witnessed increased development in the mining and irrigation sectors in recent years. The planning and implementation of these developments has occurred with little or no coordination among stakeholders in the neighbouring states sharing watercourses. The concomitant environmental impacts, characterised by increasing levels of water pollution, have also never been addressed at river basin level.

While this proposed project is not an infrastructure development project *per se*, it is an initiative that will inform the extent to which the development and utilisation of water resources linked infrastructure will and has had an effect in each of the 15 SADC shared watercourses. Polluted water is more expensive to use, as it requires treatment. In some cases reservoir waters become unusable, with negative consequences to ecosystems and the environment. Further, the polluters and the hot spots in respect to pollution will be identified and highlighted, facilitating corrective action. The data collected on water resources management and pollution will also be of great importance in the debates on equitable water allocation across all user sectors in these shared watercourses. Critical aspects to be monitored and reported on include water pollution, soil loss and sustainable development. Data sharing among the riparian states will be imperative if sustainable water resources management is to be achieved in these shared watercourses.

The project proponents will be the Secretariats of the RBOs, or the SADC Water Division where such Secretariats do not exist. ToR for the project and identification of polluters and hot spots should be completed in 2013. Detailed designs and tendering for construction for any necessary monitoring stations will be done in 2014. Procurement of equipment and instruments and the construction of the monitoring stations would start in 2015 and be completed by 2016. Monitoring and reporting would commence thereafter.

The estimated total project costs are US$15 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financiers are Sida, the African Water Facility, UNEP and GEF.

The major project challenges are the timely sourcing of project finances, as well as achieving consensus on the project with the project riparian states.

Piloting Synchronised and Conjunctive Operation of Dams for Flood and Drought Mitigation, Improved Energy Generation and Livelihoods and Provision of Water for the Environment in the Zambezi River Basin (Project GP-10)

The project proponent is the ZAMCOM Secretariat with the dam operators of the Kariba, Itezhi-Tezhi, Kafue and Cahora Bassa dams being the lead and implementing agencies. The major dams of the Zambezi River Basin have, to date, generally been operated independently, without regard to the requirements of other stakeholders. Except for the Kafue dams, all the other dams have been managed without any provision for environmental flows and other socio-economic considerations for downstream or other riparian users. Floods and droughts are part of the history of the Zambezi, with and without dams. Dams impound floods and modify downstream flows and the lake environment. However, releases can be managed to minimise upstream and downstream impacts (SADC 2011).

The need to widen the range of possible flow regimes in the Zambezi River system downstream and upstream of major dams in order to provide for more uses/users was established during the Zambezi Dam Synchronisation and Flood Releases Study (SADC 2011). The goals of system optimisation, water security and benefit sharing were also discussed in detail. Synchronisation and conjunctive operation are two terms that are closely associated with modern scientific trends in dam management to achieve these goals. There is need to demonstrate that dam synchronisation, conjunctive operation of dams and the introduction of environmental flows in the Zambezi River Basin is achievable and beneficial. Dam operators and other stakeholders require support to set up and implement a practical pilot project, which builds confidence in synchronised and conjunctive operation of dams, while providing valuable lessons and experiences for improvements and future replication in other SADC River Basins (SADC 2011).

One of the expected outcomes of the pilot project would be that the dam operators of the main dams in the Zambezi River Basin will negotiate and agree to operate their dams for optimal outcomes, which include addressing flood and drought management and environmental flow requirements. Operating Kariba, the dams on the Kafue sub-system and the Cahora Bassa Dam in a conjunctive and synchronised manner would result in optimum hydropower production, dam safety, supply of water to other users, including the environment, and reduced flood damage upstream and downstream of these major dams.

The expected next stages for this pilot project would be:

- Undertaking a feasibility study for the pilot project;
- Implementing a pilot project involving Kariba, the Kafue sub-system dams and Cahora Bassa;
- Data capturing and meetings to support implementation activities. This should be considered a short- to medium-term intervention to allow testing of a wide range of scenarios, which depend on weather/hydrological patterns;
- Dam operators and power producers are fully engaged, make the necessary changes and adopt the new modes of operation; and
- Providing a risk management plan (including funds) to cover for unforeseen loss of storage, power and/or revenue.

It is expected that the project will cost US$7 million over a period of seven years. The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy assistance

work in 2013 and execution of the project from 2014 to 2020. Possible project financiers are DBSA, GEF and GIZ. The project can be considered to be in Phase 3 of the ICA Project Development Phases.

The major project challenges foreseen are the timely sourcing of project finances and the adoption of an MoU between the dam operators to facilitate conjunctive and synchronised operation of dams, as well as information exchange.

Implications of virtual water trading in water resources development and usage in the SADC region (Project GP-11)

The project proponents are all the SADC Member States, with the SADC Water Division being the lead agency. Virtual water (also known as embedded water, embodied water or hidden water) refers, in the context of trade, to the water used in the production of goods or services. Virtual water trade in practice means that a country can potentially mitigate its water shortages by importing large amounts of virtual water, instead of building new water supply infrastructure. For instance, it takes 1 300 m^3 of water on average to produce one metric tonne of wheat. The precise volume can be more or less, depending on climate conditions and agricultural practices. By importing 100 000 tonnes of wheat a year, a water scarce country has actually imported 130 million $m^3$of water per year, a very large yielding dam indeed. At the same time, such agricultural exports from water rich countries could be drivers for economic growth.

A project that brings better understanding to the implications of virtual water among Member States of SADC and between SADC and the other African RECs should be undertaken. The project would, among other outputs, propose virtual water trade strategies for both water scarce and water rich SADC Member States for their mutual benefit, and highlight the water infrastructure requirements for the proposed water trade strategies.

It is estimated that the total cost of the project would be US$1 million. The project would start with the drafting of the ToR for the study in 2013, tendering for the consultancy work in 2013 and execution of the project in 2014. Possible project financiers are DBSA, GEF and the AfDB. The project can be considered to be in Phase 4 of the ICA Project Development Phases.

The major project challenge foreseen is timely sourcing of project finances.

Investment Projects

There are 21 investment projects which have been included in the Water Sector RIDMP: Inga III Hydropower, Lesotho Highlands Phase II, Batoka Gorge Hydroelectric Scheme, Songwe River Basin Development Project, Vaal-Gamagara Water Supply, Ressano Garcia Weir, Lomahasha/Namaacha Water Supply, Water Supply and Sanitation to 12 Border Locations, Water Supply and Sanitation for Lubango Phase II, Water Supply and Sanitation for Kinshasa, Lesotho Lowlands Water Supply Scheme Zone 1, Mombezi Multipurpose Dam, Water Supply and Sanitation to 13 Housing Estates, Movene Dam, Artificial Recharge of Windhoek Aquifer Phases 2B and 3, Reducing NRW and Increasing Water Use Efficiency, Nodvo Multipurpose Dam, Ruhuhu Valley Irrigation Scheme, Climate Change Adaptation to Drought Agro-region 1, Bulawayo-Zambezi Water Supply Scheme and Improved Agricultural Water Application Efficiencies.

Inga III Hydropower (Project RG-1)

Besides meeting the internal energy needs of the DRC and the BHP Billiton aluminium smelter, excess power from the Inga III Hydropower project will be exported to the SADC region. No dam will be constructed for the Inga III Hydropower project. Water will be diverted from the Congo River through tunnels to the power station. The nominal power station production capacity will be 4 320 MW (16 x

270 MW units).

The project proponent is the DRC Ministry of Energy. Pre-feasibility studies were concluded in 2011 financed by the AfDB. The next project development stage is feasibility studies to be conducted in 2012, followed by final designs in 2013 and tendering for construction in 2014. Construction of the project is expected to start in 2015 and will be completed in 2017.

The estimated total project costs are US$8 billion. The project can be considered to be in Phase 4 of the ICA Project Development Phases.Possible project financiers are the AfDB, DBSA and the WB.

The major project challenge is timely sourcing of project finances.

Lesotho Highlands Phase II (Project RG-2)
The total project was originally conceived to transfer 70 m^3/s from the upper portions of the Lesotho Highlands into the Vaal River Basin. The aim of Phase II is to deliver more water by gravity to the Vaal River system in South Africa. Phase II is expected to increase surface water storage in Lesotho by 2.2 x 10^6 m^3, the existing hydropower generation capacity in Lesotho by 1 200 MW to the benefit of both local and regional power consumption.

From the social and environmental perspective, it is estimated that about 17 000 people from 72 villages will be affected and compensated accordingly, and will further benefit from improved water supply and sanitation services.

The project proponents are the Lesotho Highlands Development Authority (LHDA) and the Lesotho Highlands Water Commission (LHWC). Pre-feasibility studies were concluded in 2011, financed by the DBSA. The next project development stage is feasibility studies to be conducted in 2012, followed by final designs in 2013 and tendering for construction in 2014. Construction of the project is expected to start in 2015 and will be completed in 2020.

The estimated total project costs are US$1.001 billion. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financiers are the AfDB and DBSA.

The major project challenges include:

- The resettlement and timely compensation of the 3 300 families from the 72 villages;
- Conclusion of the royalties and water purchase agreements between Lesotho and South Africa; and
- The timely sourcing of project finances.

Batoka Hydro-electric Scheme (Project RG-3)
The objective of the Batoka Hydro-electric Scheme is to increase the power generation capacity of Zambia and Zimbabwe and reduce reliance on coal-fired power stations, which are expensive to operate and maintain and are associated with greenhouse gas emissions. The project has the potential to make both Zambia and Zimbabwe power exporters after meeting local needs. The Batoka Hydro-electric Scheme involves the construction of a 1 680 x 10^6 m^3 capacity dam, with two underground power stations producing a total of 1 600 MW. Two townships will be established at Batoka, one in Zambia and the other in Zimbabwe, with a combined total population of about 200 000 people who will have adequate water supply and sanitation services.

The project proponents are the governments of Zambia and Zimbabwe with lead agents being the Zambezi River Authority (ZRA) for the dam development and Zimbabwe Electricity Supply Authority (ZESA) and Zambia Electricity Supply Corporation (ZESCO) for the south and north bank power station developments respectively. Feasibility studies were concluded in 1993, financed by the AfDB and supplemented by site/foundation exploratory works financed by the Zimbabwe Government. The next project development stage is final designs to be conducted in 2013 and tendering for construction in 2014. Construction of the dam and power stations is expected to start in 2015 and will be completed by 2021.

The estimated total project costs are US$4 billion. The project can be considered to be in Phase 4 of the ICA Project Development Phases. Possible project financiers are the AfDB, DBSA and the World Bank.

The major project challenges include:

- Obtaining final approval to proceed with the project from both governments; and
- Timely sourcing of project finances.

Songwe River Basin Development Programme (Project RG-4)

The overall goal of the Songwe River Basin Development Programme (SRBDP) is to contribute to improved living conditions of the basin population and the socio-economic development in Malawi and Tanzania. The specific objective is to prepare designs and joint investment projects for implementation, and to create an effective enabling environment for trans-boundary water resources management in the Songwe River Basin. The project is structured in five components:

1. Preparation of a shared vision towards 2050 and a 10-year SRBDP;
2. Detailed design and preparation of priority investments as a major task;
3. Environmental and social safeguarding of the SRBDP by means of a strategic environmental and social assessment and environmental and social impact assessment for the programme;
4. Establishment of a Songwe River Basin Authority and associated IWRM capacity building at local level; and
5. Support to project management and resource mobilisation for the implementation of capital investments under the programme.

With regards to water sector infrastructure development projects, the SRBDP will construct the lower dam with a capacity of 10 x 10^6 m^3, which will irrigate some 200 ha and also generate about 153 MW. It is estimated that the project will benefit some 250 000 people who will also have improved water supply and sanitation services.

The project proponents are the governments of Malawi and Tanzania. Feasibility studies were concluded in 1994, financed by the AfDB. The next project development stage is final designs to be conducted from 2012 to 2013 and tendering for construction in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed in 2021.

The estimated total project costs are US$328 million. The project can be considered to be in Phase 4 of the ICA Project Development Phases. Possible project financiers are the AfDB, Sida and the World Bank.

The major project challenges include:

- Obtaining final approval to proceed with the project from both governments;
- Timely sourcing of project finances;
- The establishment of the Songwe River Basin Authority, which will take time, but will contribute to the consolidation of the good cooperation between the two countries and the implementation of such projects;
- In order to minimise the risk of low stakeholder response to the project, considerable attention has to be paid to the environmental and social issues, including mitigation, resettlement, compensation schemes, land tenure security, gender equality and stakeholder involvement throughout the project's lifecycle. The project's focus on economic development and poverty eradication should also encourage positive stakeholder response; and
- Changed hydrological conditions due to climate change and variability is a potential threat to the economic viability of the investment. The project includes an analysis of hydrological sensitivity to clarify the risks and advise on possible mitigation measures to be taken by the Songwe River Basin Authority once established.

Vaal-Gamagara Water Supply Project (Project XB-2)

Water availability in Botswana decreases from the east to the west, with the south-western corner of Botswana having the least reliable water supply. The residents in this area suffer constant water supply constraints, which compromises their quality of life. As most of the country's water sources are found in the north-east of the country, Botswana has proposed that water supplies to the southwest be sourced from the Vaal River in South Africa, which is part of the Orange-Senqu River Basin. Botswana is a member of the Orange Senqu River Basin Commission (ORASECOM) and therefore has rights to the waters of the basin in terms of the agreement that establishes ORASECOM. Botswana's proposal is to annually draw up to maximum of 5 million m^3 of water from the Vaal, and to deliver this to the villages in the extreme southwest of the country through the Vaal-Gamagara Water Transfer Scheme. The scheme will involve the construction of cross-border water transfer infrastructure over an estimated distance of 400 km. It is assumed that no dam will be constructed, but water will be stored in ground tanks at appropriate locations along the 400 km pipeline. It is further estimated that 50 000 people will be served with safe domestic water supply and sanitation services

The project proponent is the Department of Water Affairs, Botswana. The next project development stage is a pre-feasibility study to be completed in 2013. This requires US$400 000. Thereafter, feasibility studies will be carried out in 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed in 2017.

The estimated total project costs are US$175 million, and a possible financier is KfW. The project can be considered to be in Phase 2 of the ICA Project Development Phases.

The major project challenges are the timely sourcing of project finances and possible failure of Botswana to access the Orange-Senqu waters due to lack of agreement with other riparian states.

Ressano Garcia Weir (Project XB-3)

Under the Inco-Maputo Agreement (IMA) between Mozambique, South Africa and Swaziland, it was agreed to release a minimum cross-border flow by the two upstream countries amounting to 2.6 m^3/s on average over a three-day period. The gauging methods used on both sides of the border provide data that is not consistent with each other, resulting in disputes and the non-compliance of

the IMA Agreement. This issue has been discussed several times at the TPTC and JWC meetings of these three riparian states, and there is consensus that a measuring weir would assist in monitoring and enforcing the agreed flows.

On the other hand, the town of Ressano Garcia with a population of 20 000 is currently facing serious water supply problems and urgently requires an assured water supply source for the provision of water supply and sanitation services. A border post would also be established, which would greatly help the Ressano Garcia residents. The Ressano Garcia Weir reservoir capacity would be about 200 000 m^3.

The project proponent is the National Directorate of Water (DNA), Mozambique with ARA South being the implementing agent. Feasibility studies and a comprehensive environmental and social impact assessment funded by the World Bank are underway, and will be completed in 2012. Detailed designs and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed in 2015.

The estimated total project costs are US$6 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. A possible project financier is the World Bank.

The major project challenge is the timely sourcing of project finances.

Lomahasha/Namaacha Water Supply Project (Project XB-4)
The purpose of the project is to provide a reliable and adequate water supply and sanitation services to Lomahasha in Swaziland and across the border serving the Namaacha area of Mozambique. The project will also help to:

- Improve health of the residents;
- Promote economic activity;
- Create employment opportunities;
- Increase food security and reduce poverty; and
- Provide additional revenue for the water utilities.

It is assumed that a dam with a storage capacity of 300 x 10^6 m^3 will be constructed to supply a total population of 100 000 people with a safe drinking water supply and sanitation service, as well as irrigating 1 000 ha of land.

The project proponents are the governments of Swaziland and Mozambique. Feasibility studies have been carried out for Lomahasha, and detailed designs should be completed in 2013. The current cost estimate for implementing the Lomahasha Scheme is US$16 million. Feasibility studies and detailed designs for Namaacha need to commence in 2012 and be completed in 2013, at the same time as Lomahasha. Tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed in 2017.

The estimated total project costs are US$15 million for Namaacha, giving a total project cost of US$31 million. The project can be considered to be in Phase 2 of the ICA Project Development Phases. Possible project financiers are the AfDB and the World Bank.

The major project challenge is the timely sourcing of project finances.

Water Supply and Sanitation at 12 Border Locations (Project XB-5)
This project is expected to construct 6 000 boreholes and rehabilitate 3 500 boreholes and wells by 2015, and improve the existing water supply and sanitation services at these 12 locations. Under sanitation, 310 000 latrines will be constructed. The towns and their border locations are: Kazungula-Kasane (Zambia-Botswana), Siavonga-Kariba (Zambia-Zimbabwe), Luangwa-Zumbo-Kanyemba (Zambia-Mozambique-Zimbabwe), Chanje-Maluera (Zambia-Mozambique), Chipata-Mchinji (Zambia-Malawi), Nakonde-Tunduma (Zambia-Tanzania), Mpulungu-Kasanga-Mutungu (Zambia-Tanzania-DRC), Nchelenge-Kilwa (Zambia-DRC), Kalabo-Mussuma (Zambia-Angola), Kasumbalesa-Kasumbulesa (Zambia-DRC) and Chavuma-Caripande (Zambia-Angola).

The project will undertake new investments, as well as the rehabilitation of water supply and sanitation facilities in the cross-border towns. New protected wells, boreholes and VIP latrines will be constructed during the project period. Existing water supply and sanitation facilities that are not functioning properly will be rehabilitated. This will ultimately increase access to safe water and sanitation services, which is currently low in these border towns. The project will also serve regional tourism and transport, and mitigate cross-border water borne diseases in the border towns and surrounding areas.

The 6 000 boreholes will serve an estimated 720 000 people, while the 3 500 rehabilitated boreholes will serve an estimated 420 000 people. The 310 000 latrines will serve an estimated 1 860 000 people. Some of the cross-border locations like Siavonga-Kariba have piped water supply and sanitation services. It is estimated that a total of 250 000 people will benefit from the expansion and rehabilitation of such existing water supply and sanitation services carried under this project.

The project proponent is the Government of Zambia, which has to collaborate with the other project riparian states of DRC, Tanzania, Malawi, Mozambique, Zimbabwe and Angola. Pre-feasibility studies and a comprehensive environmental and social impact assessment need to be completed by 2013, after consensus on the project is achieved with the other project riparian states. Feasibility studies would then follow in 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed by 2020.

The estimated total project costs are US$165 million. The project can be considered to be in Phase 1 of the ICA Project Development Phases. Possible project financiers are UNICEF, KfW, Water Aid and DANIDA.

The major project challenges are the timely sourcing of project finances, as well as achieving consensus on the project with the project riparian states.

Lubango Phase II Water Supply and Sanitation Project (Project P1-1)
The principal purpose of this project is to rehabilitate and extend the water supply and sanitation system of Lubango, considered the second largest city in Angola. The urgent reconstruction works for water supply and sanitation are needed as a basic requirement for the development of the city and surrounding areas. The project will supply 70 litres/person/day of domestic water supply to a total of 1 200 000 residents of Lubango.

The project proponent is the Ministry of Energy and Water in Angola. Feasibility studies for Phase II of the Lubango Project should commence in 2012 and be completed by 2013. Detailed designs and tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2016.

The estimated total project costs are US$120 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financier is the German Credit Agency, AusfurkredItgeschaft.

The major project challenge is the timely sourcing of project finances.

Kinshasa Water Supply and Sanitation (Project P1-3)

The drinking water supply system of Kinshasa has substantial constraints mainly due to the poor distribution network and the age of the electrical and reticulation systems. After the capacity of the city's water supply is increased, the rehabilitation and strengthening of the water supply and sanitation networks will follow, contributing to the improvement of life of the population. Water supply production will be increased to 800 000 m^3/day. It will also be necessary to rebuild the network for all nine municipalities linked to Kinshasa. This water supply and sanitation project will serve an estimated 10 million people.

The project proponent is the Ministry of Energy, DRC with REGIDESO being the implementing agent. Feasibility studies for the project, requiring about US$10 million, should commence in 2013 and be completed by 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and be completed by 2020.

The estimated total project costs are US$220 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financiers are Chinese and South Korean banks.

The major project challenge is the timely sourcing of project finances.

Lesotho Lowlands Water Supply Scheme – Zone 1 (Project P1-4)

The project will supply Botha-Bothe and adjacent villages with domestic water. The project is designed in such a way, that treated water will be delivered to bulk storage reservoirs from where the settlements will be supplied. The strategic storage will provide reliability during system repairs and power outages. Future expansions are provided for in the design of the project. Where possible, the expansion will be through modular design, e.g. twining storage, modular treatment works and pumping stations. In essence, the facilities can be easily upgraded by adding more components. The existing infrastructure will be integrated where appropriate or possible, but where the systems are very small or old/unreliable, these will be superseded by the project infrastructure. The infrastructure to be developed will provide water for drinking and sanitation to Botha-Bothe and adjacent villages. This is planned to benefit a total of 127 000 people by the year 2027. Ensuing from the project will be socio-economic and health benefits to the target population in the area. The project will also ease the water demand pressures from the industrial firms in Botha-Bothe, with the additional employment further benefitting the town's population. It is estimated that the total surface water storage to be created for this project will be 100 x 10^6 m^3.

