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The World Bank

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Report No: PAD685

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT FROM THE GLOBAL ENVIRONMENT FACILITY (GEF)

IN THE AMOUNT OF US$8.20 MILLION

AND A

PROPOSED GRANT FROM THE

COOPERATION ON INTERNATIONAL WATERS IN AFRICA TRUSTFUND (CIWA)

IN THE AMOUNT OF US$2.00 MILLION

TO THE

SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC)

FOR A

SUSTAINABLE GROUNDWATER MANAGEMENT IN SADC MEMBER STATES PROJECT

April 04, 2014

AFTN1/2/3
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 14, 2014)

Currency Unit = US$

FISCAL YEAR

April 01 – March 31

ABBREVIATIONS AND ACRONYMS

AGW-Net	Africa Groundwater Network
AMCOW	African Ministerial Conference on Water
AusAid	Australian Government Overseas Aid Programme
BGR	Bundesanstalt für Geowissenschaften und Rohstoffe (Federal Institute for Geoscience and Natural Resources)
BGS	British Geological Survey
CAP-Net	Capacity Building for Integrated Water Resource Management
CGIS	Global Groundwater Information Systems
CICOS	Commission Internationale du Bassin Congo-Oubangui-Sangha (International Commission for the Congo-Oubangui-Sangha River basin)
CIWA	Cooperation on International Waters in Africa, Multidonor Trustfund
CPS	Country Partnership Strategy
CWRAS	Country Water Resources Assistance Strategy
DSG	Decision Support Guidelines
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EU	European Union
GDE	Groundwater Dependent Ecosystems
GDMP	Groundwater and Drought Management Project, SADC
GEF	Global Environment Facility
GEF-IW	Global Environment Facility International Waters window
GIS	Geographic Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)
GMI	Groundwater Management Institute, SADC
GMP	Groundwater Management Programme
GWP	Global Water Partnership
IAEA	International Atomic Energy Agency
IAH	International Association of Hydrologist
IDA	International Development Association
IGRAC	International Groundwater Resources Assessment Center
IGS	Institute for Groundwater Studies, UFS
ISARM	Internationally Shared Aquifer Resources Management
IWMI	International Water Management Institute
LIMCOM	Limpopo Watercourse Commission
LTA	Lake Tanganyika Authority
M&E	Monitoring and Evaluation
MAR	Managed Aquifer Recharge

NAPA	National Adaptation Programme for Action
NOAA	National Oceanic and Atmospheric Administration
OKACOM	Okavango River Basin Commission
ORAF	Operational Risk Assessment Framework
ORASECOM	Orange-Senqu River Commission
PAD	Project Appraisal Document
PDO	Project Development Objective
PJTC Kunene	Permanent Joint Technical Committee for the Kunene River
PRIMA	Progressive Realisation of the Incomati-Maputo Agreeement
PSC	Project Steering Committee
RBO	River Basin Organisation
RFP	Resettlement Policy Framework
RSAP IWRM	Regional Strategic Action Plan for Integrated Water Resource Management and Development, SADC
RWP	Regional Water Policy, SADC
SADC	Southern African Development Community
SADC-WD	SADC Water Division, Directorate of Infrastructure and Services
SAP	Strategic Action Plan
TBA	Transboundary Aquifer
TDA	Transboundary Diagnostic Analysis
TPTC-IIAM	Tripartide Permanent Technical Committee for the Interim Incomati and Maputo River Agreement
TWAP	Transboundary Waters Assessment Programme
UFS	University of the Free State
UNESCO-IHP	UNESCO International Hydrological Programmes
WHYMAP	Worldwide Hydrogeological Mapping and Assessment Programme
WMO	World Meteorological Organisation
WRTC	Water Resources Technical Committee, SADC
ZAMCOM	Zambezi Watercourse Commission
ZRA	Zambezi River Authority

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SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC)

Sustainable Groundwater Management in SADC Member States Project (P127086)

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Africa

Sustainable Groundwater Management in SADC Member States Project (P127086)

PROJECT APPRAISAL DOCUMENT

AFRICA

AFTN1/2/3

Report No.: PAD685

Basic Information			
Project ID	Lending Instrument	EA Category	Team Leader
P127086	Investment Project Financing	B - Partial Assessment	Louise E.M. Croneborg
Project Implementation Start Date		Project Implementation End Date	
24-April-2014		30-June-2019	
Expected Effectiveness Date		Expected Closing Date	
15-May-2014		30-October-2019	
Joint IFC		GEF Focal Area	
No		International waters	
Sector Manager	Sector Director	Country Director	Regional Vice President
Jonathan S. Kamkwalala	Jamal Saghir	Colin Bruce	Makhtar Diop

Recipient: The Secretariat of the Southern African Development Community (SADC)			
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Tel. No.:	+27 51 401 9111	Email:	vermeulend@ufs.ac.za

Project Financing Data(in USD Million)			
[ ] Loan [X] Grant [ ] Other [ ] Credit [ ] Guarantee			
Total Project Cost:	10.20	Total Bank Financing:	10.20
Total Cofinancing:	0.00	Financing Gap:	0.00

Financing Source	Amount (US$ Million)
BORROWER/RECIPIENT	0.00
Global Environment Facility (GEF)	8.20
Cooperation on International Waters in Africa (CIWA)	2.00
Total	10.20

Expected Disbursements (US$ Million)

Fiscal Year	FY14	FY15	FY16	FY17	FY18	FY19
Annual	0.50	1.40	1.60	2.50	2.20	2.00
Cumulative	0.50	1.60	3.40	6.00	8.20	10.20

Project Development Objective (PDO)

To support sustainable management of groundwater at national and transboundary levels across SADC Member States.

Components

Component Name	Cost (US$m)
A: Operationalising the SADC Groundwater Management Institute	2.80
B: Strengthening institutional frameworks for sustainable groundwater management	1.50
C: Advancing knowledge & information-sharing on transboundary and national groundwater	3.00
D: Promoting groundwater infrastructure development	2.90

Institutional Data

Sector Board

Water

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Water supply	45		
Public Administration, Law and Justice	Public administration- Water, sanitation and flood protection	35		
Public Administration, Law and Justice	Public administration- Information and communications	20		
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes		
Theme (Maximum 5 and total % must equal 100)		
Major theme	Theme	%
Environment and natural resources management	Water Resource Management	45
Environment and natural resources management	Other environment and natural resources management	20
Environment and natural resources management	Climate change	20
Trade and integration	Regional integration	15
Total		100

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [x]
Does the project require any waivers of Bank policies?	Yes [ ] No [x]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [x]
Does the project meet the Regional criteria for readiness for implementation?	Yes [x] No [ ]

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	x	
Natural Habitats OP/BP 4.04		x
Forests OP/BP 4.36		x
Pest Management OP 4.09		x
Physical Cultural Resources OP/BP 4.11	x	
Indigenous Peoples OP/BP 4.10		x
Involuntary Resettlement OP/BP 4.12	x	
Safety of Dams OP/BP 4.37		x
Projects on International Waterways OP/BP 7.50	x	
Projects in Disputed Areas OP/BP 7.60		x

Legal Covenants

Name	Recurrent	Due Date	Frequency
n/a			
Description of Covenant			
Conditions			

Name	Type

Subsidiary Agreement: between SADC Secretariat & University of the Free State	Effectiveness

Team Composition

Bank Staff

Name	Title	Specialisation	Unit
Anna-Mary Esterhuizen	Team Assistant	Administration	AFMBW
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Name	Title	Office Phone	City
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Ron N. Hoffer	Sr. Advisor Water Policy/Env	-	Washington
Gerard Verhoef	Sr. Governance Specialist	-	Cape Town

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Botswana	-	Gaborone	-	-	SADC HQ
South Africa	-	Bloemfontein	-	-	UFS/ GMI
SADC Member States	Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.				

I. STRATEGIC CONTEXT

A. Regional Context

1. **Sustained and inclusive economic growth in the Southern African Development Community (SADC)[1] can accelerate job creation, poverty reduction and access to basic services.** Average GPD growth for sub-Saharan Africa is expected to continue rising in the near future. In 2013, the average regional rate of economic growth rose to 4.9%. By 2015 the rate is expected to reach 5.2%[2]. Key economic drivers include export-oriented extractive industries, strengthened domestic macroeconomic policies, and investment into skills and health. With further integration of SADC Member States into the global economy comes access to more diversified capital, but also exposure to global volatilities, such as the slowdown of government efforts to stimulate economic growth after the global recession[3]. Translating the positive economic outlook into development outcomes require measures to create jobs and investment in human wellbeing. In several SADC Member States, such measures have resulted in progress toward the Millennium Development Goals over the past decades. Sub-Saharan Africa, as a region, lags behind other countries in the speed of reducing poverty however. Since 1990, extreme poverty rates in East Asia fell by 44 percentage points whereas in sub-Saharan Africa, the rate fell by eight points[4]. Regional averages hide varying degrees of development within SADC. According to the UNDP human development index, average life expectancy in Lesotho, the Democratic Republic of Congo and Swaziland is less than 48 years. On the other hand, in countries such as Namibia, the Seychelles and Mauritius, it is over 65 years. Similarly, access to basic services such as improved water sources (MDG7b) varies between Member States, from 47% in Mozambique to 64% in Zambia to 97% in Botswana.

2. **Among different sources of water, groundwater is especially important for alleviating poverty through improving human wellbeing, livelihoods, food production, ecosystems, industries and growing cities in SADC.** It is estimated that over 70% of the 250 million people living in the SADC region rely on groundwater as their primary source of water. Forty percent of the region's population use informal or unimproved sources of water, which are often unsafe and prone to the effects of drought. Despite varying dependency on groundwater across SADC Member States, groundwater usually provides a critical buffer between dry and rainy seasons. The role of groundwater as key to economic growth is further exacerbated with the expansion of commercial farming and industries. The agricultural sector is the largest consumer of water using 83% of abstracted water. Twelve percent of this water is abstracted from groundwater. In emergent capital cities, such as Lusaka, Gaborone and Dar es Salaam, groundwater is the dominant source of water to meet the demand from expanding factories and growing urban populations. In response to such dependency, some SADC Member States are actively integrating groundwater into their water resource management policies and laws (e.g., Botswana and South Africa). On the whole, however, institutional frameworks to manage water at both national and transboundary levels do not feature groundwater prominently. In spite of unequal attention between surface water and groundwater, the economic role of the latter is significant.

[1] The SADC Member States are: Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Madagascar, Mauritius, Mozambique, Namibia, the Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.
[2] Without South Africa, the average growth rate in sub-Saharan Africa is 6.2% (World Bank, June 2013).
[3] IMF Economic Outlook (October, 2013).
[4] http://www.un.org/millenniumgoals/pdf/report-2013/mdg-report-2013-english.pdf

Economic valuation studies of groundwater undertaken by the SADC Secretariat have illustrated that the Kuseb, Swakop and Omaruru aquifers in Namibia, for example, have an estimated 25 year NPV valued at over US$1.3 billion (SADC, 2011).

B. Sectoral and Institutional Context

3. There are, by and large, five types of groundwater provinces in the SADC region. These are: basement provinces, sedimentary basin provinces, volcanic provinces, high-relief folded mountain provinces, and local alluvial aquifers along rivers and coastlines[5]. Groundwater occurrence and resource potential in the basement crystalline, sedimentary basin and alluvial aquifer systems are better understood than in the volcanic and high relief mountain aquifers; reflecting both the relative accessibility of the available groundwater and the level of dependency of communities on that groundwater. Of the many groundwater systems in Africa, approximately 37 have been identified as transboundary. More than 20 of these are located in the SADC, a region that also holds 14 internationally shared river basins. Despite the challenges in data, southern Africa is estimated to have 2,491m^3/capita/year in renewable groundwater resources (total of 647km^3 in annual average) - higher than either Europe or Asia[6].

4. **Many future water-challenges facing SADC Member States have no administrative boundaries and cannot be fully resolved through sovereign action.** In the next 25 years, the population of southern Africa is expected to double. In the medium-term, rapid economic growth is also expected to continue. With such developments comes rising demand for water and greater pressures and reliance on groundwater. Pollution of aquifers is a growing concern where fertiliser-derived nutrients from expanding commercial agricultural activities have caused the contamination of localised aquifers. It is also a concern where mining and factories degrade groundwater systems with the release of heavy metals and sulphates, while the widespread use of on-site sanitation in rural and urban areas contaminates shallow aquifers in fractured or karst bedrock with pathogens and nitrates. Recurring droughts of shallow groundwater cause social upheaval and lead to distressed ecosystems (over a third of SADC's population lives in drought prone areas). In the driest areas, across south-western Africa, groundwater is often the only source of water bridging dry and rainy seasons. Groundwater is also essential for wildlife and other biota, often in regions that attract tourism such as the Okavango River Delta. The region is known for climatic variability that translates into recurring drought and flood conditions with varying frequency and magnitude - from the deserts of Namibia to the floodplains of Mozambique. The impact of climate change will further pose substantial challenges to water resource management. By 2050, temperatures are expected to rise by an average of 1.5-2.0°C in the north of the SADC region, and by 2.5-3.0°C in the south (compared to 1961-1990 average). Research indicates dramatic warming of the Indian Ocean, making monsoons 10-20% drier and droughts prolonged and more severe.

5. **The inter-governmental organisation of the SADC has the goal of fostering cooperation and mutual benefit from shared waters among its 15 Member States.** Recognising the important role of water in fostering economic growth, the SADC Member States signed the

[5] International Groundwater Resources Assessment Center, IGRAC (2012).
[6] Regional Groundwater Valuation Study, SADC (2011). There is overall substantial scientific groundwater data and knowledge in SADC. However, quantitative information on the characteristics of aquifers (recharge, flow regimes, quality etc.) is still minimal and available information is not easily accessible.

"Protocol on Shared Watercourse Systems in the SADC Region" in 1995. The Protocol was later replaced by the legally binding "Revised Protocol on Shared Watercourses" in 2000[7] with the objective "to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourses". In 2005, the SADC Regional Water Policy (RWP) was developed to provide strategic guidance and to incorporate principles of Integrated Water Resource Management (IWRM)[8]. The RWP lent particular emphasis to regional integration and cooperation between Member States and between water-related sectors[9]. The operationalisation of the Revised Protocol and the RWP was agreed upon in the SADC Regional Strategic Action Plan for IWM (RSAP). The current SADC RSAP III (2011–2015) acknowledges the importance of groundwater to the region with a dedicated Groundwater Management Programme of Action (GMP, Programme No. 11). The GMP has four project interventions: policy and institutional frameworks; transboundary aquifer management; awareness raising; and regional cooperation and groundwater management[10]. As a region, southern Africa has a comparatively advanced agenda for strengthening groundwater management, supported by quantitative data and information[11] and backed by ratified legal instruments.

6. At the river basin level, groundwater is considered part of 'watercourses' as is stated, for example, in the 2000 Revised SADC Protocol and mirrored in river basin agreements. River basin agreements also emphasise management issues such as control of abstraction, pollution control, protection of recharge area and shared management. The operationalisation of commitments to groundwater, however, is often superseded by surface water priorities. At the level of SADC Member States, groundwater generally does not feature prominently in national water laws, policies and strategies. A number of the SADC Member States have developed and endorsed National Adaptation Programmes for Action (NAPAs) where improvements to water resource management is broadly prioritised.