The project proponent is the Lesotho Highlands Water Commission. Feasibility studies as well as detailed designs are complete. The next stage is sourcing finances and tendering for construction, which should be completed by 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2017.

The estimated total project costs are US$78 million**.** The project can be considered to be in Phase 5 of the ICA Project Development Phases. Possible project financiers are DBSA and AfDB.

The major project challenge is the timely sourcing of project finances.

Mombezi Multi-purpose Dam (Project P1-5)
The Blantyre Water Board (BWB) is responsible for the water supply to Blantyre and the surrounding peri-urban areas. Currently the city is experiencing a major water shortage, which will be mitigated by building the Mombezi Multi-purpose Dam in the Shire River Basin. The dam would be able to store 69.5 x 10^6 m^3 of water to supply water for drinking and sanitation purposes, irrigation and for the development of fisheries. The construction of the Mombezi Multi-purpose Dam is the first phase in the development of Blantyre's New Raw Water Supply Scheme.

It is estimated that the project will supply 100 000 people with a safe water supply and sanitation service, while also irrigating 500 hectares.

The project proponent is the Ministry of Irrigation and Water Development in Malawi, with the Blantyre Water Board being the project's implementing agent. Detailed designs and ESIA studies are underway and funded by the World Bank to the amount of US$4.35 million. This work is expected to be complete by 2012. Sourcing of funds for constructing the dam and associated infrastructure and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to then start in 2014 and will be completed by 2019.

The estimated total project costs are US$210 million. The project can be considered to be in Phase 5 of the ICA Project Development Phases. A possible project financier is the World Bank.

The major project challenge is the timely sourcing of project finances for constructing the dam.

Water Supply to 13 Housing Estates in Mauritius (Project P1-6)
In the wake of two severe hurricanes, which hit the Island in 1960 and 1975, the Government of Mauritius received grant assistance from the USAid Agency and the European Development Fund for the construction of some 164 housing estates comprising of about 75,000 housing units to provide shelter to the cyclone victims. The housing estates were established wherever land was available, regardless of amenities. A roof to the desperate household was what mattered at that moment. To eliminate health standards, standpipes were gradually provided to each housing estate. Ultimately each housing unit has to be provided with an individual water connection.

The project aims at upgrading the potable water supply infrastructure at some 13 housing estates numbering 3 550 housing units. The resident population of these housing units is estimated at around 15 000 people. A reliable water supply and sanitation would, no doubt, improve their standard of living. The total storage to be created for this project will be 22.2 x 10^6 m^3.

The project proponent is the Central Water Authority. Detailed designs are being undertaken by the Central Water Authority and will be completed by the end of 2012. Sourcing of funds and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2015.

The estimated total project costs are US$11 million. The project can be considered to be in Phase 5 of the ICA Project Development Phases. Possible project financiers are the European Development Fund and USAID.

The major project challenge is the timely sourcing of project finances for construction.

Movene Dam (Project P1-7)
The dam will be instrumental in poverty eradication, as the water supply from the dam will assist small-holder farmers in Mozambique, as well as provide much needed water for mainly the peri-urban population with poor water supply and sanitation. The dam would supplement the existing Pequenos Limbobos Dam.

The selection of a concrete dam is motivated by the occurrence of flash floods in the area, and the dam is proposed to be constructed as an overflow weir without gates. The active storage volume would be about 50 x 10^6 m^3.

It is estimated that the project will supply 50 000 people with a safe water supply and sanitation service, irrigate 300 hectares of land and generate about 10 MW of hydropower.

The project proponent is the National Directorate of Water (DNA), with ARA South in Mozambique being the project's implementing agent. Pre-feasibility studies and a comprehensive environmental and social impact assessment need to be completed by 2013. Feasibility studies would then follow in 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed by 2018.

The estimated total project costs are US$11 million. The project can be considered to be in Phase 1 of the ICA Project Development Phases. Possible project financiers are USAID and the World Bank.

The major project challenge is the timely sourcing of project finances.

Artificial Recharge of Windhoek Aquifer - Phases 2B and 3 (Project P1-8)
The Windhoek Aquifer is an important source of water for Windhoek, especially during periods of drought when the levels of surface dams are very low and when the supply from these sources is reduced. Over a period of 55 years, the regular abstraction of water from the aquifer has resulted in the lowering of the groundwater table by an average of 50 to 60 m. After heavy abstraction during a drought, approximately five years of natural recharge is required before water levels return to pre-drought conditions. Managed aquifer recharge (water banking) would fill up the aquifer, thereby increasing the security of supply using treated surface water, blended with reclaimed water from the reclamation plant, which will not be subjected to evaporation. Evaporation in the central areas of Namibia is approximately 3 400 mm per year, compared with Windhoek's average annual rainfall of 366 mm. Managed aquifer recharge will take place when excess water is available from the surface dams, as well as from the production wells.

This project will benefit all residents of Windhoek, as it will improve the security of water supply to the city. This, in turn, will ensure that businesses and industries will be less affected by water rationing during periods of drought. The security of supply would attract new investments, which again contributes to poverty eradication and improved livelihoods.

The ultimate recharge capacity required will amount to 8.0 x 10^6 m^3 per year. This is a surface water storage project, used only in cases of water shortages for the benefit of the same population. There will thus be no increase in the number of persons served, but in security of supply.

The project proponent is the Ministry of Agriculture, Water and Forestry with NamWater being the implementing agency. Phases 1 and 2A of the project were completed in 2003 and 2011 respectively. The feasibility studies for Phase 2B (EIA, siting, drilling and test pumping of eight deep production boreholes and eight recharge wells) commenced and will be concluded by the end of 2012. The

sourcing of funds (US$5 million) and tendering for construction for Phase 2B will be done in 2013. The execution of the associated project components is expected to start in 2014 and will be completed by 2015. Final designs, sourcing of funds (US$50 million) and tendering for construction for Phase 3 (construction of pump stations, pump houses, recharge and abstraction installations) will be done in 2014, bearing in mind the results of the borehole production tests carried out in Phase 2B. Execution of Phase 3 will commence in 2015 and be concluded by 2020.

The estimated total project costs are US$55 million. The project can be considered to be in Phase 5 of the ICA Project Development Phases. Possible project financiers are the World Bank and AfDB.

The major project challenges are the timely sourcing of project finances, and the possible pollution of the stored underground water. The pollution risk will need to be addressed as part of the project.

Reducing Non-revenue Water and Increasing Use Efficiency (Project P1-9)

The water supply situation in the Seychelles needs rapid improvement. Water shortages occur mainly during annual dry periods. Water restrictions are common on the three main islands of Mahé, Praslin and La Digue. Demand for potable water is continuously rising from population growth, tourism and other commercial developments. The islands' topography precludes sufficient storage capacity at economic costs from the traditional sources of fresh water from streams. It is thus necessary that a project that results in the reduction of water supply leakages and increased efficiency in water distribution and usage be implemented.

The project, which will be undertaken on the three islands in the next five years, relates to reducing the amount of NRW and putting effective instrumentation in place. These actions would allow greater efficiency in distribution and increased availability for use, as well as collecting the logical volumetric monitoring data using telemetries to more accurately determine the quantities of water being distributed. Implementing the overall water development projects will have a beneficial impact on the socio-economics of the Seychelles.

The additional population to be served from the savings arising from the reduction in NRW is 25 000 people.

The project proponent is the Public Utilities Corporation. Detailed designs are being undertaken by the Public Utilities Corporation and will be completed by the end of 2012. Sourcing of funds and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2015.

The estimated total project costs are US$26 million. The project can be considered to be in Phase 4 of the ICA Project Development Phases. Possible project financiers are the African Water Facility and USAID.

The major project challenge is the timely sourcing of project finances for construction.

Nondvo Multi-purpose Dam (Project P1-11)

The purpose of the project is to provide potable water to the residents of Mbabane and Manzini in Swaziland. The Nondvo Multi-purpose Dam, located on the Lusushwana River, has a potential to improve the water resources situation in the two cities, which are both currently operating at full supply capacity. The Nondvo Multi-purpose Dam would have a full supply level capacity of 150 x 10^6 m^3. This dam has a potential to generate 50 MW. The water stored in the dam will be able to meet the water supply and sanitation needs of an additional 100 000 people.

The project proponent is the Department of Water Affairs, Swaziland. Feasibility studies would be undertaken in 2013. Detailed designs, sourcing finance and tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2019.

The estimated total project costs are US$150 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financiers are DBSA, World Bank and the AfDB.

The major project challenge is the timely sourcing of project finances.

Ruhuhu Valley Irrigation Scheme (Project P1-12)

The proposed irrigation development along the Ruhuhu Valley will provide more secure infrastructure for the production of household food subsistence requirements. The irrigation development will also improve the income of farmers, as they will be able to grow high value crops, and improve the family cash flow. The Ruhuhu Valley project entails development of 3 100 ha of irrigated land, covering the proposed Lituhi and Manda irrigation schemes on the left and right banks of the river respectively. Lituhi covers 2 400 ha while 700 ha is under Manda. The project components are the construction of a dam and road at Kipingu, which will serve both sides of the river. The irrigation schemes will include canals and drains, earthworks, lining of the main canal, service roads and bridges, environmental protection and management, as well as farmers' training.

It is estimated that the capacity of the dam will be 25 x 10^6 m^3 and the water stored will also meet the domestic water supply and sanitation needs of 15 000 people.

The project proponent is the Ministry of Agriculture, Food Security and Cooperatives in Tanzania. Feasibility studies will be undertaken in 2013. Detailed designs, sourcing finance and tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2018.

The estimated total project costs are US$13 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financiers are DBSA, World Bank and the AfDB.

The major project challenge is the timely sourcing of project finances and project acceptance by stakeholders in the project area.

Climate Change Adaptation to drought - Agro-ecological Region I (Project P1-13)

The overall objective of the project is to reduce the vulnerability of those depending on rain-fed agricultural practices to anticipate rainfall shortages in the face of climate change, including variability. AER I covers the western and southern parts of Zambia and receives less than 800 mm of rain annually. AER I was once considered the breadbasket of Zambia, but it has since experienced low, unpredictable and poorly distributed rainfall over the last 20 years. The observed meteorological data indicates that it is currently the driest region in Zambia. In addition, the region is particularly drought-prone and has limited potential for crop production.

The project will adopt a two pronged approach: mainstreaming adaptation into agricultural planning at national, district and community levels to make the case for increased investment in adaptation in the agricultural sector, and test and evaluate the adaptation value of interventions that protect and improve agricultural incomes from the effects of climate change. Capacities and systems to anticipate, assess and prepare for climate change risks will be developed at community, regional and national levels. The learning generated from the pilot projects will be used to guide the

mainstreaming of adaptation in national fiscal, regulatory and development policies to support adaptive practices on a wider scale. The project will focus on the introduction of irrigation and water management systems, training, capacity building of farmers on water management practices, support to marketing, and provision of finance credit facilities. It will also cover support to the introduction of drought resistant crops such as cassava, beans, sorghum, millet, potatoes, vegetables and fruit trees. An estimated total number of 7 629 families, covering all categories of farmers and the community within AER I, will benefit from these investments. The project also entails the construction of five dams at five selected areas in AER I, eight fish ponds per site and irrigation schemes at these five separate locations.

It is estimated that the total capacity of the five dams will be 250 x 10^6 $m^{3,}$ which will irrigated a total area of 3 000 hectares and supply an estimated population of 45 000 people with a safe domestic water supply and sanitation service.

The project proponent is the Ministry of Agriculture and Cooperatives in Zambia. As there is no available documentation, feasibility studies should be carried out and be completed in 2013. Detailed designs, sourcing of funds and tendering for project implementation will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2016.

The estimated total project costs are US$80 million. The project can be considered to be in Phase 3 of the ICA Project Development Phases. Possible project financiers are UNDP and the FAO.

The major project challenges are the timely sourcing of project finances, limited capacity within the Ministry of Agriculture and Cooperatives to implement strategies of the National Irrigation Plan in Agro-Ecological Region I, lack of political will and financial resources to invest in the identified areas.

Bulawayo-Zambezi Water Supply Scheme (Project P1-14)

Bulawayo is the second largest city in Zimbabwe, and has a population estimated at 1 million people (2006). It is regarded as Zimbabwe's industrial hub and is strategically located in a position with easy access to Botswana through the Plumtree Border Post, to Zambia through Victoria Falls Border Post and to South Africa through the Beitbridge Border Post. Bulawayo is located in a semi-arid region, which is prone to droughts and, as such, water resources are limited. The city has been facing serious water shortages for a long period. Many initiatives have been undertaken, including a water conservation study and strategy carried out and developed sometime in the mid-1990s. Water rationing is a common measure applied frequently by Bulawayo to minimise the effects of the limited water supply. As a long-term strategy to solve the water supply problems of Bulawayo and the Matabeleland North region, the Bulawayo-Zambezi Project, was proposed, of which initial works were carried out in the mid-1990s. This project aims to augment the water supply of Bulawayo in two approaches. The first involves the construction of the Gwayi-Shangani dam, with a full supply level capacity of 634 x 10^6 m^3 and a pipeline from the dam to Cowdray Park in Bulawayo where a water treatment plant and a reclamation plant will be constructed. The other component involves the construction of a pipeline from the Zambezi River at Deka to Bulawayo by linking this line to the one from Gwayi-Shangani Dam at Kennedy Railway Siding.

An additional 1 000 000 persons will benefit from improved water supply and sanitation services, while 6 500 ha will be put under irrigation from water from this project. It is also expected that the Gwayi-Shangani dam will be equipped to generate 20 MW.

The project proponent is the Ministry of Water Resources Development and Management. All feasibility studies, EIAs and detailed designs were completed and construction of the dam started in

2003. However, due to a lack of financial resources, work was suspended in 2007 when only 5% of the dam construction works had been undertaken. There is therefore a need to undertake an appraisal of the current status and update costs and re-tender, or resume construction works once sufficient funds have been secured to complete all works. US$2 million is required to carry out the appraisal, source financing and resume work. This should commence in 2012 and be concluded in 2013. Implementation and construction of the associated project components would start in 2014 and will be completed by 2020.

The estimated total project costs are US$600 million. The project can be considered to be in Phase 5 of the ICA Project Development Phases. Possible project financiers are World Bank, DBSA, Chinese banks and the AfDB.

The major project challenges are the conclusion of cost reflective water tariffs for both domestic and irrigation water from the scheme, the high energy costs related with the pumping requirements of the scheme and the current power shortages with the associated load shedding being experienced in Zimbabwe and the SADC region in general.

Improved Agricultural Water Application Efficiencies for Small-scale Farmers (Project GP-7)

The overall objective of the project is to enhance the productivity of crops, reduce water losses and increase the efficiency and productivity of existing small-scale irrigation and rain-fed systems. This will result in improved income generation in small-scale farming enterprises. This can be achieved through the introduction of improved and more efficient irrigation systems like gravity-fed drip irrigation and fertigation technologies. Food crop production in the SADC region is dominated by small-scale farming. With the projected reduced rainfall over the SADC region due to global warming, the introduction of improved and more efficient irrigation systems for small-scale and rural communities is of paramount importance. One of the main constraints for increasing food crop production is the availability of irrigation facilities at all farming scales. It is important that there is a significant increase in food and agricultural production in a competitive and sustainable manner, in order to eradicate poverty and improve the livelihoods of the majority of the SADC citizens. This can be achieved through innovative production methods and novel products development, while opening access to new markets. Among the activities of the project, should be the emphasis on the production of high value crops along with the development of new large- and small-scale irrigation facilities, and improving the efficient utilisation of water resources through sensitisation of irrigation developers and planters on efficient irrigation techniques, and strengthening the institutional set-up to oversee and promote efficient irrigation development.

Various types of irrigation systems are presently being used in the SADC region. The most common ones used for the irrigation of vegetables, fruit and flower crops are flood irrigation, drag line irrigation, mini-/micro-sprinkler irrigation and portable/semi-portable sprinkler irrigation systems. Due to the imminent scarcity of water resources, there is a need to shift towards the drip irrigation system. Apart from increasing water use efficiency, drip irrigation enables fertigation, which contributes towards a higher crop yield of around 40-50 %, compared to crops that are not fertigated. The gravity-fed drip irrigation system is also gaining popularity among farmers due to its simplicity and low cost, where no pumping is required while enabling fertigation. Drip irrigation, coupled with fertigation, favours the intensive cultivation of vegetable, fruit and flower crops, both in the open field and in greenhouses. This technology enhances agricultural production in terms of quantity and quality, and contributes to the sustainable production of crops. With global warming leading to the erratic green and blue water supply, farmers will have no means but to optimise irrigation water and fertiliser use through drip fertigation, while improving food and flower crop production.

The project will involve the supply and implementation of gravity-fed drip kits that can irrigate small plots of up to 4 000 m^2. The project components will include the introduction of gravity-fed drip irrigation in localities where pressurised irrigation systems cannot be implemented due to the absence of irrigation supply networks and electricity. Coupled with the drip irrigation system, fertigation technology will be introduced whereby soluble fertilisers will be mixed with irrigation water for the fertigation of vegetable, fruit and flower crops. There will be one pilot project in each of the SADC Member States.

The project proponents are the Ministries of Agriculture of the SADC Member States. The estimated cost of the project amounts to US$11.5 million for all the pilot projects in all the SADC Member States. This includes designs, the water supply, irrigation system components, fertilisers and capacity building for each pilot project. The ToR and project specifications can be done in 2013, with implementation commencing in 2014. Thereafter, the project can be replicated in the SADC Member States.

Possible project financiers are UNDP and the FAO. The project can be considered to be in Phase 2 of the ICA Project Development Phases.

Project challenges are the timely sourcing of finances and future funds for project replication.

3.1.5 Financing and Funding Sources

Table 3.7 clearly shows that the SADC region is receiving the least amount of funding or funding commitment for the water supply services sector per capita compared to four other RECs of Africa. If the SADC agenda of poverty eradication is to be realised and meet the MDG targets, the region should receive and allocate financing towards the water supply services sector of the order of $2.6 billion annually or $10/capita/year, which is about six times the current financing/commitment levels.

The SADC Member State governments, with support from ICPs, investment loans and grants, have been the primary funders of infrastructure developments. The grants, in the form of donor aid in most cases, have been forthcoming mainly to the water supply and sanitation sub-sector. For the irrigation sub-sector, investor finance is more difficult to obtain as the financial tariff flows from irrigation projects seldom cover the capital, operation and maintenance costs.

In most of the SADC regional Water Sector infrastructure developmental projects, experience has shown that the problem is not always the lack of finance, but the lack of good projects that are bankable. Good projects means well defined and well structured projects that make business sense. Examples of other challenges faced in financing water infrastructure are project preparation for funding, investment policies, cost reflective tariffs, governance and accountability issues and institutional capacities for infrastructure implementation. There currently are SADC initiatives to deal with some of these challenges, such as the setting-up the SADC Infrastructure Project Preparation Facility within DBSA, the African Water Facility, the SADC Water Infrastructure Fund, financed by KfW, and the SADC Water Infrastructure Investment Conferences.

Domestic budgets funded by SADC Member State governments still comprise a fairly large proportion of the funding for the Water Sector. However, the distortion arises when one compares various budget shares of other sectors with the Water Sector. The Water Sector is unable to show its return. This is mainly because the real returns manifest themselves in other sectors such as health and education. One dollar invested in water will show up tenfold in health, but maybe very little in the Water Sector. This is one of the reasons why the SADC Water Division carried out the project on

Economic Accounting for Water to show these relationships.

The sources of finance for projects in the SADC Water Sector can be summarised as follows:

- Domestic investors who bring debt and equity finance;
- International power developers who bring equity finance as well as the capacity to borrow the debt finance;
- Multilateral financing agencies such as the World Bank, AfDB;
- Development banks such as the DBSA;
- Commercial banks that can offer long-term financing;
- Donor funding usually available for capacity building and enhancement, studies and institutional start-up co-finance;
- Private funding;
- Public-private partnerships;
- Concessional loans;
- Domestic fiscals (budgets); and
- The clean development mechanism (carbon credits) for hydropower projects.

One key issue about investment is that the returns must be commensurate with the risks that are being offered. It is therefore critical that when projects are being developed, there must be a clearly defined strategy that can show that the project makes business sense, and that its promoters have a good understanding of the risks and have identified the measures required to mitigate those risks. Further, there has to be a sufficient revenue stream to cover all the financial demands of the project, including a return for the investor. The risks should be borne by the institution or organisation best placed to manage the risk. The timely provision of finance will also be a major challenge for the implementation of all funded projects.

Table 3.7: Sources of ICA Funding to the Water Supply Services Sector. (Adapted from ICA 2011)

	FINANCING RECEIVED US$(x10^6)						
REGION	**2006**	**2007**	**2008**	**2009**	**AVERAGE**	**POPULATION (x10^6)**	**$/CAPITA**
Central Africa	229	252	359	347	297	39	7.62
East Africa	489	708	625	374	549	193	2.84
North Africa	360	619	722	450	457	213	2.14
Southern Africa	**233**	**636**	**354**	**431**	**414**	**260**	**1.59**
West Africa	553	588	514	586	560	302	1.85

3.2 Linkages to other RIDMP Sectors

The Water Sector, being a crosscutting sector, is linked directly or indirectly to all the other RIDMP Sectors (Energy, ICT, Meteorology, Tourism and Transport) as follows:

3.2.1 Energy Sector

Water is required in the generation of hydropower, thermal power and in other renewable energy generating sub-sectors such as wave energy. Most multipurpose dams, if appropriately designed, can produce hydropower through mini-hydro installations. For development purposes, energy and water are necessary core ingredients. For the SADC RIDMP, some of the Water Sector projects are

also indeed Energy Sector projects such as the Batoka Hydro-electric Scheme and Inga III Hydropower Scheme.

3.2.2 ICT Sector

No development sector can move positively forward without appropriate ICT. In the Water Sector, data collected for various purposes needs to be transmitted in real time terms, requiring appropriate ICT. The management and operation of water resources infrastructure requires ICT, as well as communication within external to organisations, which requires an efficient ICT infrastructure.

3.2.3 Meteorology Sector

This sector is very important for water infrastructure management, flood and drought management, as well as for food production. The sector is even more important in this global warming and climate change era.

The availability of reliable and long-term meteorological data plays a major role in the design and development of water infrastructure.

3.2.4 Tourism Sector

Water resources infrastructure, such as dams, provides tourism opportunities. Hotels, water sport, angling, boat cruises, wildlife and other eco-systems rely heavily on water infrastructure and water bodies. Therefore, water infrastructure such as dams should be designed for multi-purpose use so as to enhance the value of the Tourism Sector.

3.2.5 Transport Sector

Whenever a dam is constructed across a river, a bridge is automatically provided for crossing the river, an example here is the Kariba Dam. Roads/rail links/airports are required as part of Water Sector infrastructure development for access to deliver construction materials and for other purposes. Highly inaccessible areas become accessible with Water Sector infrastructure development and once completed, the water bodies of dams, for instance, provide further naval transport opportunities.

A good and diverse transport network reduces costs in the development of water infrastructure.

3.3 Risks and Assumptions in achieving Vision 2027

The possible major risks and assumptions are:

- In the SADC region, there is now a worrying culture that has developed in which effort and resources are targeted and prioritised towards projects related to capacity building, data collection, environmental assessments, awareness building, etc., before focusing on the preparation, marketing, financing and implementation of hard projects that have tangible impacts on the population's livelihoods and quality of life. The Energy Sector is a good example here, where the current SADC regional power shortages were predicted in the early 90's and nothing was done about it except talk. It is hoped that there will now be very little talk and procrastination in moving the 34 selected projects in the Water Sector part of the RIDMP to their fruitful and logical conclusion;

- It is assumed that there will be ownership by the SADC Member States of the resultant RIDMP. If there is no ownership, the RIDMP will not have a "home" for active follow-up and implementation;
- It is assumed that the current prevailing political goodwill between and among the SADC Member States will continue, as this is necessary for the achievement of joint and regional infrastructure development projects;
- It is assumed that the SADC Member State countries, which share the 15 SADC shared watercourses, will mandate and support their RBOs to spearhead the preparation, financing, implementation and operation of joint infrastructure, utilising the shared benefit approach; and
- It is assumed that in those shared watercourses that do not have RBOs, the watercourse states will establish RBOs or authorities with the mandate to spearhead the preparation, financing, implementation and operation of joint infrastructure, utilising the shared benefit approach.

3.4 Preparing for Future Sector Trends (beyond 2027)

The economies and population of the SADC Member States will continue to grow beyond 2027. This means that infrastructure development requirements will also continue to grow. However, by 2027, the culture of infrastructure development would be well-founded and the investor confidence well-grounded, and it will be much easier for the SADC region to move forward.

Table 3.8 gives the expected Water Sector infrastructure developments beyond 2027, which the SADC region should continue striving for. The SADC region and Member States need to prepare the necessary resources to achieve these targets beyond Vision 2027.

Table 3.8: Future Requirements beyond 2027

SECTOR	CURRENT STATUS	VISION 2027 TARGETS	GAP AFTER ACHIEVING VISION 2027	TARGETS BEYOND VISION 2027
Surface water storage	14% of ARWR stored (includes Kariba and Cahora Bassa dams)	25% of ARWR stored	An additional 50% of ARWR still to be stored	75% of ARWR stored. Best practice is 70-90% of ARWR stored
Agriculture	3.4 million hectares (7% of potential) irrigated	10 million (20% of potential) hectares irrigated	Zero gap as target is achieved. World average is 20%	An additional 5 million (10% of potential) hectares irrigated to reach 30% of potential
Hydropower	12 GW (8% of potential) installed	75 GW (50% of potential) installed	Zero gap as target is achieved, but 75 GW (50% of potential) still available to be installed	100 GW (67% of potential) installed
Water supply	61% of 260 million people served	75% of 350 million people served	Zero gap as target is achieved, but population continues to grow beyond 350 million people	100% of population served
Sanitation	39% of 260 million people served	75% of 350 million people served	Zero gap as target is achieved, but population continues to grow beyond 350 million people	100% of population served

4. Implementation

4.1 Action Plan

The RSAP III is the current official SADC programme for the Water Sector and is therefore *the de facto* implementation plan for the Water Sector part of the RIDMP. 34 projects have been prioritised and included for implementation as the Phase 1 Water Sector part of the SADC RIDMP. The total estimated cost of the 34 Phase 1 projects is about US$16 billion, to be expended over the period 2013 to 2021. The 34 Phase 1 projects, however, do not fully meet the Vision 2027 Water Sector targets as shown in *Table 4.1*. As such, further projects are required. The Implementation Plan has been split into three phases to ensure that:

- Appropriate projects aligned to the Vision 2027 Water Sector targets are identified and prepared for implementation;
- The capacity to prepare, market and implement infrastructure projects in the SADC region is fully built and enhanced;
- Adequate time is provided for the SADC regional institutions and Member States to gain confidence and experience in regional infrastructure development; and
- Sufficient time is provided for the investors to gain the confidence and trust to do business with the SADC region.

The three phases for the Water Sector part of the RIDMP as depicted in *Figure 4.1* are:

1. **Phase 1:** The 34 projects currently identified and prioritised for immediate implementation during period 2013 to 2021, with an estimated total project cost of US$16 billion;
2. **Phase 2:** Projects will be identified by the SADC Member States and prepared for implementation during 2014 to 2017. They will then be implemented during 2018 to 2027 with an estimated total project cost of US$104 billion; and
3. **Phase 3:** To ensure that any outstanding gaps are filled, projects will be identified by SADC Member States and prepared for implementation during 2019 to 2022. They will then be implemented during 2023 to 2027 with an estimated total project cost of US$80 billion.

The three phases for the implementation of the Water Sector Regional Master Plan will cost an estimated US$200 billion.

Table 4.1: Infrastructure and water supply services gap after completion of Phase 1 Projects

SECTOR	CURRENT STATUS	VISION 2027 TARGETS	CURRENT GAP	GAP AFTER PHASE 1 PROJECTS
Surface water storage	14% of ARWR stored (includes Kariba and Cahora Bassa dams)	25% of ARWR stored. To meet SADC regional demand	An additional 11% of ARWR to be stored	An additional 10.9% of ARWR still to be stored
Agriculture	3.4 million hectares (7% of potential) irrigated	10 million (20% of potential) hectares irrigated	An additional 6.6 million hectares to be irrigated	An additional 6.58 million hectares still to be irrigated
Hydropower	12 GW (8% of potential) installed	75 GW (50% of potential) installed	An additional 63 GW to be installed	An additional 55.7 GW still to be installed
Water supply	61% of 260 million people served	75% of 350 million people served	An additional 14% of 350 million people to be served	An additional 9% of 350 million people still to be served
Sanitation	39% of 260 million people served	75% of 350 million people served. Eventual target is 100% served	An additional 36% of 350 million people to be served	An additional 31% of 350 million people still to be served

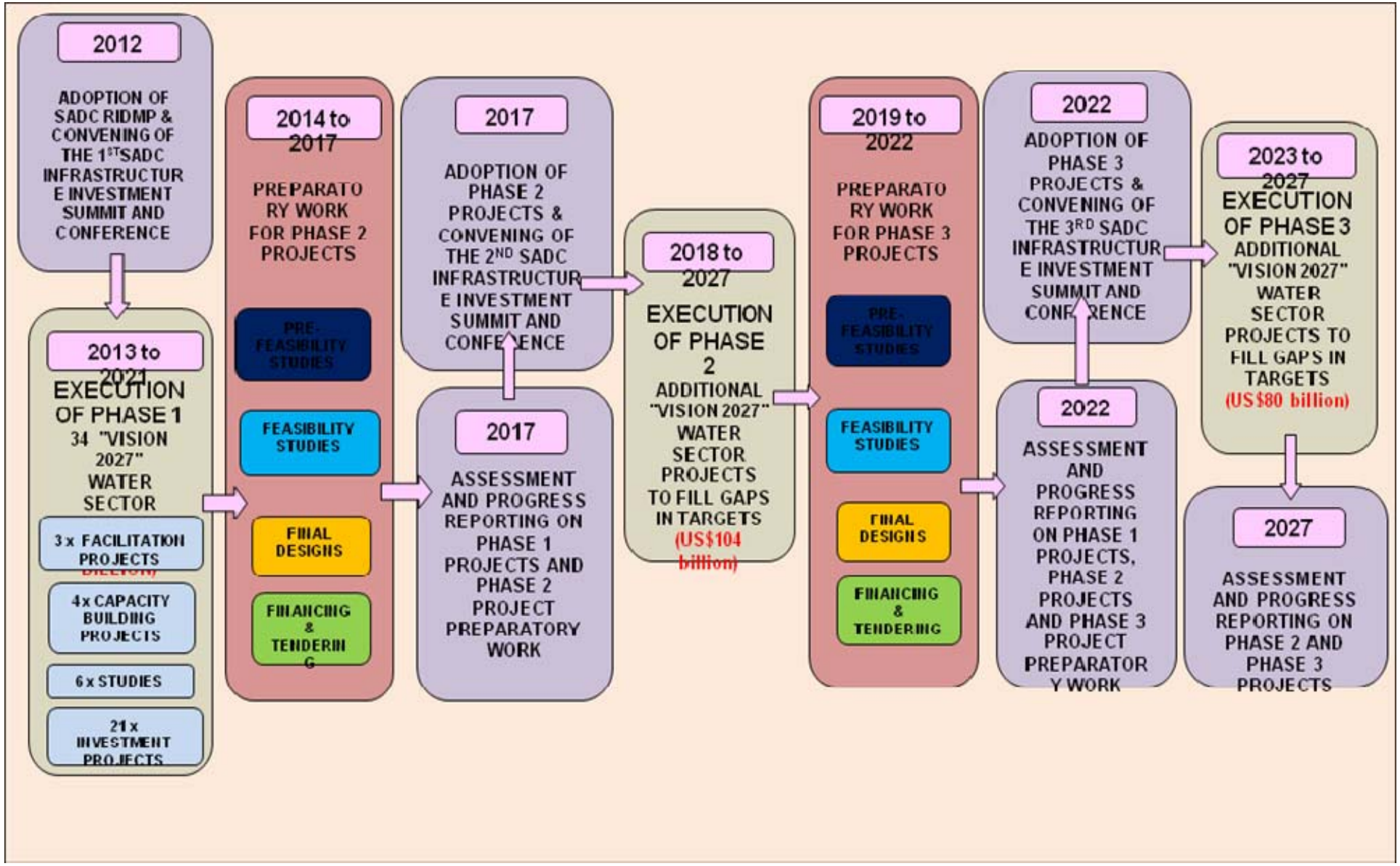

Figure 4.1: Implementation Plan for executing the Water Sector RIDMP

4.1.1 Prioritised Projects, Resource Requirements and Sequenced Timelines

Table 3.4 gives the 34 prioritised projects for implementation during Phase 1 of the Water Sector RIDMP, together with the financial resources that are required, which in total amount to about US$16 billion. *Table 4.2* gives further details regards the lead agencies in implementation, the likely sources of funding and the project timelines for the 34 prioritised projects.

4.1.2 Implementation Modalities

4.1.2.1 Initial Agreement and Maintaining Commitment of Member States

It is also important to build consensus on the way forward and the implementation methodologies for each of the 34 Water Sector projects with the proponents. A meeting in this regard is necessary with the SADC Council of Ministers responsible for infrastructure development to consider the RIDMP and plan of action in June 2012. In August 2012, it is envisaged that the SADC RIDMP will be adopted by the Council of Ministers of the SADC Member States, and will be launched during the 2012 SADC Summit. Thereafter, a SADC Infrastructure Investment Summit and Conference will be convened before the end of 2012 to facilitate the adoption and financing of the projects by potential investors, for commencement of implementation in 2013. It is important that the commitment to implement the Water Sector RIDMP is maintained by the SADC Member States to ensure that:

- The Vision 2027 Water Sector targets are achieved. This can only be achieved if the SADC Member States and their implementing institutions are fully committed, and prioritise the actions and resources required for implementation;
- A conducive, enabling environment to attract and maintain investor confidence in the SADC region, created by the SADC Member states, is maintained;
- Strong partnerships with the private sector in infrastructure development is cultured and maintained; and
- The RIDMP becomes the SADC Member States' product, which will ensure its prioritisation to ensure its success.

4.1.2.2 Financing

As a first step, it is hoped that a substantial number of projects will receive favourable support and be financed through the SADC Infrastructure Investment Summit and Conference, to be held in the last quarter of 2012. Thereafter, it is proposed that a SADC Regional Infrastructure Development Fund is established. The Development Bank of Southern Africa (DBSA) in conjunction with the African Development Bank (AfDB) and ICA can manage the fund. From this fund, financial resources to prepare projects can be accessed. The modalities of establishing such a fund can be developed by DBSA.

In the meantime, it is important that bankable projects continue to be developed and prepared for submission to continental and international financial institutions for financing. This process entails assessing the targeted potential financiers/investors and packaging the projects accordingly.

It is also important that promotional materials are developed to attract investors and cooperation partners in the development of water infrastructure in the SADC region. Priority being given to projects contributing the most towards the achievement of the Vision 2027 Water Sector targets.

Future SADC infrastructure investment summits and conferences should be held in 2017 and 2022 as depicted in *Figure 4.1.*

4.1.2.3 Key Steps and Milestones

Figure 4.1 summarises the key steps and milestones in the implementation of the Water Sector RIDMP as follows:

- Three SADC infrastructure investment summits and conferences are proposed to be held in 2012, 2017 and 2022, which are preceded by the adoption of the prepared projects by the SADC Member States;
- Phase 1 projects will be implemented during the period 2013 to 2021, Phase 2 projects during the period 2018 to 2027 and Phase 3 projects during the period 2023 to 2027;
- There will be two periods during which projects are prepared (pre-feasibility studies, feasibility studies, final designs, financing and tendering as appropriate): period 2014 to 2017 for Phase 2 projects and period 2019 to 2022 for Phase 3 projects; and
- There will be three project implementation progress assessments carried out in 2017, 2022 and 2027. These assessments will help in the monitoring and refocusing process of the implementation of the Water Sector part of the RIDMP.

4.1.2.4 Monitoring Mechanism for Status of Implementation

It is expected that at the end of Phase 2 of the Water Sector RIDMP project implementation, 40% of the Vision 2027 Water Sector targets would have been achieved, while 100% of the Vision 2027 Water Sector targets would be achieved by 2027.

A database will be established to monitor and evaluate the progress made with the implementation of the projects in all Member States. This database will be integrated with the overall SADC Water Division database.

There will also be three project implementation progress assessments carried out in 2017, 2022 and 2027. These assessments will help in the monitoring and refocusing process of the implementation of the RIDMP.

4.2 Critical Success Factors for Implementation

The following are considered critical success factors for the successful implementation of the Water Sector RIDMP:

- It is important that bankable projects are prepared and packaged meticulously so that they attract investment;
- Appropriate new institutions should be formed in shared watercourses still without institutions that deal with trans-boundary groundwater and surface water resources development and management;
- The capacities of the SADC Water Sector institutions, be they RBOs or national, should be strengthened throughout the various stages of the Water Sector RIDMP project development and implementation;
- The SADC region should be able to attract, train and retain an adequate number of motivated and highly skilled water and infrastructure development professionals;
- To ensure the sustainability of infrastructure projects, especially the pilot projects, recipient communities should be fully involved and participate in the implementation of the projects and have full ownership of the projects;

- There should be SADC Member States' support and commitment to trans-boundary water resources development and management through the creation of an enabling environment (incentives, policies and regulations), conducive to private sector attraction and retention;
- There should be an effective and financially sustainable system for data collection, assessment and dissemination at national, river basin and regional levels;
- There should be continued political will, public awareness and commitment among all;
- The SADC Member State national projects should supplement the RIDMP projects so that the Vision 2027 Water Sector targets are easier and quicker to achieve. These SADC Member State national projects should be regularly reported on and be included in the SADC Water Sector database; and
- An effective monitoring and evaluation system should be put in place to ensure that any bottlenecks are identified promptly and removed, while projects off-track are refocused to facilitate the achievement of the RIDMP.

Table 4.2: Summary of Water Sector RIDMP Project Financing and Timelines

NO.	PROJECT NAME	LEAD AGENCY	PROJECT COST (US$ x 10^6)	POSSIBLE FINANCING SOURCES	PROJECT TIMELINE									2022 to 2027
					2013	2014	2015	2016	2017	2018	2019	2020	2021	
FACILITATION PROJECTS														
GP-1	Institutional Reforms in Municipal Water Supply Service	SADC Water Division	30	DBSA/GEF/AfDB										
GP-2	Domestication and Harmonisation of SADC Protocols	SADC Water Division	2.4	Sida/GIZ/DANIDA										
GP-3	Institutional Reforms in RBOs and River/Water Authorities	SADC Water Division	0.1	Sida/GIZ/DANIDA										
CAPACITY BUILDING PROJECTS														
XB-1	Upper Okavango Food Security	Angola and Namibia	66	AfDB/FAO										
P1-10	Demand Management in 62 urban centres	DWA South Africa	62	DBSA/AWF										
GP-4	Project Preparation, Resource Mobilisation and Piloting	SADC Water Division	1	GIZ/DBSA										
GP-8	Reduction in Non-Revenue Water and Water Losses	SADC Water Division	15	DBSA/GEF/AfDB										
STUDIES														
P1-2	Limpopo Basin Water Monitoring	DWA Botswana	1	Sida										
GP-5	Assessment of the Groundwater Resources Potential	SADC Water Division	15	UNEP/GEF/AfDB										
GP-6	Monitoring Climate Change Adaptation to Drought	SADC Water Division	0.5	UNDP/FAO										
GP-9	Monitor Water Pollution in Reservoirs and Rivers	SADC RBOs/SADC WD	15	Sida/GEF/AWF										
GP-10	Piloting Synchronised and Conjunctive Operation of Dams	ZAMCOM Secretariat	7	GIZ/GEF/DBSA										
GP-11	Implications of Virtual Water Trading in Water Resources Development and Usage in the SADC Region	SADC Water Division	1	AfDB/GEF/DBSA										
INVESTMENT PROJECTS														
RG-1	Inga III Hydropower	Ministry of Energy, DRC	8 000	AfDB/DBSA/WB										
RG-2	Lesotho Highlands Phase II	LHDA and LHWC Lesotho	1 001	AfDB/DBSA										
RG-3	Batoka Gorge Hydropower Scheme	ZRA/ZESA/ZESCO	4 000	AfDB/DBSA/WB										
RG-4	Songwe River Basin Development Project	Malawi and Tanzania	328	AfDB/Sida/WB										
XB-2	Vaal-Gamagara Water Supply	DWA Botswana	175	KfW										
XB-3	Ressano Garcia Weir	DNA Mozambique	6	WB										
XB-4	Lomahasha/Namaacha Water Supply	Mozambique and Swaziland	31	WB/AfDB										
XB-5	Water Supply and Sanitation at 12 Locations	Zambia	165	UNICEF/KfW/DANIDA										
P1-1	Water Supply and Sanitation – Lubango Phase 2	Angola	120	KfW										
P1-3	Water Supply and Sanitation – Kinshasa	Ministry of Energy DRC	220	China/South Korea										

P1-4	Lesotho Lowlands Water Supply Scheme – Zone 1	LHWC Lesotho	78	DBSA/AfDB	
P1-5	Mombezi Multipurpose Dam	Blantyre Water Board Malawi	210	WB	
P1-6	Water Supply and Sanitation – 13 Housing Estates	Mauritius	11	EU/USAID	
P1-7	Movene Dam	DNA Mozambique	11	USAID/WB	
P1-8	Artificial Recharge of Windhoek Aquifer – Phases 2B and 3	NamWater	55	WB/AfDB	
P1-9	Reducing Non-revenue Water and Increasing Use Efficiency	Seychelles	26	AWF/USAID	
P1-11	Nondvo Multipurpose Dam	DWA Swaziland	150	DBSA/WB/AfDB	
P1-12	Ruhuhu Valley Irrigation Scheme	Tanzania	13	DBSA/WB/AfDB	
P1-13	Climate Change Adaptation to Drought – Agro Region I	Zambia	80	UNDP/FAO	
P1-14	Bulawayo-Zambezi Water Supply Scheme	Zimbabwe	600	WB/DBSA/China	
GP-7	Improved Agricultural Water Application Efficiencies	SADC Water Division	11.5	UNDP/FAO	
	Additional future projects to meet Vision 2027 Water Sector Targets in SADC Region				

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Annexure 1

PROJECT DESCRIPTION: SADC REGIONAL INFRASTRUCTURE DEVELOPMENT MASTER PLAN

Project title	**Institutional reforms to reduce operational inefficiencies of municipal water service providers in the capital cities of the SADC Member States (Project GP-1)**
Project sponsors	The SADC Water Division is the project proponent and the municipal water service providers of the SADC capital cities are the lead agencies.
Participating countries	All SADC Member States
Objectives	To assess the institutional reforms necessary to address operational inefficiencies of municipal water service providers of the capital cities of the SADC region to address issues such as staffing structures, cost reflective tariffs, billing and illegal water connections.
Project description	The majority of the capital cities of the SADC region experience high levels of water and revenue losses as a result of inefficient staffing structures, poor billing systems, poor maintenance, non-cost reflective tariffs, aging infrastructure and illegal connections. The poor revenue collection and high levels of water losses have resulted in poor financial sustainability of service provision for most of these municipal service providers. Poor revenue collection for water services remains a major challenge that impacts negatively on sustainable service delivery. In many cases, the government controls the water tariffs, which is usually politically motivated, resulting in poor service delivery and insufficient investments in maintenance. Illegal water connections result in water theft and reduced revenue. It is thus important that while focussing on developing new sources of water, the optimisation of existing water sources, usage and efficient operation and maintenance of existing infrastructure, are also given priority. As an example, purified sewage effluent can be used to water golf courses, parks and sports grounds.
Expected results	Revenue streams and the management of the municipal water service providers are improved with resultant improved infrastructure operation and maintenance.
Ongoing related activities in the region	To be determined.
Description of national plan to the project	This project will be implemented in all the capital cities of the SADC Member States, spearheaded by the SADC Water Division. A consultant will be procured to assist in drafting the ToR and for the execution of the project.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	Drafting of the ToR for the project in 2013, tendering for the consultancy work in 2013 and execution of the project in 2014. Project profiles for each city would then be produced for the mitigatory policy changes, works and costs thereof.
Business model	This is a capacity building project resulting in pre-investment studies for later execution.
Main parties in place	The SADC Water Division and the 15 SADC Member State capital cities water service providers.
Main parties to be procured	Possible project financiers are DBSA, GEF and the AfDB.
Project challenges	The major project challenge foreseen is timely sourcing of project finances.
Project documentation available	To be developed.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an institutional reform project. Future resultant savings from the institutional reforms could offset the financing if grant funds are not immediately available.
Estimated total cost	US$30 million
Execution period	2013 to 2014 (24 months) after securing grant finances in 2012.