C. Higher Level Objectives to which the Project Contributes

7. **The World Bank has had a long-standing commitment to global priorities and region-wide programs.** The 2008 World Bank Regional Integration Strategy for Africa provides a coherent and strategically focused framework to guide the World Bank Group's (WBG) assistance in support of regional integration and programs. The strategy acknowledges that regional approaches to the management of shared waters can provide improved water security and more sustainable management. The Bank's 2010 Strategy for Africa also recognises that many challenges, such as climate change and water resource management, are best addressed through cooperation and integration at the regional level. The World Bank Group Strategy of October 2013 lends further emphasis to the strengthening of regional initiatives and institutions

[7] The revision of the Protocol was to align with the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997). The Convention is the first international law that is applicable to groundwater. The Revised Protocol was ratified and came into force in 2003.
[8] IWRM reflects the process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital eco-systems, Global Water Partnership (2005).
[9] Policy statements 3.2.1-3.3.1 (SADC Regional Water Policy, 2005).
[10] See Annex 6.
[11] See Annex 6.

as a way to improve on development impact and fostering collective action and delivering the two WBG goals of ending extreme poverty and promoting shared prosperity.

8. **The World Bank Country Partnership Strategies for several SADC Member States include focus on water as key to economic growth, social development and environmental sustainability.** The World Bank supports several SADC Member States at the national level in their pursuit to achieve development objectives in water resource management as a means to support economic growth and poverty alleviation. The Bank's financial and technical support for water resources is aligned to country water-sector development strategies and the support of other international cooperating partners. In countries such as Mozambique, Zambia and Tanzania, the Bank developed Country Water Resources Assistance Strategies (CWRAS) together with counterparts at the national level and in government[12]. Groundwater and transboundary cooperation on shared watercourses feature as priorities in the CWRAS.

9. **The Project will support the higher level objectives of both the Global Environment Fund (GEF) focal area for International Waters, and the multidonor trustfund Cooperation on International Waters in Africa (CIWA).** Two objectives of the GEF-5 focal area for International Waters will be supported by the Project. They are: to catalyse multi-state cooperation in balancing conflicting water uses in transboundary surface and groundwater basins while considering climatic variability and change; and support foundational capacity building, portfolio learning, and targeted research needs for joint, ecosystem-based management of transboundary water systems. The Project will also support the objective of CIWA, which is to strengthen cooperative management and the development of international water resources.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

10. The Project Development Objective (PDO) is to support sustainable management of groundwater at national and transboundary levels across SADC Member States.

11. The PDO will be achieved by investments in four focus areas: the operationalisation of the SADC Groundwater Management Institute (SADC GMI) as a regional center of excellence for the region; strengthening national and transboundary institutional management of groundwater; advancing scientific research on groundwater challenges; and promoting infrastructure solutions for the development of groundwater resources. To achieve and sustain the PDO, the Project includes resources for technical capacity-building within and for Member States, mobilisation of long-term finances for GMI, and building ownership and engagement at national level through focal groups, networks, internships and pilot-grants.

B. Project Beneficiaries

12. The direct project beneficiaries includes the SADC Secretariat in Gaborone, policy and technical representatives from the 15 SADC Member States (in particular, the members of the SADC Subcommittee on Hydrogeology), and the University of the Free State in South Africa selected to host the SADC GMI and implement the Project in 2011. The Project will build a

[12] The purpose of the World Bank CWRAS is to define major water-challenges and provide solutions that the Bank can support.

platform and network of cooperation and knowledge-sharing, connecting stakeholders such as experts, decision-makers, and representatives from groundwater-dependent sectors as well as international groundwater agencies.

13. The Project investments can also reach indirect beneficiaries who will benefit from more sustainable groundwater management through the key stakeholders listed above and through the SADC GMI's outreach and collaborations. These stakeholders range from River Basin Organisations to groundwater dependent sectors at the national level (e.g., agriculture, mining, water supply etc.); from rural communities benefiting from improved infrastructure solutions promoted by the Project at the local level and through small pilots (i.e., beneficiaries of the output from sub-grant projects), to technical experts who are engaged in the proposed secondment and internship programmes of the SADC GMI.

14. Across the project activities, due attention to community involvement and gender will be mainstreamed into the project to improve development results and sustainability. For example, activities such as strengthening groundwater policy and capacity building will include gender dimensions as a cross-cutting measure to improve results. Efforts to strengthen the consideration of gender in groundwater management (including at community levels) could be pursued through involving networks and NGOs in the region[13]. Furthermore, the Project's simplified Environmental Management Framework and Resettlement Policy Framework include monitoring and mitigation plans of potential adverse social or gendered impact.

C. PDO Level Results Indicators

15. The results indicators at the PDO-level are:

- Development of the SADC Groundwater Management Institute into a regionally recognised center of excellence;
- Transboundary and national institutions strengthened to improve regional cooperation; and
- Enhanced capacity for sustainable transboundary and national groundwater management in the Ministries and departments responsible for groundwater in SADC Member States.

III. PROJECT DESCRIPTION

A. Project Components

16. The Project components and activities build on the achievements of the SADC Groundwater and Drought Management Project (GDMP) implemented with a US$7 million support from the World Bank and GEF between 2005 and 2011. The components have also been designed considering mutually reinforcing groundwater activities in the region at national and transboundary levels. All components and activities will be financed by the GEF Grant, apart from Activities A2 and C1 which will be financed by the CIWA Grant.

17. The Project has four components. Through the first Component A, the SADC Groundwater Management Institute will be operationalised to serve as a center of excellence for groundwater

[13] Examples of networks and NGOs include the Southern Africa Gender Protocol Alliance established in 2005.

in the region. Through Component A, the remaining three components will have greater impact in the areas of institutional, information and infrastructural aspects of groundwater management among SADC Member States from local to regional levels.

18. **<u>Component A.</u> Operationalising the SADC Groundwater Management Institute** (total: US$2.80 million, of which US$2.00 million GEF and US$0.80 million CIWA). Component A will finance: A1) *Coordination and administration, including staff* to enable starting and day-to-day running of the SADC GMI during project implementation. This includes, amongst others, enforcing governance structures, setting up and managing organisational functions (including the Project Implementation Manual, and Monitoring & Evaluation framework), management of staff, progress reporting and project implementation/work planning. The activity also includes fulfilling the 'interlocutor' role of SADC GMI towards the SADC Secretariat and the UFS, and facilitating the meetings and input of the SADC Subcommitte on Hydrogeology (who also fulfill a project steering committee function); A2) *Raising awareness, knowledge management and communication* involving the critical activities to inform, engage and maintain dialogue with key stakeholders of at all levels – i.e., implementing a graphic profile and communication activities, setting up and running SADC GMI and project websites, disseminating information and knowledge, and developing a research programme; A3) *Support for National Focal Groups*, through the use of small sub-grants to SADC Member States, in order for national partnerships to be established and run and thereby extending the ownership of the Project; A4) *Regional capacity building and training programme*[14] which will include the necessary scope of training offered by the GMI to technical groundwater practitioners, students and decision makers in SADC Member States (in and outside of governments) – i.e., groundwater management training (onsite and online), disseminating and/or developing training materials, cooperating with existing training initiatives, and rolling out an internship and secondment programme; and, A5) *Mobilising and soliciting financing for SADC GMI, including design of small grants scheme for Member States* that will entail developing and implementing a plan to ensure the GMI grows and sustains itself as a regional center of excellence in the long term future. The activity also includes setting up and running a Sub-Grants Scheme to support national level activities related to the Project (for example, convening national focal groups and implementing small scale pilots), in line with the agreed Sub-Grants Manual to be prepared at the onset of the Project[15].

19. **<u>Component B.</u> Strengthening institutional capacity for the sustainable management of groundwater in SADC** (total: US$1.50 million GEF). Component B will finance: B1) *Legal, policy and regulatory frameworks* which will address prevailing gaps in institutional groundwater management tools at national and transboundary levels. Activities could range from modernisation to harmonisation of laws, policies and regulatory tools through technical assistance for Member States; B2) *Compliance and advocacy* which will focus on assisting Member States in following up on implementation of existing institutional management tools to enhance compliance of groundwater governance; B3) *Guidelines, standards and management tools* that will enable groundwater practitioners in Member States to access and compare up-to-

[14] In accordance with GEF requirements, training activities in the project will include the 1% of the GEF Grant allocated for International Waters Learning (such as attending the bi-yearly IW conferences and participation in regional IW:learning events.

[15] Through the design and selection of small-scale, national activities, efforts will be made to link to parallel GEF activities.

date practical management tools with proven applicability in the region (including assessment and verification of suitable tools, taking into consideration new innovations in the sector); B4) *Strengthening groundwater monitoring and data management systems* which will support Member States in how to strengthen and integrate monitoring of groundwater into national level efforts and access guidance on best-practice and affordable monitoring and data management schemes; and, B5) *Transboundary cooperation* that will facilitate the integration and harmonisation of groundwater provisions between the national and basin level commitments – i.e., through integration of groundwater in shared watercourse commissions and agreements, addressing gaps in knowledge or mechanisms of cooperation; as well as promoting standards for groundwater data collection and open-data solutions. The activity will explore collaboration with River Basin Organisation (RBOs) across the region and specifically need to update protocols/agreements with reference to solutions needed to address shared groundwater challenges, sharing of data and benefits from ccooperation.

20. **Component C. Advancing knowledge on transboundary and national groundwater** (total: US$3.00 million, of which US$1.80 million GEF and US$1.20 million CIWA). Component C will finance: C1) *Support to Transboundary Aquifer Management* in Member States and in collaboration with relevant government authorities and River Basin Organisations (RBOs) in finding solutions to shared groundwater challenges through Transboundary Diagnostic Analysis (TDA) and Strategic Action Plans (SAP) alongside mechanisms for data collection and sharing. TDAs will be selected on the basis of the outcome from the 2012 SADC-ISARM[16] analysis and the transboundary aquifer management needs assessment by British Geological Survey a.o. (2013). Potential transboundary aquifers (TBAs) are: the Ramotswa Dolomite Aquifer (Botswana & South Africa), the Shire Valley Alluvial Aquifer (Malawi & Mozambique), the Tuli Karoo Basin Aquifer (Botswana, South Africa, Zimbabwe), the Eastern Kalahari Karoo Basin Aquifer (Botswana, Zimbabwe), and other TBAs classified with priority B in recent research on critical TBAs; C2) *Research on groundwater challenges* which will involve studies/pilots, information exchange on findings, training and implementation of solutions to emergent and priority groundwater management challenges. Priorities include: climate change, recharge, drought, pollution protection, expanding agriculture and food security, the role of remote sensing and geophysics technology, validation, groundwater buffering opportunities, mapping, monitoring and early warning systems, and others (see table 12 on priority challenges in SADC Member States); and, C3) *Information and Communication Technologies for knowledge sharing platform* to build an integrated data management system interlinked with a GIS platform and the project websites; involving storing, connecting and collecting information from various regional and global groundwater initiatives and data sources (e.g., the hydrogeological vulnerability mapping of the GDMP).

21. **Component D. Promoting groundwater infrastructure management and development** (total: US$2.90 million GEF). Component D aims to promote the role of infrastructure as a means to develop opportunities for more sustainable management of groundwater and addressing growing challenges related to issues such as drought, recharge, pollution, conjunctive land-water management, water and food security, climate change etc. in Member States. Component D will support: D1) *Infrastructure for improved groundwater utilisation, management and protection*

[16] Internationally Shared Aquifer Resources Management (ISARM). www.isarm.org

that involves developing, making available and training on design-tools related to: assessment, selection, mapping, siting, costing and designing of appropriate groundwater infrastructure solutions reflecting the geological and landscape aspects of groundwater in priority areas of Member States. Attention will be given to rehabilitation, operation & maintenance, environmental and social management (see section VI.E below), modernisation, innovation and the need for scaling up constructions. The types of groundwater infrastructure may include: Managed Aquifer Recharge (MAR) in line with pilots under the earlier GDMP, but may also explore infrastructure solutions to groundwater challenges prioritised by Member States (such as control of pollution hazards and contamination risks and improved groundwater infrastructure for urban and agriculture), both in relation to shallow and deeper aquifers; D2) *Impact evaluation and Learning* to help monitor impacts, trouble-shoot and report on results taking into consideration community and gender as well as include learning and training based upon findings of the evaluations; D3) *Operational support for groundwater infrastructure development* which will involve developing and disseminating manuals for infrastructure solutions that can improve groundwater management (e.g., for small infrastructures such as sand dams, infiltration banks and shallow wells) and guidance tools for siting of wells and/or mapping and siting of water buffering systems, cost-effective well drilling, as well as technical assistance in applying these manual and guidance tools[17]; and D4) *Support to partnership development and securing funding for infrastructure development* within governments, with private sector parties or with bi/multilateral partners and others to allow for scaling up of successful solutions. Small sub-grants will facilitate Member States developing the majority of the infrastructure pilots, in accordance with the procedures and obligations outlined in the future Sub-Grants Manual (developed under Activity A5). If appropriate, the SADC GMI may implement small scale civil works for demonstration or training purposes.

B. Project Financing

22. The Project will be financed through a US$8.20 million Grant from the Global Environment Facility (GEF) and a US$2.00 million Grant from the multidonor trustfund Cooperation on International Waters in Africa (CIWA). In November 2013, the GEF Council approved the allocation to be included in the following GEF work-programme. The donor Advisory Committee of CIWA approved the said allocation for the Project in October 2013. The annex on incremental cost analysis for the GEF funds outlines details on the wider baseline co-financing (in line with GEF definition of co-financing).

Table 1. Project Financing (US$ million)

Program Components	GEF	CIWA	**Total**
A. Operationalising the SADC Groundwater Management Institute	2.00	0.80	2.80
B. Strengthening institutional capacity for sustainable groundwater management	1.50		1.50
C. Advancing knowledge on transboundary and national groundwater	1.80	1.20	3.00
D. Promoting groundwater infrastructure management and development	2.90		2.90
Total Financing Required	**8.20**	**2.00**	**10.20**

[17] Component D would also explore the potential to partner with private sector agencies, especially those involved in mining and commercial agriculture (possibly facilitated through linkages to the International Finance Corporation).

C. Lessons Learned and Reflected in the Project Design

23. **The Project builds on the achievements and lessons learnt from the SADC Groundwater and Drought Management Project (GDMP, 2005-2011), one of which is the need to have clear implementation arrangements and manageable project procedures.** The GDMP led a five year process for the endorsement and establishment of the SADC Groundwater Management Institute resulting in the GMI being registered as a legal entity under the South Africa's Company Act in June 2011. The Project will enable the operationalisation and running of the SADC GMI, under the hosting-arrangements with the University of the Free State in South Africa agreed upon by the SADC Member States. Also in line with the GDMP results, the Project will continue implementing activities with Member States through the SADC Subcommittee on Hydrogeology (acting as Project Steering Committee), whilst expanding the engagement and ownership at country-level through national focal points, focal groups, networks and pilot activities. The GDMP was successful in communication and awareness raising on groundwater management issues, which the Project will carry forward. The findings of the research and studies done under the GDMP will also be incorporated as part of the capacity building and making available, a regional database of groundwater related research and information.