Project title	Institutional Reforms for RBOs, River/Water Authorities and Utilities (Project GP-3)
Project sponsors	SADC Water Division
Participating countries	All SADC RBOs, river/water authorities and utilities
Objectives	This project's objective is to study the pros and cons of changing the mandates of existing RBOs to gear them for joint infrastructure development or for SPVs to be set up within the River Basin for planning, developing, managing and operating joint infrastructure in the SADC region.
Project description	It can be premised that the intentions of the SADC Revised Protocol on Shared Watercourses are for Shared Watercourse Institutions to be sufficiently empowered to manage the shared watercourse, bearing in mind the definition of "managing a shared watercourse", which has provisions for infrastructure development, operation and management and for protecting the watercourse's biodiversity. Currently, all the RBOs in the SADC region are not focused on infrastructure development. Instead, they have an investigative and advisory mandate with the emphasis being more on determining an overall management system for the basin that balances socio-economic development needs with the need for protecting the basin's biodiversity e.g. OKACOM, ORASECOM, LIMCOM and ZAMCOM. The SADC institutions that have a mandate for infrastructure development, management and operation were created as Special Project Vehicles (SPVs) to execute particular projects, e.g. KOBWA, ZRA and LHDA. Against this background, it is recommended that in the river basins where there is a significant development potential, the "core business" of the RBOs should be oriented towards the preparation, development, implementation, management and operation of the SADC's Water Sector RIDMP projects.
Expected results	The SADC RBOs will have the legal and financial capacity to raise funds independent of the watercourse states, and will have the mandate for infrastructure development, management and operation over and above their current investigative and advisory roles. Where these arrangements cannot be instituted, then SPVs can be created for infrastructure development, operation and management.
Ongoing related activities in the region	The SADC Revised Protocol on Shared Watercourses mandates the RBOs and watercourse institutions to manage the river basins in their jurisdiction. SPVs have been created in the past and have successfully implemented, managed and operated joint infrastructure. Examples are KOBWA, ZRA and LHWC.
Description of national plan to the project	Member States, in their own right, where they have joint projects can create such mandated RBOs or SPVs.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	The project proponent is the SADC Water Division, which will appoint a suitable consultant. The ToR and appointment of the consultant can be done in early 2013, in time for recommendations to be submitted by mid-2013 for decisions to be appropriately made by end of 2013.
Business model	This is a capacity building project.
Main parties in place	SADC Water Division, the SADC RBOs, river/water authorities and utilities.
Main parties to be procured	Possible project financiers are Sida, DANIDA and GIZ.
Project challenges	The major project challenges foreseen are the timely sourcing of project finances and resistance to change from existing RBOs and their principals.
Project documentation available	The SADC 1st RBO Workshop Report of 2007
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an institutional reform project and grant finances should be sought.
Estimated total cost	The estimated total cost for the project is US$0.1 million.
Execution period	2013 (12 months) for the consultant's assessment and successful sourcing of grant funds in 2012. Thereafter, the mandates could be modified or SPVs created.

Project title	**Upper Okavango Food Security Project (Project XB-1)**
Project sponsors	The Ministry of Agriculture in Angola and the Ministry of Agriculture, Water and Forestry in Namibia.
Participating countries	Angola and Namibia.
Objectives	The principal purpose of this project is to identify and disseminate technical knowledge of improved approaches to water management with regards to agricultural production, including livestock and aquaculture, and market access for smallholder farmers within the project area. The second purpose of this project will focus on ensuring the sustainable management of natural resources within the project area, with particular attention to efficient water resource utilisation. The third component of this project will focus on creating and strengthening local capacity and social capital for sustainable economic development and increasing food security. The fourth component of this project will focus on infrastructure development and rehabilitation within the project area.
Project description	The benefit from the programme implementation would be a significant long-term reduction in regional food security, both chronic and acute. This reduction would be achieved through an increased number of producers having access to technologies and practices that enable them to increase the production. Adopted production technology would draw primarily on an Integrated Water Resources Management (IWRM) approach that improved sustainable access to water during deficit periods from stored or permanent resources. The agricultural support services and water resources management will benefit from both improved knowledge of appropriate resource utilisation methodology and from an increased ability to respond to changing conditions facing institutions and producers, as a result of the impact of HIV/AIDS, global trade expansion and other factors. The principal groups of beneficiaries' targeted within the programme will be: • Resource-poor rain-fed farmers and livestock herders who are vulnerable to food insecurity; and • Smallholder farmers in irrigation schemes with poor efficiency, especially emergent farmers, market agents and traders, female-headed families, HIV/AIDS affected and other most vulnerable households.
Expected results	The project will cover only the most urgent agriculture-related needs, but can also identify and prepare proposals for further infrastructure investment, particularly for roads and bridges. The last component of the project entails regional coordination and management. The project fits in well within the RSAP III Pillars, as it aims to improve water management within the project area with overall goals of improving livelihoods and poverty eradication.
Ongoing related activities in the region	The SADC Secretariat (FANR – Food Security Unit) will assist in the implementation and monitoring of this project for possible replication in other SADC Member States.
Description of national plan to the project	A project implementation unit will be established in each country with the Ministry of Agriculture in each country leading such implementation. A Coordination Committee will be hosted by OKACOM with representatives from the AfDB, FAO, Angola, Namibia and Botswana.
Status	The project can be considered to be in Phase 2 of the ICA Project Development Phases.
Next steps	The next project development stage is a pre-feasibility study to be completed in 2012. Thereafter, feasibility studies will be carried out from 2013 to 2014. Implementation and construction of the associated project components is expected to then start in 2015 and will be completed in 2019. US$1.5 million is required to undertake the feasibility studies.
Business model	Initially, this is more of a capacity enhancement project, with minimal water sector developmental infrastructure, which would be developed later.

Main parties in place	The Ministries of Agriculture in Angola and Namibia, as well as the OKACOM.
Main parties to be procured	The AfDB and FAO will likely finance the project.
Project challenges	No major challenges in the implementation of the project are foreseen at this stage. OKACOM can be capacitated to spearhead and implement this project.
Project documentation available	1. Project portfolio ref: P-Z1-AAC-006, 2. Ministry of Agriculture, Okavango Project 3. www.afdb.org/ SADC Agriculture Water Management and Food Security – Upper Okavango Basin
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a capacity building project and grant finances should be sought.
Estimated total cost	The estimated total project costs are US$66 million.
Execution period	After completion of the pre-feasibility studies and project funding in 2012, the project will be executed from 2013 to 2019 (72 months).

Project title	**Water Demand Management in 62 urban centres (Project P1-10)**
Project sponsors	The Department of Water Affairs
Participating countries	South Africa
Objectives	The objectives of this project are to reduce the demand of water users by reducing water losses and non-revenue water [NRW], achieve greater water use efficiency, increased water re-use and use of appropriate metering, monitoring and data analysis methods to document volumes delivered/provided and used.
Project description	The demand for water is continuously rising as a result of growth in population, industry, commerce, agriculture and in some tourism activities. These increased uses, along with the requirement to protect the environmental, are an integral part of the ongoing social and economic development scenarios occurring throughout South Africa. Despite past actions and ongoing programmes, it is difficult to continuously create sufficient surface water storage capacity at reasonable costs. The traditional sources of fresh water, which have been rivers, streams, to a limited extent ground water and reservoirs, are not going to be adequate to satisfy growing demands in future. WCWDM has been identified as the priority action to cater for the continued growth in water demand. As in the rest of the world, there has been a nationwide increase in the level of NRW, partly due to water losses because of the ageing infrastructure, such as municipal water reticulation networks, apparent losses such as illegal connections, meter errors and unbilled consumption by the non-metering and billing of legitimate consumers. A concerted effort in several of the major South African metros led to an improvement of the water reticulation networks and an increase in delivery efficiency. The reticulation networks in South Africa dates back more than 50 years, and most urban network pipes have exceeded their planned economic life. This unfortunately results in frequent water leaks due to burst pipes.
Expected results	The resultant water savings can be used to supply new consumers. The management of the water situation in South Africa can be improved by applying water demand management (WDM) principles in major metros and municipalities. Activities such as pipe leakage repair, pressure reduction, reuse of water and metering with commensurate data analysis can be introduced with good results, and resultant benefits to the communities being serviced. By minimising losses and wastage, the need to construct additional infrastructure, usually at higher capital cost, can be delayed.
Ongoing related activities in the region	A study by the South African Water Research Commission some years ago estimated the total physical water losses for some 62 urban systems analysed by the study to be in the order of 31% of the total water supplied. Adding unbilled consumption, the study estimated NRW for the 62 systems at around 36% of the water supplied. The results from the study have been quoted extensively and are considered one of the most reliable sources of quantifying water losses in South Africa. South Africa's 36% is similar to the world average, however South Africa is classified as a water stressed area and cannot afford to have such high levels of water losses and NRW. Globally, NRW ranges considerably, with Albania and Ecuador having more than 70% compared to Australia, New Zealand, Cambodia and Singapore each attaining less than 10% NRW.
Description of national plan to the project	Implementing the overall WDM programmes throughout a greater part of South Africa's communities could have an important impact on the socio-economics of South Africa. Significant impacts would be the ability to increase the safety and continuity of water supply and reduce the risks of meeting the growing domestic and commercial demand. At the same time, such programmes would assist in increasing the reserve needed for environmental protection.
Status	The project can be considered to be in Phase 1 of the ICA Project Development Phases.

Next steps	Pre-feasibility studies for the 62 urban centres yet to be identified need to be completed by 2013. Feasibility studies would then follow in 2014. Detailed designs and tendering for project implementation will then be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed by 2020.
Business model	Initially, this is more of a capacity enhancement project with minimal water sector developmental infrastructure, which would be developed later.
Main parties in place	Department of Water Affairs and the urban municipalities in South Africa.
Main parties to be procured	Possible project financiers are DBSA and the African Water Facility.
Project challenges	The major project challenges are the timely sourcing of project finances, achieving consensus on the selection of the 62 urban centres that will benefit and the capability/capacity of some of the selected urban centres to successfully implement their component of the project. There will be need for enhancing capacity in such urban centres.
Project documentation available	1. City of Cape Town, 2010. Progress with Implementation of the Long-term Water Conservation and Water Demand Management Strategy, Assessment, Summary Report, September 2010. 2. MA Shepherd and VA Poona, undated. Reducing Non-revenue Water in the Durban Central Business District.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a capacity building project. Future resultant savings from the interventions and revenue from the new consumers could offset the financing if grant funds are not immediately available.
Estimated total cost	The estimated total project cost for the 62 urban centres is US$62 million.
Execution period	After completion of pre-feasibility studies and project funding in 2012, the project will be executed from 2013 to 2020 (84 months).

Project title	**Capacity Enhancement in Infrastructure Project Preparation, Resource Mobilisation and Piloting (Project GP-4)**
Project sponsors	SADC Water Division
Participating countries	All SADC national/bi-national/RBOs
Objectives	The objectives of this capacity enhancement project is to enable the SADC national/bi-national/RBOs to be fully capacitated so as to be able to develop, prepare and package bankable water infrastructure projects that can be submitted to international financial institutions.
Project description	The RSAP III Programmes 7, 8 and 9 (Infrastructure Project Preparation, Resource Mobilisation for Infrastructure Development and Infrastructure Piloting respectively) should be given urgent priority and rolled out to all the SADC regional/RBO/national institutions that are going to prepare, package, promote, execute, operate and manage the new Water Sector infrastructure. There will thus be two phases to this project: preparation of training manuals and the training itself.
Expected results	The SADC national/bi-national/RBOs will be capacitated in the project preparation, packaging, promotion for funding, execution, operation and management of the new Water Sector infrastructure within their river basins and countries. This will greatly assist in the successful execution of the SADC Water Sector RIDMP.
Ongoing related activities in the region	The SADC Water Division convenes RBO workshops, Water Sector Stakeholder Dialogues and has produced River Awareness Kits for a number of SADC watercourses.
Description of national plan to the project	Prior to the implementation of the proposed capacity enhancement in infrastructure project preparation, resource mobilisation and piloting project, the following should be undertaken through the SADC Water Division: • Existing training manuals are promoted and new manuals are developed to assist policymakers, decision makers and professionals with issues around the sustainable development of large water infrastructure. • A training manual is developed that documents the different stages and requirements of project preparation; from the description of the enabling environment, to project definition, project feasibility, resource mobilisation and post-implementation support.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	The project would start with the preparation of the training manuals in early 2013 and conclusion of training in 2014.
Business model	This is a capacity enhancement project, with minimal Water Sector developmental infrastructure. However, the project will facilitate the successful implementation of Water Sector infrastructure in the SADC region.
Main parties in place	SADC Water Division and the SADC national/bi-national/RBOs.
Main parties to be procured	Possible project financiers are GIZ and DBSA.
Project challenges	The major project challenge foreseen is timely sourcing of project finances.
Project documentation available	1. River Awareness Kits 2. SADC RSAP III document 3. Strengthening of RBOs publications in four booklets
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a capacity building project. Future benefits will manifest in efficient execution of Water Sector projects in SADC.
Estimated total cost	It is estimated that the cost of preparing the training manuals would be US$0.25 million and the cost of the training would be US$0.75 million giving a total cost for the project of US$1 million.
Execution period	After project funding is secured in 2012, the project will be executed from 2013 and be completed in 2014.

Project title	**Reduction in non-revenue water and water losses in the Capital Cities of the SADC Member States (Project GP-8)**
Project sponsors	The project proponents are the SADC Member States, with the water utilities for each capital city being the implementing agency.
Participating countries	All SADC Member States
Objectives	The objectives of this project are to reduce the water demand of water users by reducing water losses and NRW, achieve greater water use efficiency, increased water re-use and use of appropriate metering, monitoring and data analysis methods to document volumes delivered/provided and used.
Project description	This is an investment opportunity study. This project will assess the level of NRW, water losses and water re-use in all the 15 capital cities of the SADC Member States and recommend appropriate actions to be taken for each city. The objectives of this proposed project are similar to those of Projects P1-9 and P1-10, which are to reduce the water demand of water users by reducing water losses and NRW, achieve greater water use efficiency and use of appropriate metering, monitoring and data analysis methods to document volumes delivered/provided and used.
Expected results	The resultant water savings can be used to supply new consumers. Revenue streams would improve as the water supply systems would be more efficient. The management of the water situation in all the 15 capital cities of the SADC Member States can be improved by applying water demand management (WDM) principles. Activities such as pipe leakage repair, pressure reduction, re-use of water and metering with commensurate data analysis can be introduced with good results and resultant benefits to the consumers being serviced. Water conservation and water demand management measures will provide cost effective means of reducing water demands in the long run, by minimising losses and wastage and by so doing, delaying the need to construct additional infrastructure, usually at higher capital cost. In any case, why build new infrastructure when similar old infrastructure cannot be efficiently managed?
Ongoing related activities in the region	A study by the South African Water Research Commission some years ago estimated the total physical water losses for some 62 urban systems analysed by the study to be in the order of 31% of the total water supplied. Adding unbilled consumption, the study estimated NRW for the 62 systems at around 36% of the water supplied. The results from the study have been quoted extensively and are considered one of the most reliable sources of quantifying water losses in South Africa. South Africa's 36% is similar to the world average, however South Africa is classified as a water stressed area and cannot afford to have such high levels of water losses and NRW. Globally, NRW ranges considerably, with Albania and Ecuador having more than 70% compared to Australia, New Zealand, Cambodia and Singapore each attaining less than 10% NRW.
Description of national plan to the project	Implementing the overall WDM programmes in all SADC Member State capital cities as a pilot project can later be replicated in the other Member States towns and cities, resulting in great savings, higher revenue streams from an increased customer base as well more efficient water supply service systems.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy work in 2013 and execution of the project in 2014. Project profiles for each city would then be produced for the mitigatory works and associated costs.
Business model	This is a capacity enhancement project, with minimal initial Water Sector developmental infrastructure. However, the project will facilitate the reduction in water losses, resulting in improved revenue for the utilities and thus delaying, where appropriate, the need for new Water Sector infrastructure.
Main parties in place	The SADC Water Division and the water utilities for each capital city of the SADC Member States.

Main parties to be procured	Possible project financiers are DBSA, GEF and the AfDB.
Project challenges	The major project challenge foreseen is timely sourcing of project finances.
Project documentation available	1. City of Cape Town, 2010. Progress with Implementation of the Long-term Water Conservation and Water Demand Management Strategy, Assessment, Summary Report, September 2010. 2. MA Shepherd and VA Poona, undated. Reducing Non-Revenue Water In The Durban Central Business District. 3. SADC Economic Accounting of Water Project Reports.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a capacity building project. Future benefits will manifest in efficient execution of Water Sector projects in SADC.
Estimated total cost	It is estimated that it will cost US$1 million per city for the study giving a total cost for all 15 cities of US$15 million.
Execution period	After project funding is secured in 2012, the project will be executed from 2013 and be completed in 2014. Thereafter, the project's recommendations for each will then be implemented.

Project title	**Limpopo River Basin Water Monitoring Project (Project P1-2)**
Project sponsors	The project proponent is the Government of Botswana.
Participating countries	South Africa, Zimbabwe and Mozambique and the LIMCOM Secretariat
Objectives	To promote sustainable water resources management and allocation in the Middle and Upper Limpopo Basin, and to institute a continuous water quality monitoring programme in the Upper and Middle Limpopo Basin.
Project description	The Upper and Middle Limpopo River Basin has witnessed increased development with numerous large-scale irrigation developments having been implemented in recent years. This has occurred with little or no coordination among stakeholders in Botswana, Mozambique, South Africa and Zimbabwe in the planning and implementation of these projects, resulting in uncoordinated drawdowns on the water resources in the basin. The four countries have also never jointly addressed the concomitant environmental impacts characterised by increasing levels of water pollution. The waters of the Limpopo River have been exploited for irrigated farming in the Limpopo Province of South Africa for many years, with limited similar development on the Botswana side. If pollution levels are allowed to increase unabatedly, there will be serious social and economic impacts on the residents of the basin. Increased pollution will result in reduced availability of potable water and general despoilment of the upper and middle sections of the river. Uncontrolled pollution will also compromise the development promise brought about by the river which, if realised, would contribute to poverty eradication, the attainment of the two countries' development objectives and the MDGs.
Expected results	While this proposed project is not an infrastructure development project *per se*, it is an initiative that will inform the extent to which the development and utilisation of water resources linked infrastructure will have on the basin. The data collected on water resources management and pollution will also be of great importance in the debates on equitable water allocation across all user sectors in the basin. The stakeholders in the basin consider this to be an important initiative given the paucity of water resources. Critical aspects to be monitored and reported upon include: water pollution, soil loss and sustainable development. Data sharing across all four countries will be imperative if sustainable water resources management is to be achieved in the Limpopo River Basin. In addition to data sharing and water quality monitoring, the four countries have also agreed to develop and implement a stakeholder engagement strategy to facilitate the sharing of best practices across the whole basin.
Ongoing related activities in the region	Botswana and South Africa tabled this matter at the recent Limpopo River Basin Commission (LIMCOM) meeting in Maputo, resulting in the mobilisation of both Mozambique and Zimbabwe to participate in the programme. Under the auspices of LIMCOM, a programme aimed at harmonising water quality standards and monitoring processes will be instituted, as will the development of a data sharing protocol among all four riparian states.
Description of national plan to the project	Initial meetings have been held between officials from the two countries with another meeting and site visit scheduled for early July 2011. The monitoring initiative still has to be scoped out. The project has been discussed at the LIMCOM meetings. While it is initiated by Botswana and South Africa, the project will have implications for the state of the river in the downstream and riparian countries of Zimbabwe and Mozambique.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Feasibility studies should be completed in 2013. Detailed designs and tendering for construction of monitoring works will then be done in 2014. Procurement of equipment and instruments and the construction of the monitoring stations would then start in 2015 and be completed by 2016.
Business model	This is a study with infrastructure requirements being the construction of water quality monitoring stations.
Main parties in place	The departments with the water quality responsibility in each of the four riparian states as well as the LIMCON Secretariat.

Main parties to be procured	Possible project financiers are Sida.
Project challenges	The major project challenges are the timely sourcing of project finances, as well as achieving consensus on the project with the project riparian states.
Project documentation available	1. Boroto, RAJ. 2000. *Limpopo River: Steps Towards Sustainable and Integrated Water Resources Management*. Department of Water Affairs and Forestry South Africa, Pretoria. 2. Mhizha A, Musariri M and Madamombe E. *Preliminary Water Resources Assessment for the Limpopo River Basin*. http://www.waternetonline.ihe.nl/challengeprogramme/IR29%20Mhizha%20prelim%20water%20res.pdf last visited 18 Aug 2011. 3. Murovh M and Matlala M. *Pros and cons of managing shared river basins.* www.inweb.gr/twm4/abs/MUROVHI%20Mashudu.pdf last visited 18 Aug 2011.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a study that will end with data collection to facilitate the efficient management of the Limpopo River, as the riparian states will be better informed. Future benefits will manifest in all four riparian states.
Estimated total cost	The estimated total project costs are US$1 million.
Execution period	After project funding is secured in 2012, the project will be executed from 2013 and be completed in 2016. Thereafter, water quality and other data will be continuously collected.

Project title	**Assessment of the Groundwater Resources Potential of the SADC region (Project GP-5)**
Project sponsors	The project proponent is the SADC Groundwater and Drought Management Project with the SADC Member States Water Sector Ministries providing the lead agencies.
Participating countries	All SADC Member States
Objectives	A pilot SADC regional project with the following objectives should be formulated and implemented, which will inform the SADC region: • To bring awareness of the critical role that groundwater plays in providing water to at least 70% of the SADC region population; • To assess the groundwater capacity, abstraction rates and recharge capabilities of aquifer systems of the SADC region, bearing in mind that most of these aquifer systems are fossil waters and not renewable; • To have a comprehensive SADC regional hydro-geological map produced; • To ensure, through the project, that provisions on groundwater management are included in shared watercourse agreements, particularly for trans-boundary aquifers; • To improve groundwater modelling; and • To improve the understanding of the protection and recharge mechanisms of groundwater resources.
Project description	Groundwater is of critical importance in the SADC region, as it is the main source of water for at least 70% of the population. However, very little is known in the SADC region regarding underground water in general and its interaction with surface water in particular. Groundwater usually provides a secure and cost-effective water supply solution, requiring little or no treatment in arid regions where surface water is seasonal, in rural areas with dispersed populations, for stock watering and for small town water supplies. Groundwater provides a cushion against droughts, and many boreholes and protected wells have been drilled and sunk during drought events.
Expected results	The knowledge gained from this project will assist in the planning and development of water resources and related infrastructure developments in the SADC Member States and the region in general.
Ongoing related activities in the region	The SADC Groundwater and Drought Management Project
Description of national plan to the project	SADC Member States would participate in the project through their Water Sector management institutions.
Status	The project can be considered to be in Phase 2 of the ICA Project Development Phases.
Next steps	The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy work in 2013 and commencement of execution of the project in 2014 ending in 2020.
Business model	This is a study.
Main parties in place	SADC Water Division and the SADC Member States.
Main parties to be procured	Possible project financiers are UNEP, GEF and the AfDB.
Project challenges	The major project challenge foreseen is timely sourcing of project finances.
Project documentation available	1. http://www.sadc-groundwater.org last accessed 10 February 2012. 2. http://iwlearn.net/iw-projects/970 last accessed 10 February 2012.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a study that will end with an informed position to facilitate the efficient management of the SADC groundwater resources. Future benefits will manifest in all the aquifer riparian states, as they can plan and compliment groundwater with surface water infrastructure.
Estimated total cost	It is estimated that the total cost of the project would be US$15 million.
Execution period	After project funding is secured in 2012, the project will be executed from 2013 and be completed in 2020.

Project title	**Monitoring Climate Change Adaptation to Drought – Agro-ecological Region I, Zambia (Project GP-6)**
Project sponsors	The project proponent is the SADC Water Division, which will appoint a suitable consultant or implementing agent such as the ZAMCOM Secretariat.
Participating countries	Zambia and the SADC Water Division
Objectives	It is important that Project P1-13 has a strong monitoring component, especially for lessons to be learnt in its implementation and applicability for replication in the SADC region. This project will independently monitor Project P1-13 to facilitate replication in similar areas of the SADC region. The monitoring project, as part of the other outputs, will recommend other areas in the SADC region where the project can be replicated with appropriate project profiles being developed.
Project description	The overall objective of the Climate Change Adaptation to Drought Project (P1-13) is to reduce the vulnerability of those depending on rain-fed agriculture practices to anticipate rainfall shortages in the face of climate change/variability. Agro-ecological Region (AER) I covers the western and southern parts of Zambia and receives less than 800 mm of rain annually. Project P1-13 will focus on the introduction of irrigation and water management systems, training, capacity building of farmers on water management practices, support to marketing and the provision of finance credit facilities. It will also cover support to the introduction of drought resistant crops such as cassava, beans, sorghum, millet, potatoes, vegetables and fruit trees. The project also entails the eventual construction of five dams at five selected areas in AER I, eight fish ponds per site and irrigation schemes at these five separate locations. This project, Project GP-6, will monitor the implementation of Project P1-13 for possible replication in other SADC Member States.
Expected results	Lessons and experiences will be shared and the project could be replicated in other SADC Member States.
Ongoing related activities in the region	This project will rely on the implementation of Project P1-13, which is to be implemented in Zambia. Portions of Project P1-13 commenced, but progress is slow due to financial and other constraints.
Description of national plan to the project	Most of the planning has already been complete and the concepts, and ideas about how to use the funds have been established as the basis for the development of this water infrastructure project so far. In terms of the ICA guidelines, the project however seems to be in Phase 2, as there is no evidence that any pre- or full feasibility study was carried out at the specific locations where the infrastructure is planned. However, the areas of need are real and the types of projects that are likely to succeed have been clearly identified and funding has been put towards their development. Therefore, the relevance of the ICA guidelines to this project is not considered particularly high in terms of next project preparation steps.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	The ToR and appointment of the consultant can be done in 2014, in time to start monitoring Project P1-13 in 2014 till 2017, as Project P1-13 will be concluded in 2016.
Business model	This is a study.
Main parties in place	The Ministry of Agriculture in Zambia and the SADC Water Division.
Main parties to be procured	Possible project financiers are UNDP and the FAO.
Project challenges	The major project challenge foreseen is timely sourcing of project finances.
Project documentation available	1. GRZ/UNDP, 2009. *Adaptation to the effects of drought and climate change in Agro-ecological regions I and II*. (Project IDS: 0085205/00072197 (ZMB10)) / Zambia_11-9-09_Adaptation_Effects_Drought_CC_Zone1-2.pdf (with GEF assessment of protect potential and technical merit for support, p.1-31).

	2. GRZ/MTENR, 2010. *National Climate Change Response Strategy (NCCRS), Ministry of Tourism, Environment and Natural Resources* (MTENR), Lusaka, p.20-21. / NCCRS FIRST DRAFT 15TH SEPTEMBER 2010.pdf 3. GRZ/MACO, 2010. *Water for Agriculture and Energy: National Investment Profile of Zambia. Ministry of Agriculture, Lusaka*. p.50./ZWP Consolidated Report. August 2010 version 5[2].doc 4. Signature page: GRZ/UNDP, 2009. *Adaptation to the effects of drought and climate change in Agro-ecological regions I and II*.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a study that will end with an informed position to facilitate the efficient management of other climate change projects in the SADC region.
Estimated total cost	The estimated total cost for the project monitoring over the four years is US$0.5 million.
Execution period	After project funding is secured in 2012 and the drafting of the ToR and procurement of a consultant in 2013, the project will be executed from 2014 and be completed in 2017.

Project title	**Monitor water pollution in reservoirs and rivers of shared watercourses of SADC (Project GP-9)**
Project sponsors	The Secretariats of the SADC RBOs or the SADC Water Division where such Secretariats do not exist.
Participating countries	All SADC Member States
Objectives	• To inform on the level of the water quality of the SADC water resources; • Identify the polluters, sources of pollution and pollution "hot spots" to enable corrective action to be taken; • To improve data sharing among the riparian states of the SADC shared watercourses.
Project description	The SADC region has witnessed increased developments in the mining and irrigation sectors in recent years. The planning and implementation of these developments has occurred with little or no coordination among stakeholders in the neighbouring states sharing watercourses. The concomitant environmental impacts characterised by increasing levels of water pollution have also never been addressed at river basin level. While this proposed project is not an infrastructure development project *per se*, it is an initiative that will inform the extent to which the development and utilisation of water resources linked infrastructure will and has had in each of the 15 SADC shared watercourses. Polluted water is more expensive to use as it requires treatment. In some cases reservoir waters become unusable, with negative consequences to ecosystems and the environment. Further, the polluters and the "hot spots" in respect of pollution will be identified and highlighted facilitating corrective action. The data collected on water resources management and pollution will also be of great importance in the debates on equitable water allocation across all user sectors in these shared watercourses. Critical aspects to be monitored and reported on include water pollution, soil loss and sustainable development. Data sharing among the riparian states will be imperative if sustainable water resources management is to be achieved in these shared watercourses.
Expected results	Details of pollution sources, polluters and pollution "hot spots" that will assist in the better management of the shared watercourses, improvement in the water quality of the SADC surface and ground waters, as well having sufficient information to enforce pollution control regulations.
Ongoing related activities in the region	This project is similar to the Limpopo River Basin Monitoring Project (Project P1-2).
Description of national plan to the project	It is expected that all SADC Member States will participate in this project through their national institutions that have the water pollution control responsibility.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	ToR for the project and identification of polluters and "hot spots" should be completed in 2013. Detailed designs and tendering for construction for any necessary monitoring stations will then be done in 2014. Procurement of equipment and instruments and the construction of the monitoring stations would then start in 2015 and be completed by 2016. Monitoring and reporting would commence thereafter.
Business model	This is a study, with infrastructure requirements being the construction of water quality monitoring stations.
Main parties in place	The departments with the water quality responsibility in each of the SADC shared watercourse riparian states, as well as the appropriate RBO Secretariat.
Main parties to be procured	Possible project financiers are Sida, the African Water Facility, UNEP and GEF.
Project challenges	The major project challenges are the timely sourcing of project finances, as well as

	achieving consensus on the project with the project riparian states.
Project documentation available	To be identified.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a study that will end with data collection to facilitate the efficient management of the SADC shared watercourses, as the riparian states will be better informed. Future benefits will manifest in all the SADC shared watercourse riparian states.
Estimated total cost	The estimated total project costs are US$15 million.
Execution period	After project funding is secured in 2012 and the drafting of the ToR and procurement of a consultant in 2013, the project will be executed from 2014 and be completed in 2016. Monitoring and data collection will continue thereafter.

Project title	**Piloting synchronised and conjunctive operation of dams for flood and drought mitigation, improved energy generation and livelihoods and provision of water for the environment in the Zambezi River Basin (Project GP-10)**
Project sponsors	The project proponent is the ZAMCOM Secretariat with the dam operators of the Kariba, Itezhi-Tezhi, Kafue and Cahora Bassa dams being the lead and implementing agencies**.**
Participating countries	Mozambique, Zambia and Zimbabwe
Objectives	• To demonstrate the benefits of conjunctive and synchronised dam operations in respect to increased hydropower generation, flood and drought control, improved riparian livelihoods and the provision of water to meet environmental needs; and • To build confidence in synchronised and conjunctive operation of dams, while providing valuable lessons and experiences for improvements and future replication in other SADC river basins.
Project description	The major dams of the Zambezi River Basin have, to date, generally been operated independently, without regard to the requirements of other stakeholders. Except for the Kafue dams, all the other dams have been managed without any provision for environmental flows and other socio-economic considerations for downstream or other riparian users. Floods and droughts are part of the history of the Zambezi with and without dams. Dams impound floods and modify downstream flows and the lake environment. However, releases can be managed to minimise upstream and downstream impacts (SADC 2011). The need to widen the range of possible flow regimes in the Zambezi River system downstream and upstream of major dams in order to provide for more uses/users was established during the Zambezi Dam Synchronisation and Flood Releases Study (SADC 2011). The goals of system optimisation, water security and benefit sharing were also discussed in detail. Synchronisation and conjunctive operation are two terms, which are very closely associated with modern scientific trends in dam management to achieve these goals. There is need to demonstrate that dam synchronisation, conjunctive operation of dams and introduction of environmental flows in the Zambezi River Basin is achievable and beneficial. Dam operators and other stakeholders require support to set up and implement a practical pilot project, which builds confidence in synchronised and conjunctive operation of dams, while providing valuable lessons and experiences for improvements and future replication in other SADC River Basins (SADC 2011).
Expected results	One of the expected outcomes of the pilot project would be that the dam operators of the main dams in the Zambezi River Basin would negotiate and agree to operate their dams for optimal outcomes, which include addressing flood and drought management and environmental flow requirements. Operating the Kariba dam, dams on the Kafue sub-system and Cahora Bassa dam in a conjunctive and synchronised manner would result in optimum hydropower production, dam safety, supply of water to other users, including the environment, and reduced flood damage upstream and downstream of these major dams.
Ongoing related activities in the region	This will be one of the first such full-scale pilot projects in SADC region.
Description of national plan to the project	The dam operators of the Zambezi River Basin will be the focus implementers of this project in consultation with their parent government ministries.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	The expected next stages for this pilot project would be: • Undertaking a feasibility study for the pilot project; • Implementation of a pilot project involving Kariba, dams on the Kafue sub-system and Cahora Bassa Kariba dam, dams on the Kafue sub-system and

	Cahora Bassa dam; • Data capture and meetings to support implementation activities. This should be considered a short- to medium-term intervention to allow testing of a wide range of scenarios, which depend on weather/hydrological patterns; • Dam Operators and power producers are fully engaged, make the necessary changes and adopt the new modes of operation; and • Provide a risk management plan (including funds) to cover for unforeseen loss of storage, power and/or revenue. The project would start with the drafting of the ToR for the project in 2013, tendering for the consultancy assistance work in 2013 and execution of the project from 2014 to 2020.
Business model	This is a study, but benefits will manifest in improved water and infrastructure management
Main parties in place	SADC, HCB, ZRA, ZESCO and ZESA
Main parties to be procured	Possible project financiers are DBSA, GEF and GIZ.
Project challenges	The major project challenges foreseen are the timely sourcing of project finances and the adoption of an MoU between the dam operators to facilitate conjunctive and synchronised operation of dams, as well as information exchange.
Project documentation available	SADC, 2011, Zambezi River Basin Dam Synchronisation and Flood Releases Project, SADC Secretariat, Gaborone
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a study that will end with experiences and knowledge that will facilitate the efficient management of the surface water storage infrastructure in the Zambezi River Basin and the SADC region.
Estimated total cost	It is expected that the project will cost US$7 million over a period of seven years starting in 2014.

Project title	**Implications of virtual water trading in water resources development and usage in the SADC region (Project GP-11)**
Project sponsors	The project proponents are all the SADC Member States with the SADC Water Division being the lead agency.
Participating countries	All SADC Member States
Objectives	A project that brings better understanding to the implications of "virtual water" among Member States of SADC and between SADC and the other African RECs should be undertaken.
Project description	Virtual water (also known as embedded water, embodied water, or hidden water) refers, in the context of trade, to the water used in the production of a good or service. Virtual water trade in practice means that a country can potentially mitigate its water shortages by importing large amounts of virtual water instead of building new water supply infrastructure. For instance, it takes 1 300 m^3 of water on average to produce one metric tonne of wheat. The precise volume can be more or less depending on climatic conditions and agricultural practices. By importing 100 000 tonnes of wheat a year, a water scarce country has actually imported 130 million m^3 of water per year, a very large yielding dam indeed. At the same time, such agricultural exports from water-rich countries could be drivers for economic growth.
Expected results	The project would, among other outputs, propose virtual water trade strategies for both water scarce and water rich SADC Member States for their mutual benefit, and thus also highlight the water infrastructure requirements for the proposed water trade strategies.
Ongoing related activities in the region	Similar studies are underway in other African RECs.
Description of national plan to the project	SADC Member States will cooperate with the project consultant in providing available data and information.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	The project would start with the drafting of the ToR for the study in 2013, tendering for the consultancy work in 2013 and execution of the Project in 2014.
Business model	This is a study.
Main parties in place	SADC Water Division.
Main parties to be procured	Possible project financiers are DBSA, GEF and the AfDB.
Project challenges	The major project challenge foreseen is timely sourcing of project finances.
Project documentation available	To be identified.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is a study that will end with experiences and knowledge that will facilitate the efficient management of the water resources of the SADC region and present strategies for infrastructure development to both “water rich” and “water scarce” SADC Member States.
Estimated total cost	It is estimated that the total cost of the project would be US$1 million.
Execution period	After project funding is secured in 2012 and the drafting of the ToR and procurement of a consultant in 2013, the project will be executed in 2014.

Project title	**Inga III Hydropower (Project RG-1)**
Project sponsors	DRC Ministry of Energy.
Participating countries	DRC
Objectives	The main objective is to provide electricity for the people of the DRC for improved wellbeing and to export electricity to increase the DRC's foreign revenue stream. Besides meeting the internal energy needs of the DRC and the BHP Billiton aluminium smelter, excess power from the Inga III Hydropower project will be exported to the SADC region.
Project description	For the Inga III Hydropower project, no dam will be constructed. Water will be diverted from the Congo River through tunnels to the power station. The nominal power station production capacity will be 4 320 MW (16 x 270 MW units).
Expected results	Production of 4 320 MW for domestic and SADC regional consumption, resulting in an improved quality of life of the DRC and SADC citizens and economic growth.
Ongoing related activities in the region	The SADC region currently has a power deficit, with most Member States experiencing severe load shedding and power cuts. The SAPP and the power utilities are trying to fast-track energy projects to meet this challenge.
Description of national plan to the project	AfDB is reported to have financed the pre-feasibility study, which has just been completed.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	Pre-feasibility studies were concluded in 2011 financed by the AfDB. The next project development stage is feasibility studies to be conducted in 2012 followed by final designs in 2013 and tendering for construction in 2014. Construction of the project is expected to then start in 2015 and will be completed in 2017.
Business model	Investment project financed as a BOT or from loans.
Main parties in place	Ministry of Energy in DRC and SNEL
Main parties to be procured	Possible project financiers are the AfDB, DBSA and the WB.
Project challenges	The major project challenge is timely sourcing of project finances.
Project documentation available	1. *INGA hydropower may cost more*, 2011 http://www.bloomberg.com/news/2011-06-30/congo-s-inga-hydropower-project-may costmore-reuters-reports.html 2. *DRC sees Inga 3 generating power by 2017/18* , 2011 http://af.reuters.com/article/investingNews/idAFJOE72E0F320110315 3. *Talks with BHP Billiton very advanced*, 2010 http://londonminingnetwork.org/2010/11/congo-says-talks-with-bhp-billiton-on-inga-3-power-plant-are-very-advanced/ http://www.bloomberg.com/news/2010-10-27/congo-says-talks-with-bhp-on-building-inga-3-very-advanced-.html 4. *Run of River Bulk HEG from Congo River without Conventional Dam*, 2010 Natural Resources, 2011, 2, 18-21 doi:10.4236/nr.2011.21003 Published Online March 2011 (http://www.scirp.org/journal/nr)
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$8 billion.
Execution period	After project funding is secured in 2012 and the final designs and tendering process is completed in 2014, construction will commence in 2015 and be completed by 2017.