24. **Focus on the administrative and financial sustainability of the SADC GMI will be essential to securing the long-term results and development objectives of the Project.** Investments into regional or transboundary organisations have often faced challenges in securing necessary financial means to building and maintaining new institutions. Systematic and sufficient funding from SADC Member States is limited despite the institutional and policy commitments that are comparatively strong in the region. Institution-building is also a long process which can accelerate or lapse around specific issues. The Project will invest in planning and implementation of measures aimed at securing long-term financing for the SADC GMI (see Activity A.4), and capitalising on opportunities for external partnerships with academic, private and public sectors.

25. **In regional and international waters projects, systematic focus on the solutions to shared and transboundary challenges is needed to manage potential frustration with the pace or projection of multilateral development and regional activities.** Cooperation at the regional or transboundary levels is often compounded with perceived and changing risks and opportunities among parties. To navigate project implementation for results, the Project will focus on both policy and technical aspects of groundwater to inform regional and transboundary dialogue on cooperation. Equally, the Project will invest in analytical research, dialogue and cooperation that can help unlock solutions for SADC Member States who share challenges in groundwater management in transboundary aquifers.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

26. **The institutional responsibilities for the Project are aligned with treaties, protocols, mandates and strategic action plans of the Southern African Development Community.** The SADC Secretariat is mandated with the strategic planning and management of SADC Programmes for the coordination and harmonisation of policies and strategies in Member States (SADC Treaty 1992, Article 14).

27. **The SADC Secretariat in Gaborone, Botswana, through the Water Division of its Directorate for Infrastructure and Services, will be the custodian of the Project and recipient of the Grant. The SADC Water Division will provide strategic guidance and management throughout implementation.** The vision of the SADC Water Division is "to attain the sustainably, integrated planning, development, utilisation and management of water resources that contribute to the attainment of SADC's overall objectives of an integrated regional economy on the basis of balance, equity and mutual benefits for all member States". For projects such as the proposed, the SADC Water Division chooses to achieve its vision and implement operational project activities through applying the subsidiarity principle (agreed upon by the SADC Council of Ministers in 2004). The said principle aims to promote cost-effectiveness and sustainability of activities that promote implementation of the SADC Treaty and SADC Protocols (including the 2000 Revised Protocol on Shared Watercourses). The SADC Secretariat and the World Bank will enter into a Grant Agreement for the Project.

28. **SADC Member States will take active part in developing and implementing the Project through Member State representatives on the SADC Subcommittee on Hydrogeology, alongside focal points, focal groups and networks at national level.** The SADC Member States will provide strategic guidance for the Project through engagement in the SADC Subcommittee on Hydrogeology who acts as a Project Steering Committee, meeting twice per year. These proposed arrangements build on those already established under the SADC Groundwater and Drought Management Project completed in 2011. Ownership of the project amongst Member States will be strengthened through: linkages and to 'on-the-ground' activities within country/basin; awareness raising and advocacy; small sub-grants for national level activities (including 'pilots') associated to the priority activities in Component B, C and D; and support to national level focal points, groups, and network of groundwater practitioners. Each SADC Member State will have to designate a Focal Point for the Project. This person will mobilise national focal groups consisting of decision makers/planners, groundwater practitioners, researchers and others engaged in national groundwater issues. Because there are wider communities at national level who will be interested and can benefit from engaging in the project activities, it will be important that wider 'networks' are established and engaged. The Project would be able to guide building such networks by connecting with already established ones such as Water-Net or Global Water Partnership Networks and can utilise social media tools to spread information, facilitate building relations and encourage dialogue.

29. **On behalf of the SADC Secretariat and Member States, the University of the Free State in Bloemfontein, South Africa, will implement the Project and host the SADC Groundwater Management Institute.** The arrangements for a regional center of expertise in groundwater begun in 2007 through the SADC Groundwater and Drought Management Project on behalf of the Member States. After an open and competitive process, the University of the Free State (UFS), through its Institute for Groundwater Studies (IGS) was selected by the SADC Subcommittee on Hydrogeology as the preferred hosting institution for the SADC GMI. Subsequently, the hosting arrangements were endorsed by the SADC Council of Ministers (2008), the SADC GMI Charter and Mandate were developed and endorsed, and a Business Plan was drafted. In June 2011, the SADC GMI was legally registered under South Africa's Company Act, and Articles and a Memorandum of Association were notarially registered in South Africa (i.e., certified and signed by Attorney). By February 2014, the SADC Secretariat and the UFS had a final draft Memorandum of Understanding for hosting of the SADC GMI that is expected

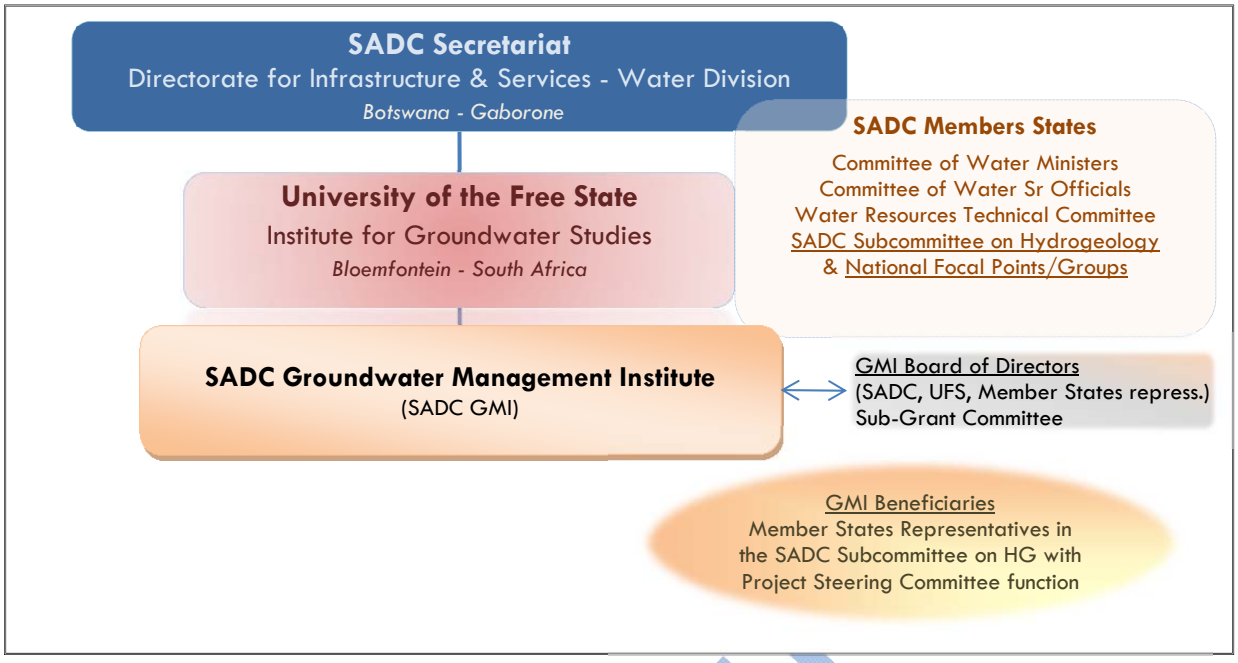
to be signed during first half of 2014. In support of implementing the MoU, the future project outcomes will include: operationalisation of SADC GMI, appointment of key operational staff including the Director of the GMI, concretisation of governance structures and organisational routines, the creation of Project Implementation Manual and Sub-Grant Manual (that includes operational manuals and a monitoring and evaluation framework, and attainment of subsidiarity status to the SADC, fiduciary and safeguard requirements among others). The University of the Free State will be the implementing entity of the Project and enter into a Project Agreement with the Bank. The SADC Secretariat and the University of the Free State will enter into a Subsidiary Agreement by effectiveness of the Project. The University of the Free State will support the SADC Secretariat in coordinating the Subcommittee on Hydrogeology (Project Steering Committee), the Sub-Grant Committee and the National Focal Groups.

30. **A small sub-grants system will be established to provide small sub-grant financing to SADC Member States**[18] for the implementation of small-scale, national level activities that will demonstrate infrastructure solutions to groundwater challenges (Activity D1, D2), and strengthening ownership through the formation of national focal groups for the Project (Activity A3). The total amount for sub-grants represents 10% of the total Project financing, implemented across the SADC Member States and over the five year project period. A Sub-Grant Manual will be designed and submitted to the Bank for clearance prior to withdrawals from the sub-grant expenditure category. The manual will outline the necessary requirements at the different stages of the sub-project cycle in a transparent and effective manner: i) formulation, ii) evaluation, iii) implementation and monitoring, and iv) reporting on results. The manual will include details on eligibility criteria, application and reporting procedures (on activities, results, fiduciary due diligence and accounting, environmental and social safeguards etc.) and a model Sub-Grant Agreement. The Sub-Grant Manual will be reviewed for necessary updates on an annual basis. The review and selection of sub-grant proposals will be done by the Sub-Grant Committee, reporting to the SADC GMI Board of Directors.

31. **The fiduciary systems of the University of the Free State are deemed suitable to govern financial management and procurement of the Project activities (in accordance with World Bank Operational Policies and Bank Procedures).** The responsibility for financial management and procurement activities of the project will reside with the University of the Free State through the support of staff at the University and those to be employed in the SADC GMI. The funds of the grants supporting the Project will be channeled directly to the University of the Free State to bring efficiencies in project implementation, facilitate reporting, and foster clarity on accountability and governance.

[18] In accordance with the procedures and eligibility criteria of the Sub-Grant Manual, and who remain in good standing with the SADC Secretariat and the World Bank.

Figure 1. Project implementation arrangements.



B. Results Monitoring and Evaluation (M&E)

32. The Director of the SADC GMI will be responsible for the monitoring and evaluation (M&E) of the project and will be supported by project staff managing reporting and communication responsibilities. The routines for M&E will be integrated into the existing frameworks for reporting agreed on in the SADC GMI Articles of Association and in line with its future Business Plan.

33. The M&E framework for the Project will build on the Results Framework (Annex 1) and include results indicators of the GEF-5 focal area for International Waters, the CIWA multidonor trustfund, and where applicable, the World Bank's core indicators. Results from the sub-grants will also be reported on as part of the regular progress reporting. A mid-term review will be held approximately 2.5 years after project effectiveness. The Bank and the implementing agencies will undertake an implementation completion report upon project closing.

C. Sustainability

34. **Building on a platform of achievements of past groundwater projects and parallel associated initiatives for strengthening groundwater management will help develop sustainability of project outcomes.** The Groundwater and Drought Management Project (GDMP) was instrumental in identifying institutional, policy and legal gaps in groundwater management in the region. Support under the GDMP encouraged regional coordination and elevation of groundwater management issues in the overall sustainable development agenda of the SADC region. With these achievements made, the Project provides opportunities to sustain the gains of the GDMP, but also a substantial opportunity for scale-up, effective communication and inclusion of new innovations. The combination of having the project implemented by the SADC Water Division, the SADC GMI and the University of the Free State, enables collaboration at the governmental level in existing foras as well as cooperation among academic institutions, development partners and the private sector. Sustainability of project outcomes will

furthermore rely on productive partnerships with institutions at national levels, river basin organisations and international initiatives (Annex 3).

35. To enhance engagement and ownership of the Project among Member States, the Project includes modalities such as: internship/secondment programme, training and capacity building, on-demand technical assistance for key challenges, small sub-grants to facilitate national level focal groups and networks, and piloting of interventions to address country specific groundwater opportunities or challenges.

36. Although existing capacity in governments and institutions across SADC may be limited and unable to provide the necessary and required support for groundwater management, the willingness to work towards such goals is reflected in the provisions of national water sector strategies, policies and laws, as well as commitment through transboundary agreements. Building on these institutional frameworks, the Project can promote the scaling up, advocacy and harmonisation of instruments that can enable more sustainable groundwater management.

37. **Building financial sustainability of the Project will be critical to the success of the SADC GMI and the impact of the Project activities.** The Project includes activities to plan and implement systematic efforts to build financial sustainability of the SADC GMI and expansion of activities to address groundwater challenges in the region. Solutions can be identified through academic partnerships, brokerage in the private sector, and seeking international funding.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	Moderate
Implementing Agency Risk	-
- Capacity	Low
- Governance	Low
Project Risk	-
- Design	Low
- Social and Environmental	Low
- Program and Donor	Moderate
- Delivery Monitoring and Sustainability	Moderate
Overall Implementation Risk	**Low**

B. Overall Risk Rating Explanation

38. **The overall risk rating of the project for implementation is deemed 'Low' considering investments into the SADC GMI, alignment with the priorities of the SADC Secretariat and the SADC Member States, and endorsed hosting arrangements and fiduciary management at the UFS**. Despite the low risk rating, there is a moderate capacity risk due to

the lack of staffing in the SADC Water Division and already committed work programme of the UFS/IGS. As an outcome of project activities, the capacity risk is estimated to fall with the recruitment of project staff and concretisation of operational procedures and routines.

39. Implementation delays may impede the rate of achieving results. Regional projects often take more time than national projects due to the need to reach agreements on follow-up steps, geographic areas to be covered, and capacity differences among participating countries. The key stakeholders have worked to achieve more simplified, clarified, and generally endorsed implementation arrangements. The project will furthermore strive to streamline activities into existing water agencies and SADC will continue to play the leading role towards continuation.

40. Effective communication can help dissipate delivery and donor risks. The Project will rely on effective exchange of information and dialogue across languages, sectors and country borders. As such, staff and activities will be supported to enhance strategic and effective communication of the SADC GMI. Communication activities will be essential to building the GMI into an interlocutor and platform for groundwater stakeholders to share information, collaborate and build ideas.

VI. APPRAISAL SUMMARY

A. Economic Analysis

41. Groundwater is a fundamental resource for social, economic and environmental sustainability across the 15 Member States of the Southern African Development Community (SADC). Human wellbeing, livelihoods, food security, ecosystems, natural habitats, industries and growing cities are directly reliant on groundwater. Access to and quality of groundwater directly affects the wellbeing of households and livestock, as well as productivity of subsistence farming (e.g., groundwater is the primary source of water for 70% of the 250 million people in the region). Economic growth, in sectors ranging from commercial farming to mining to factories, is increasingly dependent on groundwater. However, groundwater issues are often not granted equal priority in national and international water management discourses.