Project title	**Lesotho Highlands Phase II (Project RG-2)**
Project sponsors	The project proponents are the Lesotho Highlands Development Authority (LHDA) and the Lesotho Highlands Water Commission (LHWC)
Participating countries	Lesotho and South Africa
Objectives	To construct the Polihali Multi-purpose Dam to transfer water to the Katse Dam and then through the existing infrastructure and the Muela Hydropower Complex to augment water supply to the Gauteng and the Vaal River water supply system. The project will also provide advanced infrastructure, environmental and social development programmes in Lesotho.
Project description	The total project was originally conceived to transfer 70 m^3/s from the upper portions of the Lesotho Highlands into the Vaal River Basin. The aim of Phase II is to deliver more water by gravity to the Vaal River system in South Africa. Phase II is expected to increase surface water storage in Lesotho by 2.2 x 10^6 m^3 and the existing hydropower generation capacity in Lesotho by 1 200 MW, to the benefit of both local and regional power consumption. From the social and environmental perspective, it is estimated that about 17 000 people from 72 villages will be affected and compensated accordingly, and will further benefit from improved water supply and sanitation services.
Expected results	Increased surface water storage in Lesotho by 2.2 x 10^6 m^3, generate an additional 1 200 MW and provide adequate safe drinking water and sanitation services to the 17 000 people displaced by the project.
Ongoing related activities in the region	The DBSA has provided about R1 billion to the earlier aspects of the project since it started in the late 1980s.
Description of national plan to the project	The LHWP project has been implemented in a number of phases and Phase 1A and 1B, which included building the Katse and Mohale dams and their tunnel systems, have been completed. The agreement to proceed with implementation of Phase 2 was announced by Lesotho and South Africa in December 2008, and finally signed in August 2011.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Pre-feasibility studies were concluded in 2011, financed by the DBSA. The next project development stage is feasibility studies to be conducted in 2012, followed by final designs in 2013 and tendering for construction in 2014. Construction of the project is expected to start in 2015 and will be completed in 2020.
Business model	Investment project, financed as a BOT or from loans.
Main parties in place	LHDA, LHWC
Main parties to be procured	Possible project financiers are the AfDB and DBSA.
Project challenges	The major project challenges include: • The resettlement and timely compensation of the 3 300 families from the 72 villages; • Conclusion of the royalties and water purchase agreements between Lesotho and South Africa; and • The timely sourcing of project finances.
Project documentation available	1. Water project to create jobs for construction workers. *Lesotho Times*. 2010. http://www.lestimes.com/?p=4314. Accessed 18 August 2011. 2. *International Water Power And Dam Construction, An African Success Story*. June 2010. http://www.waterpowermagazine.com/story.asp?storyCode=2056820. Accessed 18 Aug 2011
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project
Estimated total cost	The estimated total project costs are US$1.001 billion.
Execution period	After project funding is secured in 2012 and the final designs and tendering process is completed in 2014, construction will commence in 2015 and be completed by 2020.

Project title	**Batoka Hydro-electric Scheme (Project RG-3)**
Project sponsors	The project proponents are the Governments of Zambia and Zimbabwe, with lead agents being the Zambezi River Authority (ZRA) for the dam development and Zimbabwe Electricity Supply Authority (ZESA) and Zambia Electricity Supply Corporation (ZESCO) for the south and north bank power station developments respectively.
Participating countries	Zambia and Zimbabwe
Objectives	The objective of the Batoka Hydro-electric Scheme is to increase the power generation capacity of Zambia and Zimbabwe and reduce reliance on coal-fired power stations, which are expensive to operate and maintain and are associated with greenhouse gas emissions.
Project description	The project has the potential to make both Zambia and Zimbabwe power exporters after meeting local needs. The Batoka Hydro-electric Scheme involves construction of a 1 680 x 10^6 m^3 capacity dam, with two underground power stations producing a total of 1 600 MW. Two townships at Batoka, one in Zambia and the other in Zimbabwe, will be established with a combined total population of about 200 000 people who will have adequate water supply and sanitation services.
Expected results	Construction of the Batoka Hydro-electric Scheme to generate 1 600 MW of power.
Ongoing related activities in the region	The AfDB provided grant funds to carry out the feasibility studies, which were concluded in 1993. Further EIA studies were carried out and were completed in 1998.
Description of national plan to the project	Zimbabwe provided US$2 million for site investigation works concluded in 1994.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	The next project development stage is final designs to be conducted in 2013 and tendering for construction in 2014. Construction of the dam and power stations is expected to start in 2015 and will be completed by 2021.
Business model	Investment project financed as a BOT or from loans.
Main parties in place	ZRA, ZESA, ZESCO
Main parties to be procured	Possible project financiers are the AfDB, DBSA and the WB.
Project challenges	The major project challenges include: • Obtaining final approval to proceed with the project from both governments; and • Timely sourcing of project finances.
Project documentation available	1. Batoka Joint Venture Consultants (BJVC), 1993. *Batoka Gorge Hydro-electric Scheme Feasibility Study Final Report*. Zambezi River Authority. Lusaka, Zambia. 2. Tumbare MJ. 2010. *The Management of the Zambezi River Basin and the Kariba Dam*. Bookworld Publishers. Lusaka, Zambia. 3. Tumbare M J. 2005. *Batoka Gorge Hydro-electric Scheme Project*. SAPP Investment Conference. www.sapp.co.zw/documents/Batoka%20Hydro%20project.pdf. Last accessed August 2011 4. Sikuka K. 2009. *Batoka hydro power station to light up Southern Africa*. South African News Features. www.sardc.net/editorial/newsfeature/o9250909.htm . Last accessed August 2011. 5. World Bank. 2011. *The Zambezi River Basin – A Multi-sector Investment Opportunities Analysis.* http://siteresources.worldbank.org/INTAFRICA/Resources/Zambezi_MSIOA_-Vol_1_-Summary_Report.pdf. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project
Estimated total cost	The estimated total project costs are US$4 billion.
Execution period	After project funding is secured in 2012 and the final designs and tendering process is completed in 2014, construction will commence in 2015 and be completed by 2021.

Project title	**Songwe River Basin Development Programme (Project RG-4)**
Project sponsors	The project proponents are the Governments of Malawi and Tanzania.
Participating countries	Malawi and Tanzania
Objectives	The overall goal of the Songwe River Basin Development Programme (SRBDP) is to contribute to improved living conditions of the basin population and the socio-economic development in Malawi and Tanzania. The specific objective is to prepare designs and joint investment projects for implementation, and to create an effective enabling environment for trans-boundary water resources management in the Songwe River Basin through the creation of the Songwe River Basin Authority.
Project description	The project is structured in five components: • Preparation of a shared vision towards 2050 and a ten-year SRBDP; • Detailed design and preparation of priority investments as a major task; • Environmental and social safeguarding of the SRBDP by means of a strategic environmental and social assessment and environmental and social impact assessment for the programme; • Establishment of a Songwe River Basin Authority and associated IWRM capacity building at local level; and • Support to project management and resource mobilisation for the implementation of capital investments under the programme. In respect of water sector infrastructure development projects, the SRBDP will construct the lower dam with a capacity of 10 x 10^6 m^3, which will irrigate some 200 ha and also generate about 153 MW. It is estimated that the project will benefit some 250 000 people who will have improved water supply and sanitation services.
Expected results	The construction of a dam to irrigate 200 ha of land and generate 153 MW to the benefit of some 250 000 people who will have improved water supply and sanitation services.
Ongoing related activities in the region	Sida has facilitated initial meetings in the two riparian states, with the AfDB having provided grant funds for feasibility studies in 1994.
Description of national plan to the project	Each country to nominate and mandate existing institutions to spearhead the project for final handover to the Songwe River Basin Authority once created.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	The next project development stage is final designs to be conducted from 2012 to 2013 and tendering for construction in 2014. Implementation and construction of the associated project components is expected to then start in 2015 and will be completed in 2021.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Governments of Malawi and Tanzania
Main parties to be procured	Possible project financiers are the AfDB, Sida and the WB.
Project challenges	The major project challenges include: • Obtaining final approval to proceed with the project from both governments; • Timely sourcing of project finances; • The establishment of the Songwe River Basin Authority, which will take time but will contribute to the consolidation of the good cooperation between the two

	countries and the implementation of such projects; • In order to minimise the risk of low stakeholder response to the project, considerable attention has to be paid to the environmental and social issues including mitigation, resettlement, compensation schemes, land tenure security, gender equality and stakeholder involvement throughout the project's lifecycle. The project's focus on economic development and poverty eradication should also encourage positive stakeholder response; and • Changed hydrological conditions due to climate change and variability is a potential threat to the economic viability of the investments. The project includes an analysis of hydrological sensitivity to clarify the risks and advise on possible mitigation measures to be taken by the Songwe River Basin Authority once established.
Project documentation available	*Songwe River Basin Development Programme Detailed Design and Investment Preparation Project, Appraisal Report*. October 2009. Funded by AfDB.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated total project costs are US$328 million.
Execution period	After project funding is secured in 2012 and the final designs and tendering process is completed in 2014, construction will commence in 2015 and be completed by 2021.

Project title	**Vaal-Gamagara Water Supply Project (Project XB-2)**
Project sponsors	The project proponent is the Department of Water Affairs, Botswana.
Participating countries	Botswana and South Africa
Objectives	To transfer water from the Vaal River so as to provide some 50 000 residents of south-western Botswana with an adequate and safe domestic water and sanitation service.
Project description	Water availability in Botswana decreases from the east to the west with the south-western corner of Botswana having the least reliable water supply. The residents in this area suffer constant water supply constraints, which compromises their quality of life. As most of the country's water sources are found in the north-east of the country, Botswana has proposed that water supplies to the southwest be sourced from the Vaal River in South Africa, which is part of the Orange-Senqu River Basin. Botswana is a member of the Orange-Senqu River Basin Commission (ORASECOM) and therefore has rights to the water of the basin in terms of the agreement that establishes ORASECOM. Botswana's proposal is to draw up to maximum of 5 million m^3 of water annually from the Vaal, and to deliver this to the villages in the extreme southwest of the country through the Vaal-Gamagara Water Transfer Scheme. The scheme will involve the construction of cross-border water transfer infrastructure over an estimated distance of 400 km. It is assumed that there will be no dam constructed, but water will be stored in ground tanks at appropriate locations along the 400 km pipeline. It is further estimated that 50 000 people will be served with safe domestic water supply and sanitation services.
Expected results	The transfer of 7 l/s of water from the Vaal and to deliver this to the villages in the extreme southwest of the country through the Vaal-Gamagara Water Transfer Scheme.
Ongoing related activities in the region	Similar water transfer projects have been undertaken between Lesotho and South Africa (Lesotho Highlands) as well as between Mozambique and Zimbabwe (Pungwe).
Description of national plan to the project	The Department of Water Affairs in Botswana will spearhead the project in consultation with ORASECOM.
Status	The project can be considered to be in Phase 2 of the ICA Project Development Phases.
Next steps	The next project development stage is a pre-feasibility study to be completed in 2013. This requires US$400 000. Thereafter, feasibility studies will be carried out in 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed in 2017.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Department of Water Affairs, Botswana and ORASECOM
Main parties to be procured	Possible financier is KfW.
Project challenges	The major project challenges are the timely sourcing of project finances and possible failure of Botswana to access the Orange-Senqu waters due to lack of agreement with other riparian states.
Project documentation available	1. *Vaal Gamagara Water Scheme*. http://www.ewisa.co.za/eWISAWaterworks/misc/MunicipalDocuments/NCDisKgalagadi/LMGamagara/vaal_gamagara_water_scheme.pdf. Last accessed 31 August 2011. 2. *Orange-Senqu-IWRM Plan – Phase 2*. http://orangesenquiwrmplanphase2.org/wrp_documents/reports/wp3/Development%20of%20WQ%20Monitoring%20Programmeme%20and%20Data%20Management%20Framework-Rep-WP3-007-2011.pdf –Last accessed 17 August 2011.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated total project costs are US$175 million.
Execution period	After project funding is secured in 2012, the project will be undertaken from 2013 to 2017.

Project title	**Ressano Garcia Weir (Project XB-3)**
Project sponsors	The project proponent is the National Directorate of Water (DNA), Mozambique with the ARA South being the implementing agent.
Participating countries	Mozambique and South Africa
Objectives	To ensure monitoring of cross-border flow in the Incomati River (provision of IncoMaputo Agreement between Governments of Mozambique, South Africa and Swaziland). Storage from weir to provide water supply to Ressano Garcia Village.
Project description	Under the Inco-Maputo Agreement (IMA) between Mozambique, South Africa and Swaziland, two upstream countries agreed to release a minimum cross-border flow amounting to 2.6 m^3/s on average over a three-day period. The gauging methods used on both sides of the border provide data that is not consistent with each other, resulting in disputes and the non-compliance with the IMA Agreement. This issue has been discussed several times at the TPTC and JWC meetings of these three riparian states and there is consensus that a measuring weir would assist in monitoring and enforcing the agreed flows. On the other hand, the town of Ressano Garcia with a population of 20 000 inhabitants is currently facing serious water supply problems and urgently requires an assured water supply source for the provision of water supply and sanitation services. A border post would also be established, which would greatly help the Ressano Garcia residents. The Ressano Garcia weir reservoir capacity would be about 200 000 m^3.
Expected results	A water supply from the new weir to supply 20 000 inhabitants of Ressano Garcia town will be constructed. The weir will serve as a gauging station to monitor flows and improve the water resources management of IncoMaputo.
Ongoing related activities in the region	Project design and environmental and social impact assessment (ESIA) funded by the World Bank.
Description of national plan to the project	Project designs and an environmental impact assessment study were carried out in 2002. In 2011 DNA undertook the further refinement studies and updating of the costing.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Feasibility studies and a comprehensive ESIA funded by the World Bank are underway to be completed in 2012. Detailed designs and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed in 2015.
Business model	This project will serve both as an infrastructure investment in respect to the water supply to Ressano Garcia town, as well as a water resources management investment. It can therefore be funded from partly grant and loan financing.
Main parties in place	DNA Mozambique and ARA Sul Mozambique
Main parties to be procured	Possible project financier is the World Bank.
Project challenges	The major project challenge is the timely sourcing of project finances.
Project documentation available	1 *Ressano Garcia Weir on the Incomati River, Final Report*. National Directorate of Water, by Tecnica in Association with Coba. 2002. 2 *Ressano Garcia Weir on the Incomati River – Assessment of Ecological Impacts, Final Report*. National Directorate of Water, by Tecnica in Association with Coba. 2002. 3 *National Investment Brief Mozambique*. Sirte. 2008. http://www.sirtewaterandenergy.org/docs/reports/Mozambique-Draft2.pdf. Last accessed 13 August 2011.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated total project costs are US$6 million.
Execution period	After project funding is secured in 2012, the project will be undertaken from 2013 to 2015. Hydrological data will be collected thereafter.

Project title	**Lomahasha/Namaacha Water Supply Project (Project XB-4)**
Project sponsors	The project proponents are the Governments of Swaziland and Mozambique.
Participating countries	Mozambique and Swaziland
Objectives	The purpose of the project is to provide a reliable and adequate water supply and sanitation services to Lomahasha in Swaziland and across the border, serving the Namaacha area of Mozambique.
Project description	It is assumed that a dam with a storage capacity of 300 x 10^6 m^3 will be constructed to supply a total population of 100 000 people with a safe drinking water and sanitation service as well as irrigating 1 000 hectares of land.
Expected results	The project will: • Improve health of the residents; • Promote economic activity; • Create employment opportunities; • Increase food security and reduction of poverty; and • Provide additional revenue for the water utilities.
Ongoing related activities in the region	The project began as the Siteki Lomahasha Water Supply Project, funded under the Government of Swaziland capital projects budget. With the government's financial constraints, the corporation concentrated on the Siteki component, which is now almost complete. The current financial challenges experienced by government have prompted the suspension of the Lomahasha component, pending further identification of infrastructure funding possibilities. The ministry has a signed a water sharing arrangement. The project was discussed in the last meeting of the Tripartite Permanent Technical Water Commission (28 July, 2011) in Maputo.
Description of national plan to the project	To be implemented as national projects in each participating country.
Status	The project can be considered to be in Phase 2 of the ICA Project Development Phases.
Next steps	Feasibility studies have been carried out for Lomahasha and detailed designs should be completed in 2013. The feasibility studies and detailed designs for Namaacha need to commence in 2012 and be completed in 2013 at the same time as for Lomahasha. Tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed in 2017.
Business model	Investment project financed as a BOT or from loans.
Main parties in place	Government of Swaziland (DWA) and Government of Mozambique (DNA)
Main parties to be procured	Possible project financiers are the AfDB and the World Bank.
Project challenges	The major project challenge is the timely sourcing of project finances.
Project documentation available	1 ED Simelane and Associates. 2004. *Inception Report Lomahasha and Siteki Water Supply*. 2 *Lomahasha-Siteki water supply project forms the backbone of the Sikhuphe water supply development*. 2009. http://www.swsc.co.sz/index.php?option=com_contentandtask=viewandid=38andItemid=44. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	Total project cost of US$31 million.
Execution period	After project funding is secured in 2012, the project will be undertaken from 2013 to 2015.

Project title	**Water Supply and Sanitation at 12 border locations (Project XB-5)**
Project sponsors	The project proponent is the Government of Zambia.
Participating countries	DRC, Tanzania, Malawi, Mozambique, Zimbabwe and Angola.
Objectives	To provide safe and adequate water supply and sanitation services to 12 border towns, so as to improve the quality of life, serve regional tourism, transport and mitigate against cross-border water borne diseases in these border towns and surrounding areas.
Project description	The towns and their border locations are: Kazungula-Kasane (Zambia-Botswana), Siavonga-Kariba (Zambia-Zimbabwe), Luangwa-Zumbo-Kanyemba (Zambia-Mozambique-Zimbabwe), Chanje-Maluera (Zambia-Mozambique), Chipata-Mchinji (Zambia-Malawi), Nakonde-Tunduma (Zambia-Tanzania), Mpulungu-Kasanga-Mutungu (Zambia-Tanzania-DRC), Nchelenge-Kilwa (Zambia-DRC), Kalabo-Mussuma (Zambia-Angola), Kasumbalesa-Kasumbulesa (Zambia-DRC) and Chavuma-Caripande (Zambia-Angola). The project will undertake new investments, as well as the rehabilitation of water supply and sanitation facilities in the cross-border towns. New protected wells, boreholes and VIP latrines will be constructed during the project period. Existing water supply and sanitation facilities that are not functioning properly will be rehabilitated. This will ultimately increase access to safe water and sanitation services, which is currently low in these border towns. The project will also serve regional tourism, transport and mitigate cross-border water borne diseases in the border towns and surrounding areas. The 6 000 boreholes will serve an estimated 720 000 people, while the 3 500 rehabilitated boreholes will serve an estimated 420 000 people. The 310 000 latrines will serve an estimated 1 860 000 people. Some of the cross-border locations, such as Siavonga-Kariba, have piped water supply and sanitation services. It is estimated that a total of 250 000 people will benefit from the expansion and rehabilitation of such existing water supply and sanitation services carried under this project.
Expected results	This project is expected to construct 6 000 boreholes and rehabilitate 3 500 boreholes and wells by 2015 and improve the existing water supply and sanitation services at these 12 locations. Under sanitation, 310 000 latrines will be constructed. The project will also serve regional tourism, transport and mitigate against cross-border water borne diseases in border towns and surrounding areas.
Ongoing related activities in the region	This project helps improve cross-border facilities, while fostering regional integration.
Description of national plan to the project	Similar projects are ongoing in different provinces within Zambia, with funding from GRZ/MLGH and cooperating partners, (GRZ/MLGH, 2007: 80-81).
Status	The project can be considered to be in Phase 1 of the ICA Project Development Phases.
Next steps	Pre-feasibility studies and a comprehensive environmental and social impact assessment need to be completed by 2013, after consensus on the project is achieved with the other project riparian states. Feasibility studies would then follow in 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed by 2020.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Ministries responsible for water and sanitation in the participating countries.
Main parties to be procured	Possible project financiers are: UNICEF, KfW, Water Aid and DANIDA.
Project challenges	The major project challenges are the timely sourcing of project finances, as well as achieving consensus on the project with the project riparian states.
Project documentation available	1. GRZ/MLGH. 2007. *National Rural Water Supply and Sanitation Programme*.

	Lusaka, 112 pp. 2. MFNP. 2011. *Sixth National Development Plan 2011-2015*. 3. *National Rural Water Supply and Sanitation Programme*. Appraisal Report. 2006. ZM-2006-114-EN-ADF-ZAMBIA-AR-NATIONAL-RURAL-WSS-PROGRAMME.PDF (Major aspects of project prior to publication of 2007 programme ['06-'15]. Hard copy document available).
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated total project costs are US$165 million.
Execution period	After project funding is secured in 2012, the project will be undertaken from 2013 to 2020.

Project title	**Lubango Phase II Water Supply and Sanitation Project (Project P1-1)**
Project sponsors	The project proponent is the Ministry of Energy and Water in Angola.
Participating countries	Angola
Objectives	The principal purpose of this project is to rehabilitate and extend the water supply and sanitation system of the City of Lubango, considered the second largest city in Angola.
Project description	The urgent reconstruction works for water supply and sanitation are needed as a basic requirement for the development of the city and surrounding areas. The project will supply 70 litres/person/day of domestic water supply to a total of 1 200 000 residents of Lubango. The project construction activities include: • Rehabilitation of all components of water supply; • Drilling of an additional borehole at Nossa Senhora do Monte Wellfield; • Construction of a water reservoir at Esplanada da Capela; and • Installation of 15 km of sewer interceptors for the sanitation network. The project will be complemented by a monitoring project for the development of groundwater in the Tundavala mountains.
Expected results	The benefit from the implementation would be significant to the population in general. Improvement of the system will bring industrial growth and increase wealth to the population, particularly with regard to the growth of agro-food and others industries with associated increase in employment opportunities. The tourism industry is growing rapidly.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	Phase 1 of this project was launched in March 2011. The German company, Gauff Engineering, is doing the management of the Phase 1 project and will assist in finalising requirements for Phase 2.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Feasibility studies for Lubango Phase II project should commence in 2012 and be completed by 2013. Detailed designs and tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2016.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Ministries responsible for water and sanitation in the participating countries.
Main parties to be procured	Possible project financier is the German credit agency, Ausfurkredltgeschaft.
Project challenges	The major project challenge is the timely sourcing of project finances.
Project documentation available	1. *Investment programme for Ministry of Energy and Water until 2016, projecto Reabilitaçãoe Reforço do sistema de Abastecimento de Água da cidade do Lubango (Phase 1)*. Page 13 (Phase 1 details only). 2. 28 February 2011. Novo sistema dedistribuição garante mais água ao Lubango. *Jornal de Angola*. (Phase 1 only) 3. SADC. *RSWIDP part 2 final report*. June 2006. (Historical perspective) 4. *Council of ministers approves GAUFF-project in Lubango*. 2011. http://www.gauff.net/en/news/articles/article/ministerrat-von-angola-genehmigt-gauffprojekt-in-lubango.html. Last accessed August 2011.

	5. *National Investment Brief Angola*. 2008. www.sirtewaterandenergy.org/docs/reports/Angola-Draft2.pdf. Last Visited August 2011. 6. *Lubango's Water Supply System Reform Launched*. 2011. http://allafrica.com/stories/201103180903.html. Last accessed August 2011. 7. Angola business and investment climate overview. 2011. http://www.google.co.za/search?q=angola+investment+briefandie=utf-8andoe=utf-8andaq=tandrls=org.mozilla:en-US:officialandclient=firefox-a. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project
Estimated total cost	The estimated total project costs are US$120 million.
Execution period	After project funding is secured in 2012, the project will be undertaken from 2013 to 2016.

Project title	**Kinshasa Water Supply and Sanitation (Project P1-3)**
Project sponsors	The project proponent is the Ministry of Energy, DRC with REGIDESO being the implementing agent.
Participating countries	DRC
Objectives	To supply water and sanitation services for municipalities of Kinshasa.
Project description	The drinking water supply system of Kinshasa has substantial constraints mainly due to the poor distribution network and the age of the electrical and reticulation systems. After the capacity of the city's water supply is increased, the rehabilitation and strengthening of the water supply and sanitation networks in the city will follow, contributing to the improvement of life of the population. Water supply production will be increased to 800 000 m^3/day. It will also be necessary to rebuild the network for all nine municipalities linked to Kinshasa. This water supply and sanitation project will serve an estimated 10 million people.
Expected results	This project will significantly improve the living standards of the population of Kinshasa by improving the health of a population, which is suffering from habitual water shortages.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	Priority of DRC Government, with no certain funding identified to date.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Feasibility studies for the project, requiring about US$10 million, should commence in 2013 and be completed by 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and be completed by 2020.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	REGIDESCO
Main parties to be procured	Possible project financiers are Chinese and South Korean Banks.
Project challenges	The major project challenge is the timely sourcing of project finances.
Project documentation available	1. Réhabilitation et renforcement du réseau de distribution d'eau potable de Kinshasa REGIDESO/DG. Novembre 2004. *Requête de financement pour le réseau de la ville de Kinshasa*. 2. *Etude ICEA MAZRS*. Juillet 2007. 3. Etude régionale du Plan de Développement du secteur de l'eau potable et de l'assainissement (1991-2010). *Alimentation en eau potable de Kinshasa*. OTUI. Octobre 1991.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$220 million.
Execution period	After project funding is secured in 2012, the project will be undertaken from 2013 to 2020.

Project title	**Lesotho Lowlands Water Supply Scheme – Zone 1 (Project P1-4)**
Project sponsors	The project proponent is the Lesotho Highlands Water Commission.
Participating countries	Lesotho
Objectives	To provide water supply services for Botha-Bothe and adjacent villages in the north of Lesotho.
Project description	The project will supply Botha Bothe and adjacent villages with domestic water. The project is designed in such a way that treated water will be delivered to bulk storage reservoirs from where the settlements will be supplied. The strategic storage will provide reliability during system repairs and power outages. Future expansions are provided for in the design of the project. Where possible, the expansion will be through modular design, e.g. twining storage, modular treatment works and pumping stations. In essence, the facilities can be easily upgraded by adding more components. The existing infrastructure will be integrated, where appropriate or possible, but where the systems are very small or old/unreliable, these will be superseded by the project infrastructure. The infrastructure to be developed will provide water for drinking and sanitation to Botha-Bothe and adjacent villages. This is planned to benefit a total of 127 000 people by 2027. Ensuing from the project will be socio-economic and health benefits to the target population in the area. The project will also ease the water demand pressures from the industrial firms in Botha Bothe, with the additional employment further benefitting the town's population. It is estimated that the total surface water storage to be created for this project will be 100×10^6 m^3. The project is designed around five standardised components: • River intakes to abstract raw water from the Hololo River; • Water treatment plant to convert the raw water into potable water; • Pipeline to transport the potable water to the demand centres; • Pumping station to lift the potable water to the demand centres; and • Bulk reservoir storages at strategic locations.
Expected results	The infrastructure to be developed will provide water for drinking and sanitation to Botha-Bothe and adjacent villages. This is planned to benefit a total of 106 800 people to the year 2020. Ensuing from the project will be socio-economic and health benefits to the target population in the area. The project will also ease the demand pressures from the industrial firms in town, with the employment benefits further ensuing to the town's population.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	The feasibility study and the preliminary designs of the whole Low Lands Water Scheme were completed in September 2004. The institutional and policy framework were completed in February 2007 with finalisation of the Lesotho Water and Sanitation Policy. The legal and regulatory frameworks were finalised in 2008 with the passing of the Lesotho Water Act of 2008, the Lesotho Electricity and Water Authority of 2008, and the Water and Sewerage Authority Vesting Bill of 2008. The relevant government departments have approved detailed design drawings and the tender dossiers of all the eight zones of the Low Lands Bulk Water Supply Project. While Zones 4 and 5 of the Low Lands Water Scheme is under way, the other zones are complete from the proposal view and awaiting funding.
Status	The project can be considered to be in Phase 5 of the ICA Project Development

	Phases.
Next steps	Feasibility studies as well as detailed designs are complete. The next stage is sourcing finances and tendering for construction, which should be completed by 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2017.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	LHWC
Main parties to be procured	Possible project financiers are DBSA and AfDB.
Project challenges	The major project challenge is the timely sourcing of project finances.
Project documentation available	*The Lesotho Lowlands Water Supply Scheme.* http://www.gov.ls/articles/2004/LLW_Supply_Scheme.htm. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$78 million**.**
Execution period	After project funding and tendering is completed in 2013, the project will be undertaken from 2014 to 2017.

Project title	**Mombezi Multi-purpose Dam (Project P1-5)**
Project sponsors	The project proponent is the Ministry of Irrigation and Water Development in Malawi, with the Blantyre Water Board being the project's implementing agent.
Participating countries	Malawi
Objectives	To construct Mombezi Multi-purpose Dam, which is to provide raw water supply for Blantyre and surrounding areas for the purposes of domestic use, industrial use, irrigation and fishing.
Project description	The Blantyre Water Board (BWB) is responsible for the water supply to the city and the surrounding peri-urban areas. Currently Blantyre is experiencing a major water shortage, which will be mitigated by building the Mombezi Multi-purpose Dam in the Shire River Basin. The dam would be able to store 69.5 x 10^6 m^3 of water to supply water for drinking and sanitation purposes, irrigation and for the development of fisheries. The construction of the Mombezi Multi-purpose Dam is the first phase in the development of Blantyre's new Raw Water Supply Scheme. It is estimated that the project will supply 100 000 people with a safe water supply and sanitation service, while also irrigating 500 hectares.
Expected results	• Improved access to safe and clean water by citizens; and • Increased economic benefits to farmers living around the site.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	The project is in line and with guidance from the Water Works Act, 1995, National Water Policy, 2005, and Malawi Growth and Development Strategy (MGDS 2011-16). Detailed designs and ESIA studies are underway and funded by the World Bank to the amount of US$4.35 million. This work is expected to be complete by 2012.
Status	The project can be considered to be in Phase 5 of the ICA Project Development Phases.
Next steps	Sourcing of funds for constructing the dam and associated infrastructure and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2019.
Business model	PPP
Main parties in place	Blantyre Water Board, Ministry of Agriculture, Irrigation and Water Development, city and district councils, Malawi Institution of Engineers and ESCOM
Main parties to be procured	Possible project financier is the World Bank.
Project challenges	The major project challenge is the timely sourcing of project finances for constructing the dam.
Project documentation available	World Bank. 2010. *Feasibility studies and preliminary design for Blantyre's Raw Water Source and other purpose*. Feasibility study report.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$210 million.
Execution period	After project funding and tendering is completed in 2013, the project will be undertaken from 2014 to 2019.

Project title	**Water Supply to 13 Housing Estates in Mauritius (Project P1-6)**
Project sponsors	The project proponent is the Central Water Authority.
Participating countries	Mauritius
Objectives	The project aims at upgrading the potable water supply infrastructure at some 13 housing estates numbering 3 550 housing units.
Project description	In the wake of two severe hurricanes, which hit the island in 1960 and 1975, the Government of Mauritius received grant assistance from the US Aid Agency and the European Development Fund for the construction of 164 housing estates comprising of 75 000 housing units to provide shelter to the cyclone victims. The housing estates were established wherever land was available, regardless of amenities. A roof to the desperate household was what mattered at that moment. To eliminate health standards, stand pipes were gradually provided to each housing estate. Ultimately each housing unit has to be provided with an individual water connection. The resident population of these housing units is estimated at around 15 000 people. The project involves the replacement of 50 km of heavily leaking asbestos cement type pipelines with HDPE/Ductile iron pipelines of sizes varying from 75 mm to 150 mm ND. This will be done in cooperation with the ongoing maintenance of the existing sanitation system installed in the areas where the water supply is being improved. The total storage to be created for this project will be 22.2×10^6 m^3.
Expected results	A reliable water supply and sanitation service for 15 000 people, which would, no doubt, improve their standard of living.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	Co-funding of 20% to be provided by the Central Water Authority. Detailed design to be done and funded by Central Water Authority.
Status	The project can be considered to be in Phase 5 of the ICA Project Development Phases.
Next steps	Detailed designs are being undertaken by the Central Water Authority and will be completed by end of 2012. Sourcing of funds and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2015.
Business model	PPP
Main parties in place	Central Water Authority – Mauritius
Main parties to be procured	Possible project financiers are the European Development Fund and USAID.
Project challenges	The major project challenge is the timely sourcing of project finances for construction.
Project documentation available	http://cwa.gov.mu Central Water Authority, Mauritius
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$11 million.
Execution period	After project funding and tendering is completed in 2013, the project will be undertaken from 2014 to 2015.

Project title	**Movene Dam (Project P1-7)**
Project sponsors	The project proponent is the National Directorate of Water (DNA) and ARA South in Mozambique being the project's implementing agent.
Participating countries	Mozambique
Objectives	To store water for human consumption, irrigation and livestock, contributing to socio-economic development, poverty eradication and food security.
Project description	The dam will be instrumental in poverty eradication, as the water supply from the dam will assist small-holder farmers in Mozambique, as well as provide much needed water for mainly the peri-urban population with poor water supply and sanitation. The dam would supplement the existing Pequenos Limbobos Dam. The selection of a concrete dam is motivated by the occurrence of flash floods in the area, and the dam is proposed to be constructed as an overflow weir without gates. The active storage volume would be about 50 x 10^6 m^3. It is estimated that the project will supply 50 000 people with a safe water supply and sanitation service, irrigate 300 hectares of land and generate about 10 MW of hydropower.
Expected results	This project aims at construction of the Movene Dam, which will have a great impact on the socio-economic development of the surrounding area, namely: • Increase the water availability for human consumption and livestock; • Promote the irrigated agriculture, increasing the agricultural production and productivity, thereby contributing to food security; • Increase in rural household income due to the high crop yields; and • Reduce the vulnerability to droughts in area of the project; contributing to maintenance of ecological flows. The dam will be instrumental in poverty eradication as the water supply from the dam will assist smallholder farmers in Mozambique
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	A priority project for Mozambique requiring external financing.
Status	The project can be considered to be in Phase 1 of the ICA Project Development Phases.
Next steps	Pre-feasibility studies and a comprehensive environmental and social impact assessment need to be completed by 2013. Feasibility studies would follow in 2014. Detailed designs and tendering for construction will be done in 2015. Implementation and construction of the associated project components is expected to start in 2016 and will be completed by 2018.
Business model	Investment project financed as a BOT, Grants or from Loans.
Main parties in place	DNA and ARA Sul
Main parties to be procured	Possible project financiers are USAID and the World Bank.
Project challenges	The major project challenge is the timely sourcing of project finances.

Project documentation available	1. *National Water Resources Development Plan for the Umbeluzi River Basin*. Sweco in association with Consultec/Impacto/BKS Acrees. 2003. 2. Guale. 2000. Potencial da bacia do rio movene para construcao da barragem. Published report referenced in Tembe and Baloi. 2001. *Water access, policies and Irrigation Schemes Management in Mozambique, A case study of the Umbeluzi.* www.usaid.gov/pdf_docs/PDABT396.pdf. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$11 million.
Execution period	After project funding and tendering is completed in 2015, the project will be undertaken from 2016 to 2018.

Project title	**Artificial Recharge of Windhoek Aquifer - Phases 2B and 3 (Project P1-8)**
Project sponsors	The project proponent is the Ministry of Agriculture, Water and Forestry with NamWater being the implementing agency.
Participating countries	Namibia
Objectives	Artificial recharge of the Windhoek Aquifer as the best option for the supply of augmentation to central Namibia.
Project description	The Windhoek Aquifer is an important source of water for Windhoek, especially during periods of drought when the levels of surface dams are very low and when the supply from these sources is reduced. Over a period of 55 years, the regular abstraction of water from the aquifer has resulted in the lowering of the groundwater table by an average of 50 to 60 m. After heavy abstraction during a drought, approximately five years of natural recharge is required before water levels return to pre-drought conditions. Managed aquifer recharge (water banking) would fill up the aquifer, thereby increasing the security of supply using treated surface water, blended with reclaimed water from the reclamation plant, which will not be subjected to evaporation. Evaporation in the central areas of Namibia is approximately 3 400 mm per year compared with Windhoek's average annual rainfall of 366 mm. Managed aquifer recharge will take place when excess water is available from the surface dams and the production wells. The ultimate recharge capacity required will amount to 8.0×10^6 m^3 per year. This is a surface water storage project, used only in cases of water shortages for the benefit of the same population. There will be no increase in the number of persons served, but security of supply will increase.
Expected results	This project will benefit all residents of Windhoek, as it will improve the security of water supply to the city. This, in turn, will ensure that businesses and industries will be less affected by water rationing during periods of drought. The security of supply would attract new investments, which again contributes to poverty eradication and improved livelihoods.
Ongoing related activities in the region	Windhoek carried out a financial analysis as part of the feasibility study. The World Bank also carried out a financial analysis for the project. Both studies showed that the project is financially viable with a financial profitability index of 0.48 at *[8?] % discount rate (2004 prices). The economic profitability index is 1.95.
Description of national plan to the project	Phases 1 and 2A of the project were completed in 2003 and 2011 respectively. The feasibility studies for Phase 2B (EIA, siting, drilling and test pumping of eight deep production boreholes and eight recharge wells) commenced and will be concluded by the end of 2012.
Status	The project can be considered to be in Phase 5 of the ICA Project Development Phases.
Next steps	Sourcing of funds (US$5 million) and tendering for construction for Phase 2B will be done in 2013. Execution of the associated project components is expected to start in 2014 and will be completed by 2015. Final designs, sourcing of funds (US$50 million) and tendering for construction for Phase 3 (construction of pump stations, pump houses, recharge and abstraction installations) will be done in 2014, bearing in mind the results of borehole production tests carried out in Phase 2B. Execution of Phase 3 will commence in 2015 and be concluded by 2020.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	City of Windhoek, MWAF, NamWater
Main parties to be procured	Possible project financiers are the World Bank and AfDB.
Project challenges	The major project challenges are the timely sourcing of project finances and possible pollution of the stored underground water. The pollution risk will need to be addressed as part of the project.

Project documentation available	1. Artificial recharge of the Windhoek aquifer, Namibia: Water quality considerations. *Boletín Geológico y Minero*. 120 (2): 269-278. ISSN: 0366-0176 2. WISA. 2004. *Biennial Conference Proceedings*. ISBN: 1-920-01728-3 3. Gale, I. 2005. *Strategies for MAR in semi-arid areas*. www.unesdoc.unesco.org/images/0014/001438/143819e.pdf. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project. which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$55 million.
Execution period	After project funding and tendering is completed in 2013, the project Phases 2B and 3 will be undertaken from 2014 to 2020.

Project title	**Reducing Non Revenue Water and Increasing Use Efficiency (Project P1-9)**
Project sponsors	The project proponent is the Public Utilities Corporation (PUC).
Participating countries	Seychelles
Objectives	Reduce leakage and increase efficiency in distribution and usage.
Project description	The water supply situation in Seychelles needs rapid improvement. Water shortages occur mainly during annual dry periods. Water restrictions are common on the three main islands of Mahé, Praslin and La Digue. Demand for potable water is continuously rising from population growth, tourism and other commercial developments. The islands' topography precludes sufficient storage capacity at economic costs from the traditional sources of fresh water from streams. It is thus necessary that a project that results in the reduction of water supply leakages and increased efficiency in water distribution and usage is implemented. The project will be undertaken on the three islands in the next five years, related to reducing the amount of NRW and putting effective instrumentation in place. These actions would allow greater efficiency in distribution and increased availability for use, as well as collecting the logical volumetric monitoring data using telemetries to more accurately determine the quantities of water being distributed. Implementing the overall water development projects will have a beneficial impact on the socio-economics of the Seychelles. The additional population to be served from the savings arising from the reduction in non revenue water is 25 000 people.
Expected results	Implementing the overall water development projects will have a beneficial impact on the socio-economics of the Seychelles. The most significant impacts being a safe continuous water supply to satisfy the growing domestic and commercial demand and increased environmental protection in these main areas of the islands.
Ongoing related activities in the region	The plan also noted that the water industry is now very active internationally with private sector participation, and that the PUC can benefit from this by obtaining commercial funds more easily for capital and improvement works, gaining specialist technical and management skills that do not exist within the PUC and achieving improved efficiencies by setting appropriate targets within contracts with private companies.
Description of national plan to the project	The PUC is currently working with EIB and AFD to secure funding for a significant part of the entire integrative project. The PUC plans to carry out detailed design using a mixture of in-house procured consultants (to transfer knowledge and build capacity of PUC) and external consultancy firms for tender preparation, EIA, followed by construction.
Status	The project can be considered to be in Phase 4 of the ICA Project Development Phases.
Next steps	Detailed designs are being undertaken by the Public Utilities Corporation and will be completed by end of 2012. Sourcing of funds and tendering for construction will be done in 2013. Implementation and construction of the associated project components is expected to start in 2014 and will be completed by 2015.
Business model	PPP
Main parties in place	PUC
Main parties to be procured	Possible project financiers are the African Water Facility and USAID.
Project challenges	The major project challenge is the timely sourcing of project finances for construction.

Project documentation available	1. Gibb (Mauritius). 2011. *The Seychelles Water Development Plan 2008-2030, Final Report – Executive Summary*. 87 p. 2. Water Supply and Sewerage. 2011. *Virtual Seychelles*. http://www.virtualseychelles.sc/index.php/business/infrastructure/137-water-supplyand-sewerage. Last accessed August 2011. 3. *Seychelles Water Supply Development Plan*. 2008. http://www.afdb.org/en/projects-and-operations/project-portfolio/project/p-sc-eao-002. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$26 million.
Execution period	After project funding and tendering is completed in 2013, the project will be undertaken from 2014 to 2015.