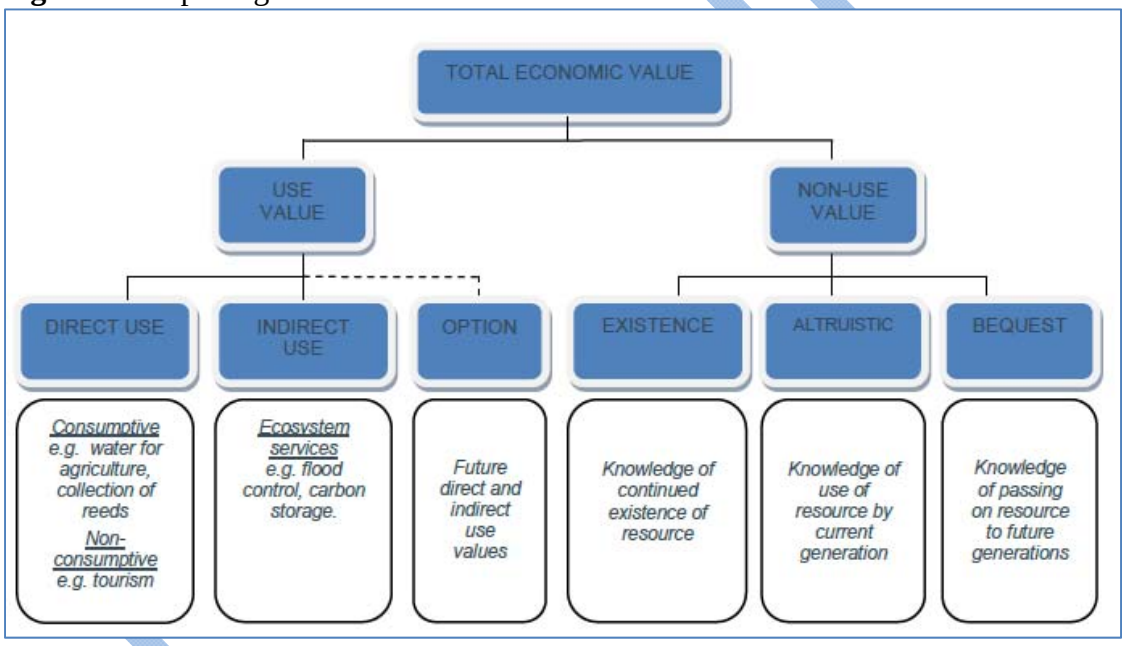
42. The direct and indirect contribution of groundwater in economic terms ranges along with its contribution to numerous economic sectors and society. The value of groundwater is, as can be expected, very difficult to assess accurately. Studies have shown that when groundwater provides a critical production input, it is easier to estimate. Yet, groundwater underpins the wellbeing of vast amounts of people in southern Africa, provides water for livestock and enables ecosystem services and tourism, alongside the non-static altruistic values (see figure 2). Groundwater is on the whole undervalued, due partly to the lack of data and institutional frameworks to manage groundwater. Economic studies can however help raise awareness and inform decision making. As part of the previous Groundwater and Drought Management Project, a Groundwater Valuation Study (October 2011) completed detailed assessment of the socio-economic value of groundwater in SADC. Case studies were done on four aquifers in Namibia, South Africa, Botswana and Tanzania using a combined methodology for economic valuation. The study found that groundwater provides significant economic cross-sector contributions. For example, the Usangu Alluvial Aquifer in south-central Tanzania has a combined present value of $734,963,416 (16% discount rate over 25 years) with contributions to irrigation, regulation for

groundwater dependent ecosystems such as the Usangu wetland, fishing in the Mtera reservoir, hydropower at Mtera and Kidatu, and tourism.

43. The economic role of groundwater is expected to grow exponentially with the steady rates of economic development in southern Africa, particularly in natural resources, along with growing populations as outlined earlier. Although there may not be critical groundwater management challenges across all Member States or all types of aquifers (including transboundary groundwater systems), heightened demand for water and localised threats of overuse or pollution will emphasise the importance of valuating groundwater in economic terms.

44. The activities financed by the Project grants of US$10.20 million are predominantly focused on technical assistance, research, international cooperation, capacity building, regulation and monitoring, as well as institution building. Component D will provide support to SADC Member States in developing infrastructure solutions to enhance the management of groundwater for human and productive use. In turn, promotion of infrastructures such as sand dams, shallow wells, managed aquifer recharge etc. is expected to have direct beneficial impact on people and economic activities. To assess the exact value of such downstream infrastructures not financed directly by the Project, or any small demonstration civil works under the Project is not feasible at this time.

Figure 2. Scope of groundwater valuation



B. Technical

45. The design of the Project intervention to support the SADC Secretariat, the operationalisation of a regional center of excellence in groundwater in the region (the SADC Groundwater Management Institute, SADC GMI) and the 15 SADC Member States is the result of a 11-month preparation period with consultations with key stakeholders, findings from relevant research and assessment of the deliverables of the previous Groundwater and Drought Management Project (2005-2011, World Bank, US$7 million GEF). The former project provides a foundation for the new Project, with several essential studies completed in areas ranging from economic valuation

to groundwater mapping across the region. It also completed infrastructure pilots in rural communities in Botswana, South Africa and Zimbabwe, from which lessons can inform future promotion of small-scale groundwater infrastructures. Importantly, the previous Project was able to mobilise engagement and cooperation among representatives from the 15 SADC Member States which, amongst other, resulted in the agreement to establish the SADC GMI to work in the region for the region at the highest level of the SADC Council of Ministers. The new Project provides an opportunity to fully operationalise the SADC GMI as an interlocutor for various groundwater initiatives in the region (local, basin/transboundary and international), a point of reference for technical assistance and research information, as well as a provider of capacity building and training for groundwater practitioners in the region. An effective SADC GMI, would also link project activities to on-going, on-the-ground national or basin level activities through active outreach and input from national level stakeholders.

46. The Bank's team has worked with the key grant recipients and implementing agencies in the SADC Secretariat in Gaborone, Botswana and at the University of the Free State in Bloemfontein, South Africa. The pilot sites were visited by the Bank's team as part of the completion review of the previous project and consultation with the SADC Subcommittee on Hydrogeology (which consists of the government representatives from the 15 Member States) has been done through workshops and communications facilitated by the SADC Water Division. The Bank's team has also engaged in the forum of the SADC International Cooperating Partners, the SADC Water Strategy Reference Group and at international groundwater conferences to share information and build harmonisation and partnerships amongst various groundwater initiatives.

47. The four components of the Project reflect the need to address the critical areas of groundwater management which impedes human and economic development and environmental sustainability. Component A enables the operationalisation of the SADC GMI as the foundation on which the other components will have a greater reach and potential to succeed – addressing the needs related to institutional frameworks for groundwater management whilst building coalitions and networks to connect groundwater practitioners and decision makers; knowledge sharing and research on critical groundwater management such as climate change, pollution and transboundary aquifers; and, the promotion of groundwater infrastructures to mobilise and support Member States in practical and useful ways.

C. Financial Management

48. The financial management assessment was carried out in accordance with the Bank's Operational Policy 10.00 and the Financial Management Manual issued by the Financial Management Board on March 01, 2010. The assessment found that the principle project implementing entity (the University of Free State, UFS) has financial management arrangements with an overall risk-rating of "Low" and that the arrangements satisfy the Bank's minimum requirements under the Bank's policy and procedures on financial management, OP/BP 10.00.

49. The budget preparation for the project will be done by the Director of Research Development who is a qualified chartered accountant and once approved, uploaded in PeopleSoft (financial system) that has automated controls to prevent any processing if the funds are exhausted. The financial system is reliable to produce necessary reports required to manage and monitor the financial operations. Interim Financial Reports (IFRs) will be produced on a quarterly basis. As

this is the small sub-grant for identified activities, project Specific Annual Financial Statements will be prepared and submitted to the Bank.

50. Funds will flow from the Bank to the Designated Account (DA) opened and managed by UFS. Funds in the DA will be used to finance bank eligible activities of all the components of the project. Disbursement of the funds will be based on the quarterly interim unaudited financial reports (IFRs). An advance will be made to the Designated Account at the effectiveness of the Grant at the request of the Recipient. The option of disbursing the funds for large payments through direct payments from the grant account will also be available.

51. The project financial statements will be audited annually in accordance with International Standards on Auditing as promulgated by the International Federation of Accountants (IFAC). The audit report for the project specific activities will be submitted to the Bank within six months after the financial year-end. The Audit Terms of Reference (ToRs) will be developed, agreed between the UFS and prospective auditors, and cleared by the Bank prior to signing of the Grant Agreement, to ensure adequacy of the scope of the audit.

52. For the small sub-grants, the UFS will establish a simple reporting mechanism and put in place a simple monitoring and control system for each grant. These mechanisms will be detailed in the grant manual. The grants will be subject to external audit processes.

D. Procurement

53. The grant recipient and the implementing agencies have agreed that the University of the Free State will manage all procurement-related processes. A procurement capacity assessment was conducted for the UFS. UFS ascribes to competitive bidding and open and transparent procurement. Its internal procedures in some cases are similar to those of the World Bank. As UFS staff have not had the opportunity to work on Bank financed projects, a detailed procurement and consultant selection training session will be organised. Considering the types of procurements and consultant selections envisaged, the capacity of the UFS is deemed adequate provided (i) the training above is undertaken, (ii) selected contracts are subject to prior review (iii) enhanced procurement and technical support from the Bank is provided during the grants implementation. The findings of the Procurement Risk Assessment Management System (PRAMS) concluded that the implementing agency risk is rated as ‘Moderate’.

54. Procurement for the proposed operation will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" published by the World Bank in January 2011 ("Procurement Guidelines"), in the case of goods, works and non-consulting services; and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" published by the World Bank in January 2011 ("Consultant Guidelines") in the case of consultants' services, and the provisions stipulated in the Grant Agreement. Further, the “Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants”, dated October 15, 2006, and revised in January 2011 will apply.

55. The procurement plan for the project has been prepared and was reviewed at Appraisal. It will be updated at least annually (or as required) to reflect project implementation needs.

E. Management of Environmental and Social (including safeguards)

56. The application of the Bank's operational safeguard policies was assessed as a part of project preparation. At Appraisal, it was confirmed that the project would be classified as Environmental Category B and that the safeguard policies triggered by the Project are: OP/BP 4.01 *Environmental Assessment*, OP/BP 4.11 *Physical Cultural Heritage*, OP/BP 4.12 *Involuntary Resettlement*, and OP/BP 7.50 *Projects in International Waterways*.

57. The Project's activities are primarily focused on technical assistance in the form of analysis, research, advisory services, training, workshops and information sharing, among others. The Project will dedicate resources to the promotion of infrastructure solutions to improving groundwater management. The types of infrastructure solutions that would be promoted include: managed aquifer recharge (e.g., small water retention structures such as sand dams/river bank infiltration/infiltration ponds), pollution control, well drilling and exploration practices, groundwater monitoring stations, operation and management of groundwater wells, aquifer monitoring stations, and so forth. The activities to promote these types of infrastructures include: capacity building, tender/design documents, specifications, financing, and maintenance training.

58. These activities to promote and demonstrate groundwater infrastructures (the latter through estimated ≤15 sites) renders the project as an Environmental Category B project, and triggers safeguard policies OP/BP4.01, OP/BP4.11 and OP/BP4.12. Along with the promotion of infrastructure solutions for more sustainable groundwater management, the Project will facilitate the management of environmental and social impacts from associated interventions. As part of project preparation a Simplified Environmental Management Framework (EMF) with an Environmental Management Plan (EMP) and a Resettlement Policy Framework (RPF) has been developed, disclosed and consulted in line with due diligence requirements for OP/BP 4.01, OP/BP4.11 and 4.12. The EMF-EMP/RPF provide a framework that Member States and Project implementing agencies can adapt to local circumstances and downstream investments, and particularly to any demonstration/pilot works financed through the Project directly or through small sub-grants. Integration of EMF-EMP/RPF is monitored in the Project's Results Framework and adherence to safeguard requirements is included in the Sub-Grant Agreements. The experience and application of environmental and social management during the pilot-schemes of the previous SADC Groundwater and Drought Management Project will be applied as appropriate.

59. OP/BP7.50 *Projects on International Waterways* is triggered because of the planned investments relating to diagnostics of select transboundary aquifers within the SADC region. This project will also finance a number of technical assistance activities focusing on: pilot demonstrations for improved groundwater infrastructure that could take place in/over transboundary aquifers solely within SADC Member States. Guidance on scaling-up will include provisions for notification as prescribed through the Revised SADC Protocol on Shared Watercourses, and relevant River Basin Agreements as appropriate. The riparian notification process is considered satisfied, since all riparian SADC Member States are beneficiaries of the project and involved in project preparation and implementation through participation in the SADC Subcommittee of Hydrogeology, which is also responsible for strategic project guidance. Thirteen Member States have submitted GEF Endorsement Letters acknowledging awareness of the key design elements and components of the project (GEF Requirement). The Endorsement Letters are on file. Furthermore, the Revised SADC Protocol on Shared Watercourses (2000) is

in force and the SADC Secretariat, which oversees compliance with the Protocol is itself mandated to implement the project by SADC Member States. Under these circumstances, the requirement for notification of other riparians does not apply.

ANNEX 1: RESULTS FRAMEWORK

Sustainable Groundwater Management in SADC Member States Project

Project Development Objective (PDO): The PDO is to support sustainable management of groundwater at national and transboundary levels across SADC Member States.

PDO Results Indicators	WB Core	Unit of Measure	Baseline (2014)	Cumulative Target Values						Data Collection and reporting			
				2014	2015	2016	2017	2018	2019	Frequency	Data Source / Methodology	Responsibility for Data Collection	Description (indicator definition) [19]
PDO Indicator One: Development of the SADC Groundwater Management Institute to a recognised center of excellence	☐	%	n/a	Survey of key stakehd & beneficir:s **0%**	Stakeh & benef:s: expectation reported w **25%**	Expect:s on GMI met with **60%** satisf.	Expect:s on GMI met with **70%** satisf.	Expect:s on GMI met with **80%** satisf.	Expect:s on GMI met with **80%** satisf.	Annually	Survey / Progress Reports	SADC Sec UFS/GMI	GEF Indicator
PDO Indicator Two: Transboundary institution strengthened to improve regional cooperation	☐	Text	Establ.	n/a	Operating with full staff	Operating with full staff & work-pgrm impl.	Operating with full staff, work-prgrm & long-term Financial Mgmt Plan	Operating with full staff, work-prgrm & long-term Financial Mgmt Plan impl.	Operating with full staff, work-prgrm & long-term Financial Mgmt Plan impl.	Annually	Progress Reports	SADC Sec UFS/GMI	CIWA Indicator (institution: SADC GMI)
PDO Indicator Three: Enhanced capacity for sustainable transboundary groundwater management in the Ministries responsible for groundwater in SADC Member States	☐	Text	n/a	Survey of capacity demands in SADC Ministries (baseline)	Capacity demands reported & plan to meet demand	40% of capacity demand met	60% of capacity demand met	70% of capacity demand met	70% of capacity demand met	Annually	Surveys / Progres Reports	SADC Sec/UFS	GEF Indicator
Direct project beneficiaries (number)	☒	#	0	0	700	1,300	2,300	3,500	5,000	Annually	Progress Reports	SADC Sec/UFS	# reported participants of activities
Direct female project beneficiaries (% of total direct project beneficiaries)[20]	☒	#	0	0	400	800	1,400	2,000	2,900	Annually	Progress Reports	SADC Sec/UFS	Same as above

[19] Core-/Indicators from the GEF and CIWA Results Fra
mework (October, 2013) have, to the extent possible, been incorporated in the Project's results framework; as well as the Bank's core indicators.
[20] Direct project beneficiaries from this project are people benefitting from training, pilots and outreach activities.