Project title	**Nondvo Multipurpose Dam (Project P1-11)**
Project sponsors	The project proponent is the Department of Water Affairs, Swaziland.
Participating countries	Swaziland
Objectives	The purpose of the project is to provide potable water to the residents of Mbabane and Manzini in Swaziland.
Project description	The Nondvo Multipurpose Dam, located on the Lusushwana River, has the potential to improve the water resources situation in the two cities, which are both currently operating at full supply capacity. The Nondvo Multipurpose Dam would have a full supply level capacity of 150 x 10^6 m^3. This dam has the potential to generate 50 MW. The water stored in the dam will be able to meet the water supply and sanitation needs of an additional 100 000 people.
Expected results	The Nondvo Dam will improve potable water supply to people residing in Mbabane and Manzini. An increased supply of water to these two cities will improve economic activities within these areas, especially around the Matsapha industrial area, which is the industrial hub of Swaziland currently under serious water stress.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	A priority project for Swaziland requiring external financing.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Feasibility studies will be undertaken in 2013. Detailed designs, sourcing finance and tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2019.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Department of Water Affairs, Swaziland
Main parties to be procured	Possible project financiers are DBSA, World Bank and the AfDB.
Project challenges	The major project challenge is the timely sourcing of project finances.
Project documentation available	1. *Appendix A, Joint Maputo River Basin Water Study – Final Recommendations*. 2009. www.dwaf.gov.za/Docs/Other/IncoMaputo/Synopsis.pdf. Last accessed August 2011. 2. The Nondvo site on the Lusushwana River is the likely site to be investigated, in Ministry hires consultant for Ethemba Dam project. 2009. *The Observer*. http://www.observer.org.sz/index.php?news=6506. Last accessed August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$150 million.
Execution period	After project funding and tendering is completed in 2014, the project will be undertaken from 2015 to 2019.

Project title	**Ruhuhu Valley Irrigation Scheme (Project P1-12)**
Project sponsors	The project proponent is the Ministry of Agriculture, Food Security and Cooperatives in Tanzania.
Participating countries	Tanzania
Objectives	To reduce floods and provide an opportunity for an increased income and improved food security within and outside the project area.
Project description	The proposed irrigation development along the Ruhuhu Valley will provide more secure infrastructure for the production of household food subsistence requirements. The irrigation development will also improve the income of farmers, as they will be able to grow high value crops, and improve the family cash flow. The Ruhuhu Valley project entails the development of 3 100 ha of irrigated land covering the proposed Lituhi and Manda Irrigation Schemes on the left and right banks of the river respectively. Lituhi covers 2 400 ha, while 700 ha is under Manda. The project components are the construction of a dam and road at Kipingu, which will serve both sides of the river. The irrigation scheme will include canals and drains, earthworks, lining of the main canal, service roads and bridges, environmental protection and management, as well as farmers' training. It is estimated that the capacity of the dam will be 25 x 10^6 m^3 and the water stored will also meet the domestic water supply and sanitation needs of 15 000 people.
Expected results	This irrigation project will have qualitative benefits in terms of social goods and services. The outcome of the increased agricultural produce will be to increase food security, alleviate poverty, reduce rural-urban migration and generally improve standard of living of the people in and around the project area. Farm activities in the developed area are also going to attract hired labour, providing employment to a number of the otherwise jobless people.
Ongoing related activities in the region	Similar efforts in other SADC Member States pursuant to meeting the MDG targets on water supply and sanitation services.
Description of national plan to the project	A Task Force involving the Districts of Mbinga and Rudewa (which shares the river as the boarder), and the ministry has been established to oversee the implementation of the project feasibility study in accordance with the Agricultural Sector Development Programme (ASDP). The government is fast-tracking this project, which will also put in place a bridge linking these two districts with high agricultural potential. Status report of what has been done to date is shown in a separate brief.
Status	The project can be considered to be in Phase 3 of the ICA Project Development Phases.
Next steps	Feasibility studies will be undertaken in 2013. Detailed designs, sourcing finance and tendering for construction will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by 2018.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Ministry of Agriculture, Food Security and Cooperatives in Tanzania.
Main parties to be procured	Possible project financiers are DBSA, World Bank and the AfDB.
Project challenges	The major project challenge is the timely sourcing of project finances and project acceptance by stakeholders in the area.
Project documentation available	1. World Bank. 2008.Zambezi River Basin. *Sustainable Agriculture Water Development*. http://bscwapp1.et.ethz.ch/pub/bscw.cgi/d11577706/Zambezi%20Irrigation%20Study.pdf. Last accessed 5 September 2011. 2. World Bank. *Tanzania Agricultural Sector Development Support Programme, undated*.

	http://www.worldbank.org/afr/padi/TZ_ASDP_PCN%20.pdf. Last accessed August 2011. 3. MCC. *Summary of all projects submitted for MCC consideration*. Undated. www.mcat.gov.tz/documents/doc_download/22-summary-of-allprojects.html. Last accessed August 2011.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated total project costs are US$13 million.
Execution period	After project funding and tendering is completed in 2014, the project will be undertaken from 2015 to 2018.

Project title	**Climate Change Adaptation to drought – Agro-ecological Region I (Project P1-13)**
Project sponsors	The project proponent is the Ministry of Agriculture and Cooperatives in Zambia.
Participating countries	Zambia
Objectives	The overall objective of the project is to reduce the vulnerability of those depending on rain-fed agricultural practices to anticipate rainfall shortages in the face of climate change including variability.
Project description	Agro-ecological Region (AER) I covers the western and southern parts of Zambia and receives less than 800 mm of rain annually. AER I was once considered the breadbasket of Zambia, but it has since experienced low, unpredictable and poorly distributed rainfall over the last 20 years. The observed meteorological data indicates that it is currently the driest region in Zambia. In addition, the region is particularly drought-prone and has limited potential for crop production. The project will adopt a two pronged approach: mainstreaming adaptation into agricultural planning at national, district and community levels to make the case for increased investment in adaptation in the agricultural sector; and test and evaluate the adaptation value of interventions that protect and improve agricultural incomes from the effects of climate change. Capacities and systems to anticipate, assess and prepare for climate change risks will be developed at community, regional and national levels. Adaptation of learning generated from the pilot projects will be used to guide the mainstreaming of adaptation in national fiscal, regulatory and development policies to support adaptive practices on a wider scale. The project will focus on the introduction of irrigation and water management systems, training, capacity building of farmers on water management practices, support to marketing and provision of finance credit facilities. It will also support the introduction of drought resistant crops such as cassava, beans, sorghum, millet, potatoes, vegetables and fruit trees. An estimated total number of 7 629 families covering all categories of farmers and the community within AER I will benefit from these investments. The project also entails the construction of five dams at five selected areas in AER I, eight fish ponds per site and irrigation schemes at these locations. It is estimated that the total capacity of the five dams will be 250 x 10^6 $m^{3,}$ which will irrigated a total area of 3 000 hectares and supply an estimated population of 45 000 people with a safe domestic water supply and sanitation service.
Expected results	The project's expected outcomes, as outlined by GRZ and UNDP (2010:24), are: • Climate change risks will be integrated into critical decision-making processes for agricultural management at the local, sub-national and national levels; • Agricultural productivity in the pilot sites made resilient to the anticipated impacts of climate change; • National fiscal, regulatory and development policy will be revised to promote adaptation responses in the agricultural sector; and • Lessons learned and knowledge management component established.
Ongoing related activities in the region	The proposed Project GP-6 would monitor this project.
Description of national plan to the project	To complement funding of project activities in year 2012, the Government of the Republic of Zambia is expected to provide US$255 000 for the Irrigation Development Support Programme as technical support to construction of dams.
Status	The project can be considered to be in Phase3 of the ICA Project Development Phases.
Next steps	As there is no available documentation, feasibility studies should be carried out and be completed in 2013. Detailed designs, sourcing of funds and tendering for project implementation will be done in 2014. Implementation and construction of the associated project components is expected to start in 2015 and will be completed by

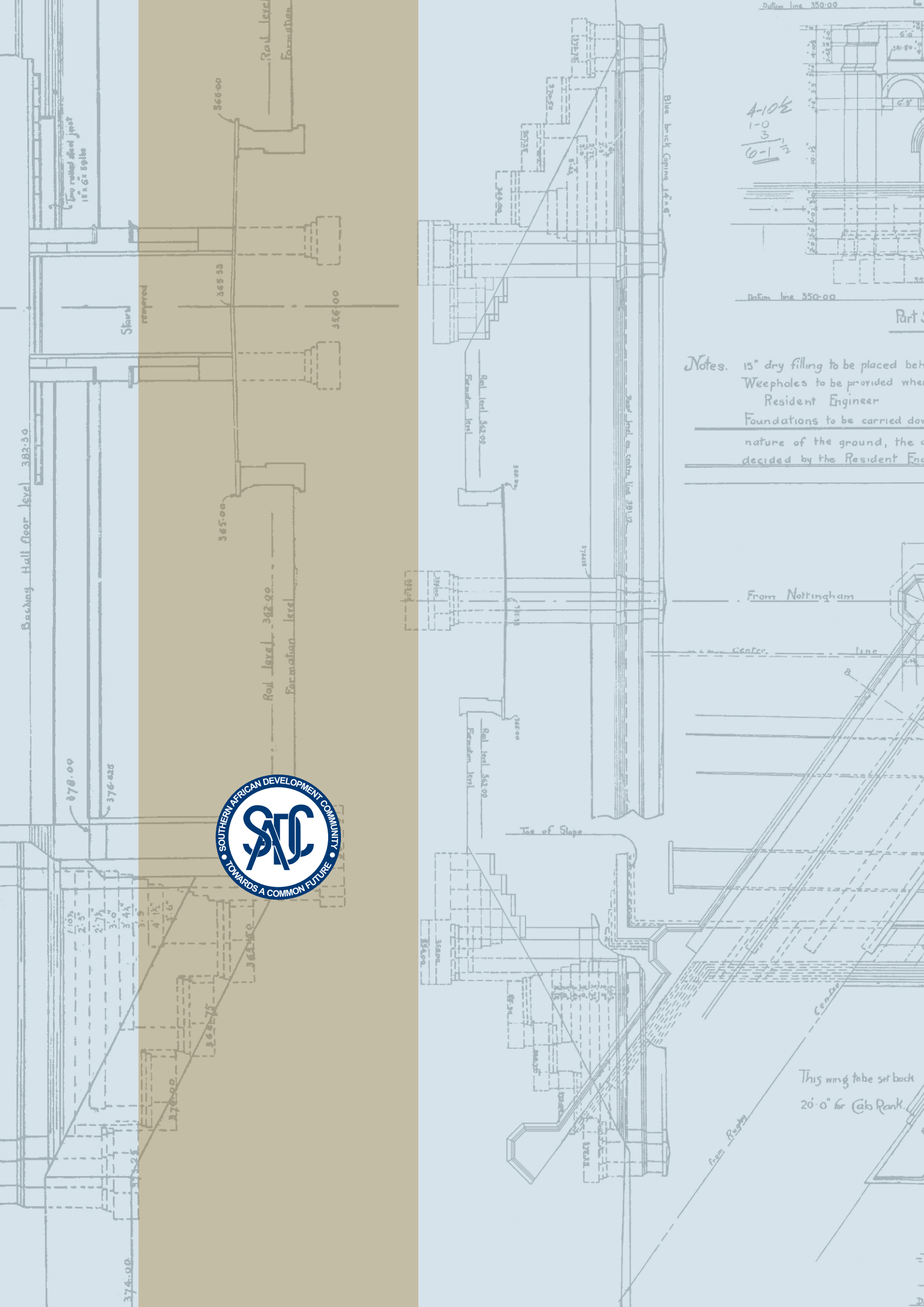
	2016.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	Ministry of Agriculture and Cooperatives in Zambia.
Main parties to be procured	Possible project financiers are UNDP and the FAO.
Project challenges	The major project challenges are the timely sourcing of project finances, limited capacity within the Ministry of Agriculture and Cooperatives to implement strategies of the National Irrigation Plan in Agro-Ecological Region I, lack of political will and financial resources to invest in the identified areas.
Project documentation available	1. GRZ/UNDP. 2009. *Adaptation to the effects of drought and climate change in Agro-ecological Regions I and II*. (Project IDS: 0085205/00072197 (ZMB10)) / Zambia_11-9 09_Adaptation_Effects_Drought_CC_Zone1-2.pdf (with GEF assessment of protect potential and technical merit for support, p.1-31). 2. GRZ/MTENR. 2010. National Climate Change Response Strategy (NCCRS). *NCCRS First Draft 15th September 2010.* Ministry of Tourism, Environment and Natural Resources (MTENR), Lusaka. p.20-21. 3. GRZ/MACO. 2010. *Water for Agriculture and Energy: National Investment Profile of Zambia*. Ministry of Agriculture, Lusaka. p.50. /ZWP_Consolidated_Report_August_2010_ver_5[2].doc 4. GRZ/UNDP. 2009. Adaptation to the effects of drought and climate change in Agro-ecological regions I and II. *National Investment Brief – Zambia 2008*. Signature page. 5. www.sirtewaterandenergy.org/docs/reports/**Zambia**-Draft2.pdf. Last accessed August 2011. 6. *The economic impacts of climate change on agriculture in Zambia*. 2006. http://www.ceepa.co.za/docs/POLICY%20NOTE%2027.pdf. Last accessed August 2011.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated total project costs are US$80 million.
Execution period	After project funding, further studies and tendering is completed in 2014, the project will be undertaken from 2015 to 2016.

Project title	**Bulawayo-Zambezi Water Supply Scheme (Project P1-14)**
Project sponsors	The project proponent is the Ministry of Water Resources Development and Management.
Participating countries	Zimbabwe
Objectives	To augment drinking water supply to Bulawayo, Zimbabwe.
Project description	Bulawayo is the second largest city in Zimbabwe and has a population estimated at 1 million people (2006). It is regarded as Zimbabwe's industrial hub and is strategically located in a position with easy access to Botswana through the Plumtree Border Post, to Zambia through Victoria Falls Border Post and to South Africa through the Beitbridge Border Post. Bulawayo is located in a semi-arid region, which is prone to droughts and, as such, water resources are limited. The city has been facing serious water shortages for a long period. Many initiatives have been undertaken, including a water conservation study and strategy carried out and developed sometime in the mid-1990s. Water rationing is a common measure applied frequently by the City of Bulawayo to minimise the effects of the limited water supply. As a long-term strategy to solve the water supply problems of Bulawayo and the Matabeleland north region, the Bulawayo-Zambezi Project was proposed, of which initial works were carried out in the mid-1990s. This project aims to augment the water supply of Bulawayo in two approaches. This involves the construction of the Gwayi-Shangani Dam with a full supply level capacity of 634 x 10^6 m^3 and a pipeline from the dam to Cowdray Park in Bulawayo where a water treatment plant and a reclamation plant will be constructed. The other component involves the construction of a pipeline from the Zambezi River at Deka to Bulawayo by linking this line to the one from Gwayi-Shangani Dam at Kennedy Railway Siding.
Expected results	An additional 1 000 000 people will benefit from improved water supply and sanitation services, while 6 500 ha will be put under irrigation from water from this project. It is also expected that the Gwayi-Shangani Dam will be equipped to generate 20 MW.
Ongoing related activities in the region	A feasibility study was initiated and completed in 1996 by SWECO of Sweden in association with Hydro-utilities of Zimbabwe. The Zimbabwean Government and the Swedish Government funded this. An environmental impact assessment was carried out with the feasibility study by the same consulting engineering firms. The design of the Gwayi-Shangani Dam has since been completed, and was carried out by the Department of Water Development of the Government of Zimbabwe.
Description of national plan to the project	Several attempts have been made through a BOOT arrangement. The Government of Zimbabwe funded the construction of the Gwayi-Shangani Dam, which started in 2003 and was stopped in 2007 due to funding problems. As such, no substantial progress was made owing to funding problems and progress currently stands at 5%.
Status	The project can be considered to be in Phase 5 of the ICA Project Development Phases.
Next steps	All feasibility studies, EIAs and detailed designs were completed, and construction of the dam started in 2003. However, due to lack of financial resources, work was suspended in 2007 when only 5% of the dam construction works had been undertaken. There is therefore need to undertake an appraisal of the current status and update costs and re-tender or resume construction works once sufficient funds have been secured to complete all works. US$2 million is required to carry out the appraisal, source financing and resume work. This should commence in 2012 and be concluded in 2013. Implementation and construction of the associated project components would start in 2014 and will be completed by 2020.
Business model	Investment project financed as a BOT, grants or from loans.
Main parties in place	ZINWA
Main parties to be procured	Possible project financiers are the World Bank, DBSA, Chinese Banks and the AfDB.
Project challenges	The major project challenges are the conclusion of cost reflective water tariffs for both domestic and irrigation water from the scheme, the high energy costs related to

	the pumping requirements of the scheme and the current power shortages with the associated load shedding being experienced in Zimbabwe and the SADC region in general.
Project documentation available	1. Bulawayo-Matabeleland-Zambezi: Water supply feasibility study: Phase 2. *Feasibility Report – Main Report*. 1996. 2. Wikipedia. Last updated January 2011. http://en.wikipedia.org/wiki/Matabeleland_Zambezi_Water_Project. Last accessed 18 August 2011.
Intervention requiring financing	Project to be presented for financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which will raise sufficient revenue to repay any loans procured for implementing the project.
Estimated total cost	The estimated total project costs are US$600 million.
Execution period	After project funding is secured by in 2013, the project will be undertaken from 2014 to 2020.

Project title	**Improved Agricultural Water Application Efficiencies for Small-scale Farmers (Project GP-7)**
Project sponsors	SADC Water Division with the Ministries of Agriculture of the SADC Member States.
Participating countries	All SADC Member States
Objectives	The overall objective of the project is to enhance the productivity of crops, reduce water losses and increase the efficiency and productivity of existing small-scale irrigation and rain-fed systems.
Project description	This can be achieved through the introduction of improved and more efficient irrigation systems, such as gravity-fed drip irrigation and fertigation technologies. Food crop production in the SADC region is dominated by small-scale farming. With the projected reduced rainfall over the SADC region due to global warming, the introduction of improved and more efficient irrigation systems for small-scale and rural communities is of paramount importance. One of the main constraints for increasing food crop production is the availability of irrigation facilities at all farming scales. It is important that there is a significant increase in food and agricultural production in a competitive and sustainable manner, in order to eradicate poverty and improve the livelihoods of the majority of the SADC citizens. This can be achieved through innovative production methods and novel products development, while opening access to new markets. The project should emphasise the production of high value crops, along with the development of new large- and small-scale irrigation facilities, improving the efficient utilisation of water resources through sensitisation of irrigation developers and planters on efficient irrigation techniques and strengthening the institutional set-up to oversee and promote efficient irrigation development. Various types of irrigation systems are presently being used in the SADC region. The most common ones used for the irrigation of vegetables, fruit and flower crops are flood irrigation, drag-line irrigation, mini-/micro-sprinkler irrigation and portable/semi-portable sprinkler irrigation systems. Due to the imminent scarcity of water resources, there is a need to shift towards the drip irrigation system. Apart from increasing water use efficiency, drip irrigation enables fertigation, which contributes towards a higher crop yield of around 40-50 %, compared to crops that are not fertigated. The gravity-fed drip irrigation system is also gaining popularity among farmers due to its simplicity and low cost where no pumping is required while enabling fertigation. Drip irrigation, coupled with fertigation, favours the intensive cultivation of vegetable, fruit and flower crops, both in the open field and in greenhouses. This technology enhances agricultural production in terms of quantity and quality, and contributes to the sustainable production of crops. With global warming leading to the erratic green and blue water supply, farmers will have no means but to optimise irrigation water and fertiliser use through drip fertigation, while improving food and flower crop production. The project will involve the supply and implementation of gravity-fed drip kits that can irrigate small plots of up to 4 000 m^2. The project components will include the introduction of gravity-fed drip irrigation in localities where pressurised irrigation systems cannot be implemented due to the absence of irrigation supply networks and electricity. Coupled with the drip irrigation system, fertigation technology will be introduced whereby soluble fertilisers will be mixed with irrigation water for the fertigation of vegetable, fruit and flower crops. There will be one pilot project in each of the SADC Member States.
Expected results	This will result in improved income generation in small-scale farming enterprises and mitigate poverty.
Ongoing related activities in the region	Similar projects are being proposed in individual SADC Member States.
Description of national plan to the project	SADC Member States will identify pilot areas for the implementation of the project in their country. After completion, it is hoped that SADC Member States will replicate the

	project using their own resources.
Status	The project can be considered to be in Phase 2 of the ICA Project Development Phases.
Next steps	This includes designs, the water supply, irrigation system components, fertilisers and capacity building for each pilot project. The ToR and project specifications can be done in 2013, with implementation commencing in 2014. Thereafter, the project can be replicated in the SADC Member States.
Business model	Social project funded through grant finances.
Main parties in place	Ministries of Agriculture of the SADC Member States.
Main parties to be procured	Possible project financiers are UNDP and the FAO.
Project challenges	Project challenges are the timely sourcing of finances and future funds for project replication.
Project documentation available	To be identified/developed.
Intervention requiring financing	Project to be presented for grant financing during the planned 1st SADC Infrastructure Investment Summit and Conference to be held in the last quarter of 2012.
Revenues for financing repayment	This is an infrastructure investment project, which may not raise sufficient revenue to repay any loans procured for implementing the project as the project can be considered as a social project.
Estimated total cost	The estimated cost of the project amounts to US$11.5 million for all the pilot projects in all the SADC Member States.
Execution period	After project funding is secured by in 2012, the project will be undertaken from 2013 to 2014. Thereafter, SADC Member States can replicate the project in their own countries using their own resources.


Datum line 350·00
Blue brick coping 14"x 9"
Rail level 362·00
Formation level
Rail level on centre line 381·12
Notes. 15" dry filling to be placed
Weepholes to be provided
Resident Engineer
Foundations to be carried
nature of the ground, the
decided by the Resident
From Nottingham
Centre line
Toe of Slope
This wing to be set back
20·0" for Cab Rank.
Backing Hall floor level 382·30
Rail level 362·00
Formation level
Skirt removed
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