Intermediate Results Indicators	WB Core	Unit of Measure	Baseline (2014)	Cumulative Target Values**						Data Collection and reporting			
				2014	2015	2016	2017	2018	2019	Frequency	Data Source / Methodology	Responsibility for Data Collection	Description (indicator definition)
Intermediate Result (Component A): Operationalising the SADC Groundwater Management Institute													
MoU Signed between SADC Secretariat and the University of the Free State	☐	Text	MoU drafted	MoU Signed	MoU Signed	MoU Impl.	MoU Impl.	MoU Impl.	MoU Impl.	Annually	Progress reports	SADC Sec/UFS	n/a
SADC GMI obtains Subsidiarity Status of SADC	☐	Text	Not obtained	Plan for Subs status	Subs status applied	Subs status granted	Subs status granted	Subs status granted	Subs status granted	Annually	Progress reports	SADC Sec UFS/GMI	n/a
Strengthened transboundary institutions with improved analytic tools, knowledge products, data, forecasting, and/or capacity for improved water and climate risk management	☐	# of RBOs	0	0	4	5	7	7	7	Annually	Progress reports	SADC Sec UFS/GMI	CIWA Indicator/ Activities together with RBOs
Number of joint activities conducted with international groundwater initiatives	☐	#	0	0	2	8	15	20	25	Annually	Progress and Activity Reports	SADC Sec UFS/GMI	# activities, trainings, conf., meetings with othe institutions
Financial resources sought and secured for long-term sustainability &/or expansion of operations	☐	Text	None	GEF & CIWA approved	Long-term fin. plan drafted	2 research grant sought	3 research grant sought	grant/ revenues secured	grant/ revenues secured	Annually	Progress Reports	SADC Sec UFS/GMI	Grants & revenues for financial sustainability
# of visitors to SADC GMI website	☐	#	0	700	2,000	5,000	9,000	15,000	20,000	Annually	Progress Reports & Web reports	SADC Sec UFS/GMI	n/a
Sub Grant Manual implemented	☐	Text	None	Draft	Satifactory accord. WB	Implement.	Updated & Implement.	Updated & Implement.	Updated & Implement.	Annually	Progress Reports & Web reports	SADC Sec UFS/GMI	Sub-Grant Manual in accordance with GA
# of times on-demand technical assistance requests from SADC Member States met	☐	%	0	0%	30%	40%	60%	80%	80%	Annually	Progress Reports	SADC Sec UFS/GMI	Request log from Member States
# of Interns/Seconded with the regional internship programme at SADC GMI*	☐	#	0	0	8	16	26	35	45	Annually	Participant list	SADC Sec UFS/GMI	# of Interns

Intermediate Results Indicators	WB Core	Unit of Measure	Baseline (2014)	Cumulative Target Values**						Data Collection and reporting			
				2014	2015	2016	2017	2018	2019	Frequency	Data Source / Methodology	Responsibility for Data Collection	Description (indicator definition)
Intermediate Result (Component B): Strengthening institutional frameworks for sustainable groundwater management													
% of participants satisfied with seminars and workshops conducted on knowledge transfer ('excellent rating')*	☐	%	0	20%	50%	60%	70%	70%	80%	Annually	Workshop Survey Reports	SADC Sec UFS/GMI	Events for stakeholders
# of legislation, policies, and regulatory instruments for transboundary and national aquifers adapted, harmonised, or written with the help of the Project	☐	#	0	0	5	8	12	17	20	Annually	Progress Reports	SADC Sec UFS/GMI	n/a
# of trainings dedicated to providing guidance to stakeholders on identifying solutions for strengthening legal, policy, and regulatory tools*	☐	#	0	0	2	4	6	8	10	Annually	Progress Reports	SADC Sec UFS/GMI	n/a
# of people received training dedicated to groundwater data collection, management & sharing*	☐	#	0	0	20	40	60	80	120	Annually	Progress Reports	SADC Sec UFS/GMI	# trainees
Intermediate Result (Component C): Advancing knowledge & information-sharing on transboundary and national groundwater													
Advanced scientific knowledge enabling sustainable transboundary groundwater management among SADC Member States	☐	%	0	0	1	2	3	4	4	Annually	Progress Reports	SADC Sec/ UFS/GMI	GEF Indicator/ Cumulative # of TDAs on TBA
Improved strategic analyses conducted and knowledge products developed to illustrate the evidence base for cooperation needs and challenges	☐	#	0	0	1	2	3	4	4	Annually	Progress Reports	SADC Sec/ UFS/GMI	CIWA Indicator/ Cumulative 3 of SAPs on TBA
# of research studies completed on groundwater management challenges selected by SADC Member States	☐	#	0	0	1	3	4	5	7	Annually	Progress Reports	SADC Sec/ UFS/GMI	Programme of research agreed during first year
Running of a fully integrated data management system: stores, connects, collects & makes available information from groundwater initiatives and data sources	☐	Yes/No	No	No	No	Yes	Yes	Yes	Yes	Annually	Progress Reports	SADC Sec/ UFS/GMI	n/a

Intermediate Results Indicators	WB Core	Unit of Measure	Baseline (2014)	Cumulative Target Values						Data Collection and reporting			
				2014	2015	2016	2017	2018	2019	Frequency	Data Source / Methodology	Responsibility for Data Collection	Description (indicator definition)
Intermediate Result (Component D): Promoting groundwater infrastructure development													
# of sub-grant pilot activities at SADC Member States level completed with satisfactory outcome	☐	#	0	0	0	4	8	12	15	Annually	Progress Reports	SADC Sec/ UFS/GMI	# of pilots satisfy according to Sub Grant Manual
# of people directly benefitting from demonstration/pilot groundwater infrastructures*	☐	#	0	0	0	750	1,500	3,000	3,000	Annually	Progress Reports	SADC Sec/ UFS/GMI	Direct beneficiaries from improved groundwater management at pilot sites
# of people learning applied skills from demonstration/pilot groundwater infrastructures*	☐	#	0	0	5	15	30	60	60	Annually	Progress Reports	SADC Sec/ UFS/GMI	Learning through involvement and visits to pilots
# of people receiving training in infrastructure solutions in priority areas of Member States*	☐	#	0	0	20	40	80	130	180	Annually	Progress Reports	SADC Sec/ UFS/GMI	n/a
# of manuals produced which provide operational support for groundwater infrastructure development (including management of environmental and social impacts)	☐	#	0	0	1	4	5	5	5	Annually	Progress Reports	SADC Sec/ UFS/GMI	Updated and disseminated
% of trained groundwater practioners who deemed training and manuals satisfactory*	☐	%	0	0	50%	60%	70%	80%	80%	Annually	Progress / Survey Reports	SADC Sec/ UFS/GMI	n/a
# of documents produced on financing of construction and maintenance of groundwater infrastructures	☐	#	0	0	0	2	4	5	5	Annually	Progress Reports	SADC Sec/ UFS/GMI	n/a

*Monitoring will involve disaggregated reporting by gender.

ANNEX 2: DETAILED PROJECT DESCRIPTION

Sustainable Groundwater Management in SADC Member States Project

A. Project Development Objective and Strategic Rationale.

1. **The Project Development Objective (PDO) is to support sustainable management of groundwater at national and transboundary levels across SADC Member States**.

2. The PDO will be achieved by investments into four focus areas. These are: operationalising a regional groundwater institute located in the region for the Southern African Development Community (SADC) – i.e., the SADC Groundwater Management Institute (SADC GMI); strengthening institutional, legal and policy frameworks for improved groundwater management at national, transboundary and regional levels; advancing research on and sharing knowledge of priority groundwater challenges facing SADC Member States and the region; and, promoting infrastructure development to improve groundwater management for key opportunities to develop groundwater and manage priority challenges to sustainable groundwater.

3. **The Project is designed to directly support the vision and Regional Strategic Action Plan of the inter-governmental organisation of the SADC, which is to foster cooperation on and mutual benefits from shared waters among its 15 Member States.** Recognising the important role of water in supporting economic growth, the SADC Member States signed the "Protocol on Shared Watercourse Systems in the SADC Region" in 1995. The Protocol was later replaced by the legally binding "Revised Protocol on Shared Watercourses" in 2000[21] with an objective "to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourses". In 2005, the SADC Regional Water Policy (RWP) was developed to provide strategic guidance and to incorporate principles of Integrated Water Resource Management and Development (IWRM&D)[22]. The RWP gave particular emphasis to regional integration and cooperation between Member States and between water-related sectors[23]. The operationalisation of the Revised Protocol and the RWP is agreed upon in the SADC Regional Strategic Action Plan for IWRM&D (RSAP). The current SADC RSAP III (2011–2015) acknowledges the importance of groundwater to the region with a dedicated Groundwater Management Programme of Action (GMP, Programme No. 11). The GMP has four project interventions agreed by the Member States and the SADC: policy and institutional frameworks; transboundary aquifer management; awareness raising; and regional cooperation and groundwater management[24]. With active engagement and ownership of the Project amongst Member States (e.g., through the SADC Subcommittee on Hydrogeology who also function as Project Steering Committee, through the national focal points and national focal groups being set

[21] The revision of the Protocol was to align with UN Convention on the Law of the Non-Navigational Uses of International Watercourses (1997). The Convention is the first international law that is applicable to groundwater. The Revised Protocol was ratified and came into force in 2003.
[22] IWRM reflects the process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital eco-systems, Global Water Partnership (2005).
[23] Policy statements 3.2.1-3.3.1 (SADC Regional Water Policy, 2005).
[24] See Annex 6.

up by the Project, and through targeted project activities and pilots supported by small sub-grants), active participation and linkage to activities at the basin, national and local levels can be promoted.

4. **The proposed regional project will support the objectives of the Global Environment Facility focal area 5 on International Waters and the results-areas of the multidonor trustfund Cooperation on International Waters (CIWA) managed by the World Bank.**

5. The main funding for the Project is sourced from the GEF-5 focal area for International Waters, to support groundwater system and shared aquifer sustainable and cooperative joint management. The Project will also address issues related to climatic change and variability, and the impact of droughts and floods as extreme events in a transboundary context. The two specific GEF-5 objectives supported by the Project are:

- Objective 1: Catalyse multi-state cooperation to balance conflicting water uses in transboundary surface and groundwater basins while considering climatic variability and change); and,
- Objective 3: Support foundational capacity building, portfolio learning, and targeted research needs for joint, ecosystem-based management of trans-boundary water systems).

6. The relevant CIWA results-areas that the Project will support are:

- Transboundary institutions strengthened to improve regional cooperation;
- Strengthened transboundary institutions with improved analytic tools, knowledge products, data, forecasting, and/or capacity for improved water and climate risk management; and
- Improved strategic analyses conducted and knowledge products developed to illustrate the evidence base for cooperation needs and challenges.
- Engaging with academia seeks to enhance the long-term development of local professional capacity. The development of internship/young professional programs in basin organisations to improve outreach, in-sourcing of cutting-edge talent, and building capacity of the next generation of water-related multi-disciplinary professionals and the development of MoUs or other meaningful working arrangements with academia, civil society organisations, research institutes, and other professional entities is also expected to be enhanced

B. Components

7. The project consists of the following four components:

8. **Component A. Operationalising the SADC Groundwater Management Institute** (total: US$2.80 million, of which US$2.00 million GEF and US$0.80 million CIWA)[25]. The overall objective of Component A is to operationalise and maintain the SADC Groundwater Management Institute (SADC GMI) as a center of excellence in the region for the SADC Member States to improve capacity and share experiences on groundwater planning, policy development, management, monitoring and protection. The GMI will be hosted by the University of the Free State in Bloemfontein, South Africa under the strategic guidance of the SADC Water Division in Gaborone, Botswana, and the 'beneficiaries' of the SADC GMI (i.e., Members of the SADC Subcommittee of Hydrogeology who equally serve as Project Steering

[25] Activity A2 and C1 will be funded through support by CIWA.

Committee). The vision for the SADC GMI is to "ensure the equitable and sustainable use and protection of groundwater, as well as being a centre of excellence in the areas of groundwater drought management and management of groundwater dependant ecosystems in the region".

9. The SADC GMI was established as a legal entity under South Africa's Company Act (registered as a not-for profit company) on June 05, 2011. This followed a five year process of developing, endorsing and confirming the SADC GMI's charter, mandate, organisational structure and business plan; as well as creating the hosting arrangements to establish and operationalise the SADC GMI for which the University of the Free State was selected after a transpartent and competitive process concluded in 2009. The Memorandum and Articles of Association were notarially registered in June 2011, including the establishment of a Board of Directors.

10. Component A will be supported through the provision of: i) consultant services and technical assistance; ii) goods, equipment and non-consulting services, including equipment for purposes such as monitoring, mapping, computers, vehicles and office equipment; iii) works; iv) operating costs, v) training and capacity building; vi) audits and vii) sub-grants.

11. Component A consists of the following activities:

A1) Coordination & administration (including Staff) In order to operationalise the GMI, the project will support the *Development and Organisation of management functions*. This will involve setting out the procedures, routines, mandates and responsibilities of each governance level, including the Board of Directors, 'beneficiaries' of the company, the Project Steering Committee routines and meetings, GMI staffing, and support for national level focal points. The activity will align with the GMI Memorandum and Articles of Association of June 05, 2011 and new rules and regulations under the new South Africa Company Act (No.71, 2008). The activity will also support work needed to develop and maintain a *Governance Plan* for the cooperation between the University of the Free State/Institute for Groundwater Studies, and the SADC Secretariat for the hosting of the SADC GMI on a day-to-day basis, in line with the hosting bid submitted by UFS. To secure the subsidiary status of SADC GMI to the SADC Secretariat, the activity will also include the *Application process of SADC Subsidiary Status* (to be secured by year two of project implementation). Operational arrangements and procedures will be reflected in the *Project Implementation Manual (PIM)*. The PIM will include instructions on management of activity work-plans, monitoring and evaluation, procurement, financial management and due-diligence to environmental and social management (see Annex 3, section E). The activity will ensure GMI has *adequate staffing* during the project implementation period. This will cover costs associated with a minimum of the GMI Director, a Sr. Groundwater Technical Specialist, an ICT/Communications Specialist, a Programme Officer and Administrative Support Staff. Because GMI will have a prominent regional and international role, the activity will support work needed to maintain its *role as interlocutor* with other regional and international groundwater agencies. This will involve activities related to *building partnerships, networks and joint activities* with international and SADC based organisations and governments, as well as SADC GMI's collaboration with national level focal groups and networks. The GMI's administration responsibilities will also include necessary *fiduciary due diligence, reporting and audits*. In order for the SADC GMI's physical offices at the University to be fully functional, the activity can also cover any

additional expenses related to ICT and physical renovations (i.e., laymen works) on top of that provided by the University of the Free State through its hosting responsibilities.

A2) Raising awareness, knowledge management and communication. As a regional organisation with responsibility to serve SADC Member States and facilitate international cooperation, the SADC GMI will develop a recognised presence through raising awareness, generating and transferring knowledge and communicating effectively. The activity will manage the communications aspects of activities that enhance dialogue and cooperation amongst SADC Member States, River Basin Organisations, and stakeholders who are associated with shared groundwater challenges. Raising awareness of the importance of groundwater, for example in economic terms or the risks of pollution, is an important input to engaging decision makers and regulators. This will involve: the development and implementation of a *graphic profile* of the SADC GMI; roll-out of a *communication plan* to create a platform for discussion and cooperation among Member States, and the active presence in communication/media forums (from a dynamic website to radio outreach); ensure preparation and *dissemination of information and knowledge* materials; hosting *seminars and workshops;* establish, operate and maintain *information management systems* and meta databases; coordinate *knowledge transfer seminars* with relevant international groundwater management institutions; leverage *lessons learned* from projects/institutions so as to replicate successes and share best practices; and to manage the communication aspects of an interactive *research programme.*

A3) Support for National Focal Groups. At Member State level, the national focal point (who is also the government appointed member of the SADC Subcommittee on Hydrogeology and part of the Project Steering Committee) will be required to set up a national focal group for the Project. This is to strengthen the dialogue, project ownership, engagement and linkages between the regional level and national level. For the national focal group to undertake activities, small sub-grants can be provided in accordance with the application, implementation, reporting, fiduciary and environmental and social management requirements outlined in the Sub-Grants Manual (see Activity A5). National focal groups will be reporting on activities and results in establishing national networks at the regional level.

A4) Regional capacity building & training[26]. The activity will include: collaborating with existing capacity building initiatives and where necessary, establishing new ones to offer *groundwater management training on priority challenges*; supporting capacity improvement in Member States by providing *on-demand technical training assistance,* determined based on the priority challenges facing Member States and a process of selection and design of training - face-to-face, training of trainers and on-line etc. (this links transboundary aquifer management, research on groundwater challenges and groundwater infrastructure promotion across the other components); developing capacity and expertise in *raising finances* for sustainable groundwater monitoring, management, and protection among Member States; developing capacity building/training *materials and initiatives* through the IGS or other groundwater institutions; and developing a

[26] In accordance with GEF requirements, the Project includes the 1% of the Grant allocated for International Waters Learning.

regional internship programme and secondments. The latter will enable groundwater trainees or practioners in SADC Member States to come to SADC GMI for taking part in Project activities and obtain training on critical groundwater challenges.

A5) Mobilising and soliciting financing, and design of Small Grants Scheme. The SADC GMI is intended to be a sustainable institution to develop and function as a center of groundwater expertise in the long-term. However, institutions often face challenges of financial sustainability to maintain and scale up activities. The activities planned will include soliciting and administering *long-term funding plan for GMI's financial sustainability*; mobilising funds for *groundwater research*; and raising and managing funds for *GMI programmes and staffing*. The plan of action for SADC GMI's long-term financial sustainability will be initiated in year one of the project with expected additional revenues to be secured by year 3 of the project. The activity also includes the design, establishment and running of a *Sub-Grant Scheme* to support national level focal groups and pilot activities under Component D. The Sub-Grant Scheme will include the planning, priority setting, calls for proposals, review, selection and award, as well as monitoring of results, financial management and compliance with the Sub-Grant Agreements. The Activity will include the completion of a *Sub-Grants Manual*, acceptable to the Bank prior to disbursements.

12. **Component B. Strengthening institutional capacity for the sustainable management of groundwater in SADC** (total: US$1.50 million GEF). The overall objective of Component B is to enhance the capacity of government institutions in SADC Member States and transboundary organisations that are mandated to promote groundwater management services. Component B aims to address shortcomings of national and transboundary water legislation and policies, either by better featuring groundwater in proceedings, or enhancing the capacity of these institutions to monitor compliance and implementation. Furthermore, Component B will aim to bridge institutional divides between groundwater-dependent sectors (such as agriculture and urban water supply) so as to encourage integrated management.

13. The rationale for strengthening institutional capacity under Component B lies in the need for: improving and implementing policies for improved groundwater management at transboundary and national levels; promoting harmonisation of legal instruments; building on the gains of the 2005-2011 Groundwater and Drought Management Project – for example the application of the Groundwater Decision-Support Guidelines (DSG); fostering active participation in collaborations on transboundary groundwater management for key aquifers and in existing fora (such as the SADC Water Dialogue and RBOs such as LIMCOM, ZAMCOM and ORASECOM etc.[27]); and developing a capacity for improved groundwater monitoring and data collection at the transboundary, national and local levels for the relevance, timeliness, and quality of data from groundwater mapping.

14. Component B will support alignment with the provisions of the 2008 United Nations International Law Commission Draft Articles on the Law on Transboundary Aquifers as recommended by the 3rd SADC Water Dialogue. The component will assist the southern African region to explore mechanisms for developing and deepening agreements to include groundwater

[27] LIMCOM: Limpopo Watercourse Commission; ORASECOM: Orange-Senque River Commission; and ZAMCOM: Zambezi Watercourse Commission.

provisions and linkages with other initiatives such as with the Groundwater Commission of the African Ministerial Conference on Water (AMCOW).

15. Component B will support the provision of: i) consultant services and technical assistance; ii) goods, equipment and non-consulting services; and iii) training and capacity building.

16. Component B consists of the following activities:

B1) Legal, policy and regulatory frameworks. The institutional frameworks for managing groundwater varies across Member States, as do the challenges that such frameworks are meant to address. The activity will provide support to Member States with *technical assistance, analysis, and strategic guidance* in their pursuit to update and harmonise legislation, and improve policy and regulatory instruments for challenges facing transboundary and national aquifers across sectors. It will also provide guidance to stakeholders on identifying *solutions for strengthening legal, policy and regulatory tools*. The activity will be rolled out based on survey and dialogue between the SADC GMI, SADC and Member States and implemented on-demand basis of request from SADC Member States. The activity is also envisaged to engage other stakeholders involved in institutional frameworks for managing groundwater.

B2) Compliance & Advocacy. Because a number of Member States have existing legal, policy and regulatory instruments in place (or activities to this effect were implemented in the previous SADC Drought and Groundwater Project, this activity would support policy-makers, planners, technical experts and other stakeholders in Member States in their pursuit to *build compliance to legislative and policy commitments* for sustainable groundwater management at the transboundary and national levels (including, for example, budgetary allocation and incorporation of groundwater in key strategic planning).The activity can include activities such as advocacy, targeted information for briefing decision makers, monitoring of compliance etc.

B3) Guidelines, standards and management tools. The activity will build on existing tools and expertise in parallel initiatives (e.g., CAP-Net, AgwNet and IGRAC) and help adapt and disseminate these tools to practitioners in SADC Member States. A lot of material has been developed globally and regionally for promoting tools. The activity will involve verifying/assessing the usefulness of existing tools, identify measures to improve tools as well as develop and disseminate new tools. With innovation and new technologies, the activity is expected to capitalise on the opportunities emerging with the use of cheaper and adapted technologies, and expanding internet and cellular capacity. Selection of appropriate tools will be based on its effective use and proven applicability for the groundwater situation in the SADC region.

B4) Groundwater monitoring and data management. The activity will support *capacity building* and *technological solutions* for expanding and revitalising groundwater data collection, management and sharing (facilitated by more open-access to groundwater data management at the national and transboundary levels)[28]. It will also explore and test *institutional and financial mechanisms* to promote sustainable and secure monitoring

[28] For example, the project can explore new technologies and application of 'down-the-hole' geophysics, or application of derivatives to test pump analysis (e.g., in fractured aquifer systems).

networks and programs. The previous SADC Groundwater and Drought Management Project included a substantial regional monitoring study. The new activity will pick up such achievements, and collaborate with national and international agencies for enhancing the systems used to monitor and collect groundwater data. The activity will link closely with the data-management system being developed as part of the Project's activity C3, to be managed by the SADC GMI, as part of a fully integrated platform for data access and exchange.

B5) Transboundary cooperation. The activity will help strengthen the *integration of groundwater in shared watercourse commissions and agreements*, addressing *gaps in knowledge or mechanisms of cooperation*; as well as promoting *standards for groundwater data collection* and *open-data solutions* for sharing information and analysis of regional groundwater information. The activity will focus on the policy and legal aspects of the effective integration or emphasis of groundwater within basin-level agreements, and any need for instruments related to transboundary aquifers specifically. Technical aspects of transboundary cooperation are included under Component C below.

17. **Component C. Advancing knowledge on transboundary and national groundwater** (total: US$3.00 million, of which US$1.80 million GEF and US$1.20 million CIWA). The overall objective of Component C is to improve the availability of and access to greater knowledge and information on groundwater across the SADC region. With more relevant and accurate information, various stakeholders such as water resources planners, academic researchers, mining companies, commercial farmers and technical staff in Member States could make more informed decisions and engage in greater dialogue on shared groundwater. Component C aims to build on past analytical and research work, create linkages between the existing initiatives, and improve the open access to information.

18. The rationale for Component C lies in the need to strengthen the capacity of SADC Member States in the face of groundwater management challenges at the national and transboundary levels, including: enabling groundwater's development potential; competitive demand and impact from urbanisation, industrial expansion, growing commercial farming and dire need to improve food security; climate change and variability (including impact droughts such as groundwater recover); threat and management of pollution and degradation; sustainability of groundwater dependent ecosystems; compliance monitoring and regulation; among other (table 12 in Annex 6 provides a summary overview of groundwater priorities amongst Member States).

19. Component C will be supported through the provision of: i) consultant services and technical assistance; ii) goods, equipment and non-consulting services; iii) operating costs; iv) works; v) sub-grants and vi) training and capacity building.

20. Component C consists of the following activities:

C1) Support to Transboundary Aquifer Management[29]**.** Through the multi-disciplinary analysis of shared aquifers, the activity will support Member States and associated RBOs in finding solutions to joint development and management issues through *TDA (Transboundary Diagnostic Analysis) and SAPs (Strategic Action Plans).* The development of TDA with SAPs will follow the methodology developed by

[29] Activity C1 will be funded through support by CIWA.

UNESCO and intended to incorporate tasks such as necessary research through to agreed action plans. TDAs and SAPs will also create mechanisms for *data collection and sharing* and provide support to management interventions for shared transboundary groundwater challenges. The activity, to the degree necessary, could include strengthening *groundwater monitoring capacity and stations* applicable to the purpose of the TDA and SAP (i.e. minor civil works). The proposed transboundary aquifers will be selected on the basis of the outcome from the 2012 SADC-ISARM[30] analysis and the TBA management needs assessment by BGS a.o. (2013), as well as identified transboundary aquifers where limited knowledge or data may hide emerging management challenges. Potential TBAs are: the Ramotswa Dolomite Aquifer (Botswana & South Africa); the Shire Valley Alluvial Aquifer (Malawi & Mozambique); the Tuli Karoo Basin Aquifer (Botswana, South Africa, Zimbabwe); the Eastern Kalahari Karoo Basin Aquifer (Botswana, Zimbabwe); and other TBAs classified with priority B in recent research on critical TBAs[31]. The activity will be implemented in collaboration with relevant government authorities and River Basin Organisations. The activity provides opportunities to engage with other parties involved in transboundary water management (see Role of Partners, Annex 3 section G).

C2) Support the undertaking and dissemination of research on critical groundwater challenges. The activity will help Member States to *identify and research critical groundwater management challenges* and *enable information exchange* on findings and implementation of solutions. This may relate to climate change, recharge, drought and recovery of groundwater systems after drought, pollution protection, commercial farming and enhancing food security, the role of remote sensing and geophysics technology, validation, groundwater buffering opportunities, mapping, monitoring and early warning systems, decentralised management, and other components. The activity builds on previous work and pilots developed under the SADC Groundwater and Drought Management Project which undertook research into and built understanding of groundwater-related risk identification and management (for example, Drought Vulnerability Mapping and Economic Valuation Studies). Selection of priority groundwater challenges will be defined based on dialogue with SADC Member States with the view of having a plan of research agreed in year one of the Project. The results will be disseminated to *advocate and build capacity on the findings of research* to groundwater managers, users and politicians. The activity will therefore put equal emphasis to 'changing behavior and decision making' as to the actual production of new research (to prevent that research ends at publication). Across the activity, the integrated management of groundwater with surface water, land use and other sectors will be promoted to strengthen linkages with other sectors such as agriculture, mining and domestic water supply.

C3) ICT platform for knowledge sharing. The activity will involve building a fully integrated *information management system* (meta database) interlinked with a *GIS*

[30] ISARM: Internationally Shared Aquifer Resources Management. www.isarm.org

[31] A critical overview of transboundary aquifers shared by South Africa, J. E. Cobbing & P. J. Hobbs & R. Meyer & J. Davies; Hydrogeology Journal (2008). The selection of TBA will be further detailed during implementation to align with ongoing initiatives to avoid duplication of efforts.

platform and *running of the website* designed under Activity A1. The SADC GMI's information management system will enable storing, connecting, collecting and making available, information on groundwater initiatives and data sources, as well as potential integration of groundwater into existing or new Decision Support Systems (e.g., the hydrogeological vulnerability mapping of the GDMP). The information sharing platform will be important as a 'backbone' to the SADC GMI website and will facilitate easy access for SADC Member States and practitioners involved in research, planning, and valuation (including efforts to integrate information that resides with private sector agencies on groundwater). Linkages to on-going projects and future support to groundwater management systems (e.g., the SADC Hydrogeological Mapping, the TDA for the Stampriet Kalahari-Karoo Information Management System, BGS grey literature initiatives etc.) will be integral to the success of the activity.

21. **Component D. Promoting groundwater infrastructure management and development** (total: US$2.90 million GEF). The overall objective of Component D is to promote the development and scaling up of infrastructure solutions as a means for more sustainable management of groundwater across SADC Member States. Component D provides the opportunity to compile and encourage best practises, new innovations, and operational guidelines to Member States in their pursuit of more sustainable groundwater management in areas such as Managed Aquifer Recharge (MAR), recharge, exploration of boreholes and drilling, pollution control, food production and the operation and maintenace of wells.

22. Across the SADC region, a number of physical interventions have been deployed to improve and prolong groundwater recharge and water availability in community wells. Despite this, drilling for groundwater is often uncoordinated and unregulated. Due to the lack of maintenance and rehabilitation, it is also not uncommon that infrastructure fails to operate after a short period of time. For example, UNICEF has estimated that a total of 36% of installed hand pumps in sub-Saharan Africa are not operating at any point in time and breakdown rates are as high as 60%.[32] Sustainable groundwater is specifically important to drought-prone areas. Experiences and best practices in the SADC region and in other semi-arid regions like the Sahel and Horn of Africa can be shared to provide a broader portfolio on technical solutions as well as the guidelines to plan and develop them. Component D will also build on the results from the SADC Groundwater and Drought Management Project where small scale infrasturcture pilots were developed in the upper Limpopo (Botswana, Zimbabwe and South Africa) involving small sand dams, rainwater harvesting techniques, improved monitoring, and the rehabilitation of shallow wells in arid zones.

23. Component D will be supported through the provision of: i) consultant services and technical assistance; ii) goods, equipment and non-consultant services; iii) works; iv) training and capacity building; v) small sub-grants and vi) audits.

24. Component D consists of the following activities:

D1) Infrastructure for improved groundwater utilisation management and protection. The activity would involve the *assessment, selection, mapping, siting, costing and designing* of appropriate groundwater infrastructure solutions reflecting the geological and landscape aspects of groundwater in priority areas of Member States.

[32] http://www.unicef.org/wash/files/2012_WASH_Annual_Report_14August2013_eversion_(1).pdf

Depending on prioritisation, these infrastructures could range from community level groundwater buffering and managed aquifer recharge (MAR) through to solutions needed to manage commercial irrigation or urban water supply and control measure on pollution hazards. Promoting the improvement of groundwater infrastructures will include rehabilitation, operation & maintenance, modernisation and scaling up of groundwater infrastructures. Importantly, the activity will also include due attention to social and physical design aspects such as appropriate structures for community involvement and ownership, attention to gender and environmental and social management (in accordance with the Project's Simplified Environmental Management Framework, see Annex 3, Section E). To optimise learning and research potential of groundwater infrastructures, the activity will include *Piloting of Demonstration Infrastructures including dissemination of results and training*. The selection, siting, design and construction of the pilot groundwater infrastructures (i.e., civil works and management interventions) would be initiated by national focal groups in consultation with the SADC GMI, the Subcommittee on Hydrogeology, relevant RBOs and relevant national/local authorities. The activity will build on lessons learnt and good practice, including the pilot sites under the previous SADC Groundwater and Drought Management Project. The SADC GMI can, if appropriate, implement small-scale infrastructure activities for the purpose of training and innovation. With the use of small sub-grants, the Member States can also explore the development of groundwater infrastructure solutions (in accordance with the Sub-Grants Manual and fiduciary obligations of the UFS and the World Bank). Due to the limited scope of project financing and supervision across the region, the emphasis on the small scale infrastructures is to enable learning, innovation and scaling up of appropriate solutions.

D2) Impact evaluation & learning. The activity will support the *monitoring of impacts*, progress, trouble-shooting problems and the reporting of results. Particular attention will be given to key outcomes such as: sustainability of infrastructures, community ownership, integration of gender considerations into design and implementation, and development benefits. Evaluating impact will also be part of regular reporting by SADC Member States as they are involved in the meetings and events organised by the SADC GMI. To build on findings from the evaluations, the activity will also include training and learning for key technical infrastructure staff, such as drillers.

D3) Operational support for groundwater infrastructure development. The activity will involve *manuals* (e.g. for sand dams and subsurface dams) and *guidance tools* (siting of wells and/or mapping and siting of water buffering systems, cost-effective well drilling) as well as *technical assistance* in applying these manual and guidance tools. As part of operational support, the activity will encourage and support planners and decision makers in SADC Member States to cooperate and align any community level groundwater management with ongoing efforts in these sectors in the region. Activity D3 will also include promotion of environmental and social management of groundwater infrastructures, building on best practice, national laws and tools used in the previous infrastructure pilots under the SADC Groundwater and Drought Management Project. The activity will include attention to rehabilitation, operation and maintenance of groundwater infrastructures that present real challenges to sustained access to groundwater (e.g., deterioration of hand pumps).

D4) Support to securing funding and developing partnerships for infrastructure development. This activity will provide advice and technical assistance to the Member States on *securing funding for the infrastructure development* from domestic budgets, as well as bilateral and international cooperating partners. The activity can support Member States in developing partnerships with relevant private and public sector agencies in order to enhance cost sharing and scaling-up. This activity can furthermore involve dissemination of announcement of funding opportunities, and tailored information on the economic contribution of groundwater management as advocacy for greater national budget allocations and other funding resources.

25. **The Project design is informed by the achievements of the previous GEF-supported SADC Groundwater and Drought Management Project implemented between 2005-2011 (GDMP, US$7 million).** The GDMP, among others, included enhancing awareness (between both policy-makers and local level stakeholders) on the importance of sustainable groundwater management; raising the posituion of groundwater in sustainable development agendas; forming a regional center of excellence (SADC GMI); and piloting groundwater and drought management within Limpopo River basin. The Project extends the benefits from the GDMP and builds on the gains already made (see detailed information in Annex 6, table 14).

26. The GDMP policy and institutional support work now needs to be implemented and operationalised. Policy and institutional capacity improvement (including broad awareness-creation) will be pursued at the national level, taking advantage of the favourable climate created towards sustainable groundwater management by GDMP and the activities identified by the SADC RSAP III. In selected aquifers in each country, groundwater and drought management systems will be scaled-up in a manner which will be informed by the lessons learned from GDMP pilot activities. A primary task for the SADC GMI staff will be to collect, assess and integrate the available deliverables of the GDMP; this includes research reports and data, mapping, communication materials, website, and groundwater monitoring tools and IT-equipment.

27. In addition, the project will be cognisant of the major lessons learned from the GDMP. These issues include: 1) The proven success of communication outreach by the SADC GDMP in future and parallel initiatives meant to strengthen groundwater management; 2) The possibility of building on the unique solutions provided by GEF support otherwise not possible from alternative global resources; 3) Strengthening the application of tools for improved groundwater policy and planning at the national level, and the linkages of such policy and planning measures to the transboundary level; 4) Tailoring infrastructure solutions for enhanced groundwater management to realistic local contexts; and 5) Ensuring the operational alignment of administrative and procurement procedures among implementing parties.

28. **SADC Member States in-kind financing for the Project.** Though it has not been possible to estimate the in-kind contribution of SADC Member States to the Project, in financial terms, it is important to recognise them. The in-kind contribution includes the staff time of SADC Member States government officials, research and collaboration contributions on individual consultancies and activities, as well as time and resources spent to facilitate the sub-grant activities, amongst others.

Table 2. Detailed financing estimates (US$ million)[33]

Program Components	GEF	CIWA	Total
A. Operationalising the SADC Groundwater Mgmt Institute	**2.00**	**0.80**	**2.80**
A1. Coordination & administration (incl. Operational staff)	1.40		1.40
A2. Raising awareness, knowledge management and communication		0.80	0.80
A3. National Focal Groups	0.30		0.30
A4. Regional capacity building & training	0.15		0.15
A5. Mobilising and soliciting financing & design of small grants scheme	0.15		0.15
B. Strengthening institutional capacity for groundwater management	**1.50**		**1.50**
B1. Legal, policy and regulatory frameworks	0.30		0.30
B2. Compliance & Advocacy	0.30		0.30
B3. Guidelines, standards and management tools	0.40		0.40
B4. Groundwater monitoring and data management	0.30		0.30
B5. Transboundary cooperation	0.20		0.20
C. Advancing knowledge on transboundary & national groundwater	**1.80**	**1.20**	**3.00**
C1. Support to Transboundary Aquifer Management		1.20	1.20
C2. Support research on groundwater challenges	1.20		1.20
C3. ICT platform for knowledge sharing	0.60		0.60
D. Promoting groundwater infrastructure mgmt & development	**2.90**		**2.90**
D1. Infrastructure for improved groundwater utilisation management and protection	1.25		1.25
D2. Impact evaluation & Learning	0.40		0.40
D3. Operational support for groundwater infrastructure development	0.90		0.90
D4. Support to securing funding for infrastructure development	0.35		0.35
Total Financing Required	**8.20**	**2.00**	**10.20**

[33] In accordance with GEF requirements, the Project includes the 1% of the Grant allocated for International Waters Learning.

ANNEX 3: IMPLEMENTATION ARRANGEMENTS

Sustainable Groundwater Management in SADC Member States Project

A. Institutions

29. **The institutional responsibilities for the Project are aligned with treaties, protocols, mandates and strategic action plans of the Southern African Development Community (SADC).** The SADC Secretariat in Gaborone, Botswana, through the Water Division of its Directorate for Infrastructure and Services, is the recipient of the two project grants and will be the custodian of the Project through providing strategic management during implementation. On behalf of the SADC Secretariat and Member States, the University of the Free State in Bloemfontein, South Africa, will implement the Project and host the SADC Groundwater Management Institute (SADC GMI) as the Project Implementing Entity. SADC Member States will be engaged in strategic guidance of the Project and be active through the SADC Subcommitee on Hydrogeology (who equally serve as Project Steering Committee and future beneficiaries of the SADC GMI). Member States will also identify national project focal points and focal groups, run national networks, and take part in and implement relevant activities. The fiduciary systems of the University of the Free State are deemed suitable to govern the management of financial and procurement aspects of the Project activities in accordance with World Bank Operational Policies and Bank Procedures.

30. **The SADC Secretariat and governance structure**. The SADC Secretariat is mandated with the strategic planning and management of SADC Programmes for the coordination and harmonisation of policies and strategies in Member States (SADC Treaty 1992, Article 14). In the 2000 Revised Protocol on Shared Watercourses, the institutional mechanisms and functions for the implementation of the Protocol were established. The table below outlines the main institutions and their respective areas of responsibility.

31. The annual meeting of the Committee of Water Ministers is preceded with a meeting of the Water Resources Technical Committee (WRTC). To support the WRTC, the Subcommittee on Hydrogeology has been established to address issues and priorities on groundwater management across the SADC region. The Subcommittee on Hydrogeology functioned both as a Steering Committee for the previous GEF-financed SADC Groundwater and Drought Management Project, and will continue to fulfill this function for the Project and equally as a beneficiaries of the SADC GMI.

Table 3. Institutional structure and responsibilities of SADC Water Sector Organs

Institution	Function
Committee of Water Ministers	Oversee implementation of the Protocol Assist in resolving potential conflicts Guide cooperation & harmonisation of legislation, policies, strategies, programmes & projects Recommend & advise the SADC Council of Ministers
Committee of Water Senior Officials	Examine the reports from the WRTC Advice & update the Committee of Water Ministers on decisions for Council & status of implementation of Protocol
Water Sector Coordinating Unit/SADC Water Division	Monitor implementation of, advice & provide guidance of interpretation of Protocol Liaise with SADC organs & shared watercourse institutions on matters pertaining to Protocol

Institution	Function
	Organise & manage technical & policy meetings Mobilise & facilitate technical & financial resources for implementation of Protocol
Water Resources Technical Committee & Subcommittees	Provide technical support/advice to Committee of Water Sr Officials through Water Sector Coordination Unit Appoint standing subcommittees for longer term tasks
Shared Watercourse Institutions	
· States establish appropriate institutions such as watercourse commissions, water authorities or boards as may be determined · Shared Watercourse Institutions shall provide information necessary to assess progress on the implementation of the provisions of this Protocol · States undertake to adopt appropriate measures to give effect to the institutional framework referred to in the Protocol	

32. **The SADC Water Division.** The SADC Water Division, at the Directorate for Infrastructure & Services in the SADC Secretariat, has the vision "to attain the sustainably, integrated planning, development, utilisation and management of water resources that contribute to the attainment of SADC's overall objectives of an integrated regional economy on the basis of balance, equity and mutual benefits for all Member States".

33. The SADC Water Division can opt to achieve its vision and implement operational project activities through applying the subsidiarity principle agreed by the SADC Council of Ministers in 2004. The subsidiarity principle aims to promote cost-effectiveness and sustainability of activities that promote implementation of the SADC Treaty and SADC Protocols (including the Revised Protocol on Shared Watercourses). The application of the subsidiarity principle is considered suitable for technically complex projects such as the proposed Project, and ensures comparative and optimised use of the SADC Water Division staff capacity. A key outcome of the project will thus be the application of the SADC GMI to obtain subsidiarity status during project implementation (see Activity A1).

34. **The SADC Groundwater Management Institute (SADC GMI).** As part of the SADC Groundwater and Drought Management Project (www.sadc-groundwater.org) that was completed in 2011 and supported by the World Bank/GEF, the arrangements for a regional center of expertise in groundwater were developed. After an open and competitive selection process, the University of the Free State (UFS) through its Institute for Groundwater Studies (IGS) was chosen by the SADC Subcommittee on Hydrogeology as the preferred hosting institution for the SADC GMI. Subsequently, the hosting arrangements were endorsed by the SADC Council of Ministers in 2008, the SADC GMI Charter and Mandate were developed and endorsed, and a GMI Business Plan was drafted. On June 05, 2011, the SADC GMI was legally registered as a not-for-profit company under South Africa's Company Act. Although the SADC GMI was established and legally registered, the institute was not fully operationalised due to a shortfall in transferring necessary funds and the closure of the previous Project.

Table 4. Timeline and progress of developing the SADC GMI (2008-2011)

Action/Decision	Date	Meeting	Format
PSC members were tasked to facilitate nomination of potential GMISA host institutions. The nominated potential host institutions were contacted and provided with pre-qualification forms to fill. The 3rd PSC meeting reviewed and adopted the selection criteria for the short listing and subsequently PSC members from Member States that did not nominate potential host institutions participated in the short listing at the end of the meeting.	April 08, 2008	Project Steering Committee/SADC Member States in Johannesburg	Minutes
The Project Steering Committee unanimously APPROVED the criteria for the selection of a country to host the Groundwater Management Institute of Southern Africa as presented.	April 08, 2008	Project Steering Committee/SADC Member States in Johannesburg	Minutes
• Short listing of potential hosts (April 8th 2008) • Field visits to each Shortlisted institute (May 2008) • SADC Water Resources Technical Committee approval of the shortlist (May 2008) • Integrated Council of Ministers approval of the shortlist (June 2008) • SADC Council endorsement of the shortlist (August 2008) • Development of framework (June 2008) • Visit to the University of the Free State/Institute for Groundwater Studies to initiate establishment of the GMI (Jan 2009)	April 2008 – March 2009	n/a	Progress Report, Minutes of 4th PSC Meeting March 12, 2009
GMI Institutional Framework (Governance Structure and Operating procedures) presented and discussed	March 12, 2009	Project Steering Committee/SADC Member States in Windhoek	Minutes
Institutional Framework of the SADC GMI is developed and endorsed: Mandate & Charter, Business Plan, Staffing structure and Job profiles developed.	Apr 2009 - June 2011	n/a	n/a
SADC GMI registered as legal entity under South Africa's Company Act (not-for profit company).	June 05, 2011	Certificate	Certificate issued by South Africa's Companies and Intellectual Property Registration Office (Ref No. 2011/011724/08)
Directors [Board] of GMI appointed: Head of SADC Water Division; SADC Member State (Zambia); and Director of UFS/IGS.	June 05, 2011	Certificate	Certificate issued by South Africa's Companies and Intellectual Property Registration Office (Ref No. 2011/011724/08)
SADC GMI Memorandum and Articles of Association accepted as properly notarially certified	June 22, 2011	Letter	Letter from South Africa's Companies and Intellectual Property Registration Office
Memorandum of Incorporation prepared to transfer project under South Africa Company Act (No. 71, 2008) Board of Directors updated Board of Directors hold first Board meeting (Feb 12, 2014) MoU and Advertisement of SADC GMI Director to tabled at the Board meeting.	February 2014	Minutes	The Board of Directors of SADC GMI meeting February 2014 (agenda & other documents circulated)

35. The vision for the SADC GMI is to "ensure the equitable and sustainable use and protection of groundwater, as well as being a centre of excellence in the areas of groundwater drought management and management of groundwater dependant ecosystems in the region". The role of the GMI is envisaged to:

- Build knowledge on groundwater, while supporting improvements in Member States' capacity by providing technical assistance;
- Define minimum joint standards for groundwater sustainable use and management;
- Support the establishment of coordinated management systems for transboundary aquifers;
- Establish a central information clearing house that will be accessible at the national, River Basin Organisations and local levels;
- Serve as a focal interlocutor with other regional and international groundwater agencies;
- Prepare awareness creation material and coordinate its implementation;
- Facilitate training courses on groundwater management in River Basin Organisations[34]
- Conduct and support SADC Member States in conducting scientific research;
- Periodically revise groundwater legal and policy frameworks and propose revision as appropriate;
- Promote integrated management of groundwater with surface water, land use and other sectors; and
- Solicit and administer long-term funding for financial sustainability.

36. The mandate and management structure of the SADC GMI are stated in the Memorandum and Articles of Association. These were accepted as properly notarially certified documents as part of the registration of the SADC GMI, constituting a legal entity under South Africa's Company Act (not-for profit company) on June 05, 2011. Since then, a new Company Act has been adopted in South Africa (No. 71, 2008). The SADC GMI Board of Directors will, during early 2014, undertake the necessary actions for a Memorandum of Incorporation to reflect the transition of SADC GMI under the new Company Act. The SADC GMI remains a not-for-profit company. The Board of Directors currently consists of the Head of the SADC Water Division, the Director of the IGS at UFS and a selected representative of the SADC Member States.

37. **The University of the Free State (UFS) and the Institute for Groundwater Studies (IGS).** Established in early 1900s, the University of the Free State has its main campus in Bloemfontein, South Africa and is one of the country's oldest institutions of higher learning. The UFS's vision is to be "a university recognised across the world for excellence in academic achievement and in human reconciliation". The University has over 33,000 students across its seven faculties. In 1974, the Institute for Groundwater Studies (IGS) was established in the University. The IGS has to date qualified more than 500 postgraduate students in Geohydrology and is leading in areas such as fractured rock aquifers, industrial and mining contamination,

[34] This can be linked to long-term efforts of AGW-NET/CapNet in cooperation with IWMI, BGR, IGRAC and others to develop a training course on Groundwater Management for African Basin Organisations.

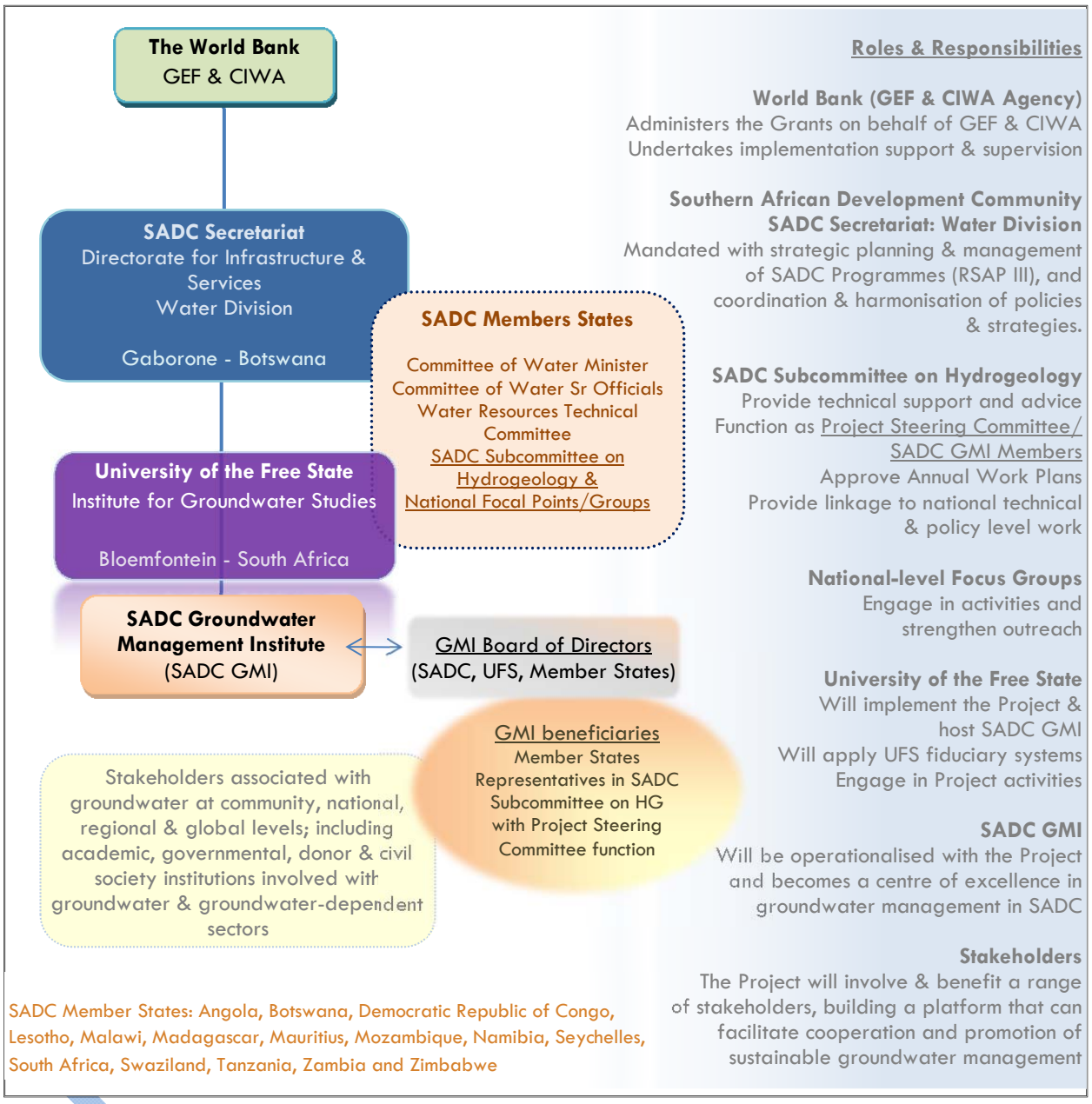
groundwater governance, groundwater resources and shale gas and hydraulic fracturing (fracking). The IGS also has a commercial and water-research laboratory, and provides training in subject matters ranging from groundwater reserve determination to acid-mine drainage and design of groundwater monitoring systems.

38. **SADC Member States.** In the previous SADC Groundwater Project, the SADC Member States primarily interacted with the project through their representatives on the SADC Subcommittee on Hydrogeology. These Member States representatives also functioned as the previous project's Steering Committee. This group fulfilled a critical role for the strategic guidance of the project: dissemination of project results and the selection of the UFS to host the SADC GMI. The new Project will mobilise the interaction with SADC Member States through these country representatives, and SADC has recently received an updated list of government representatives for the Subcommittee. The first meeting of the new group took place on February 11, 2014 in Gaborone, Botswana.

39. The project aims to further strengthen engagement and ownership of the Project through appointed national project focal points and national focus groups for the project, who also establish national networks. Through national focus groups, the project will build and strengthen the network of collaboration among decision-makers in Government (both policy and technical), groundwater practitioners, academia, civil society and the private sector. The Project will support the national focal groups in developing activities and forums for dissemination of information, dialogue and capacity building through the use of small, limited grants. Stakeholders in SADC Member States will also be engaged in the project activities through the implementation of small sub-grants that can fund national level pilot activities related to Component D.

40. The implementing and hosting arrangements for the new Project and the SADC GMI are illustrated in figure 3 below.

Figure 3. Project implementation arrangements.



B. Project management structure and responsibilities.

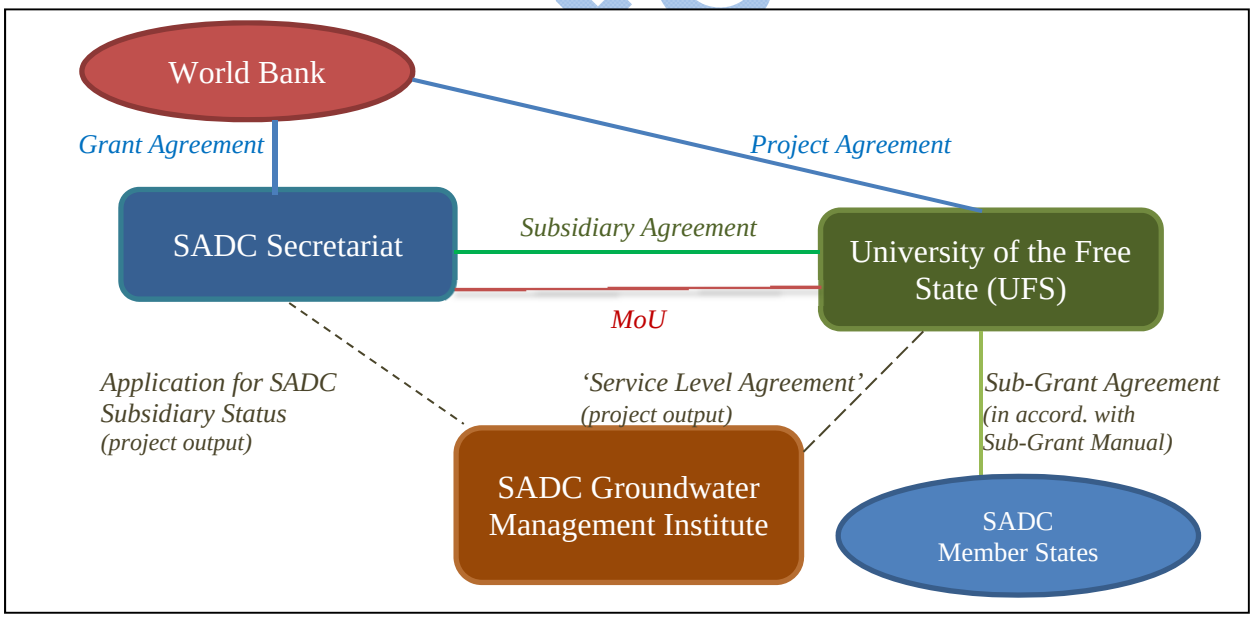
41. **Strategic management of the Project will be provided by the SADC Secretariat.** The SADC Water Division will provide higher-level guidance to the project, ensuring the alignment of work plans and activities with the vision of the Revised Protocol and agreed priority activities for groundwater in the RSAPIII for IWRM&D. The Head of the SADC Water Division equally serves as one of the Directors on the Board of Directors for the SADC GMI. Strategic guidance of the Project will also be provided by a 'project steering committee' consisting of SADC Member States representatives serving on the SADC Subcommittee on Hydrogeology (and also

as beneficiaries of the SADC GMI). The SADC Secretariat and the World Bank will enter into the Project's Grant Agreement (see figure 4 below).

42. **The University of the Free State will be the *implementing entity* for the project by hosting the SADC GMI and the Project activities on behalf of the SADC Secretariat.** The proposed hosting arrangements build on the 'principle of subsidiarity' that the SADC Secretariat applies to a range of projects it implements. The principle is employed to make optimum and comparative use of the capacity of the SADC Water Division. In the case of this Project, an application for subsidiarity status to the SADC Secretariat will be pursued for the SADC GMI as an output of the Project. The University of the Free State and the World Bank will enter into a Project Agreement for implementation of the Project.

43. **Within the University of the Free State, it is the Institute for Groundwater Studies (IGS) that will work with the Project and the SADC GMI on a day-to-day basis to deliver the Project outputs and manage the project finances.** The IGS will, for example, provide office space, ICT support, and other facilities to assist implementation of project activities and operationalisation of the SADC GMI. Because the SADC GMI is not yet sufficiently strong to take on the full responsibility of the Project, the implementation period provides a transitional phase for the SADC GMI to become fully operationalised and develop its routines and structures as an output of the Project. In the meantime, the Project activities will comply with the administrative procedures and fiduciary routines of the UFS and IGS.

Figure 4. Institutional and legal structure for Project.



44. **The delivery of the Project's management and operational functions will be the responsibility of staff recruited under the Project in the SADC GMI.** The staffing and capacity of the SADC GMI was elaborated as part of the organisational design developed in 2010, and updated with project preparation (including the identification of the necessary capacity and staff functions to be included in SADC GMI: business/management, operational, groundwater technical, communication and ICT, procurement, financial management and administration). During recruitment and implementation, the organisational framework will be

further refined and developed to match the needs of the institute. The SADC GMI may consist of the following core functions and staff members:

- *Director:* will fulfill role as 'Project Manager' and be on the Board of Directors of SADC GMI, with ultimate responsibility for delivering the Project, including strategic overview of project activities and the Sub-Grant Scheme.
- *Sr. Groundwater Specialist:* will function as technical specialist assigned to lead research and policy activities, training, and capacity building.
- *Communication & ICT Specialist*: will be responsible for outreach, awareness raising, dialogue and advocacy work; as well as activities related to managing the access and exchange of information and knowledge using Information and Communication Technologies;
- *Programme Officer:* will support the SADC GMI staff on delivering activities, reporting on progress and results (M&E) as well as supporting procurement and financial management routines; alongside providing operational support to the Sub-Grant Scheme.
- *Administrative Assistant:* will support the SADC GMI staff on administrative functions and routines, reporting, logistics for the Project events and other associated tasks.

45. **Project management will be the responsibility of the SADC GMI Director and staff, with frequent input from SADC Member States to ensure that project activities are relevant and linked to groundwater management challenges and activities within countries and the region.** The SADC Subcommittee on Hydrogeology will also fulfill a 'project steering committee' function through active membership of the SADC GMI. Regular meetings will form opportunities to improve annual workplans and seize opportunities to link project activities to Member State priorities and actions.

46. **The fiduciary responsibilities of the Project will reside with the University of the Free State as hosting agency of the Project activities and the SADC GMI.** As key staff of the SADC GMI are employed, UFS and the SADC GMI will enter into a 'service level agreement' (in accordance with South African terms) to affirm that the SADC GMI applies the UFS fiduciary procedures for project activities and reporting. The fiduciary policies and procedures will comply with the World Bank's Operational Policies and Bank Procedures for the procurement and financial management aspects of the Project. Detailed routines and processes will be outlined in the Project Implementation Manual and the Governance Plan between SADC GMI and UFS.

60. **The Sub-Grants Scheme will be established to provide small sub-grant financing to SADC Member States**[35] for the implementation of small-scale, national level activities that will demonstrate infrastructure solutions to groundwater challenges (Activity D1, D2), and strengthening ownership through the formation of national focal groups for the Project (Activity A3). The total amount for sub-grants represents 10% of the total Project financing, spread across the SADC Member States and the five year implementation period.

[35] In accordance with the procedures and eligibility criteria of the Sub-Grant Manual, and who remain in good standing with the SADC Secretariat and the World Bank.

61. A Sub-Grant Manual will be designed and submitted to the Bank for clearance prior to withdrawals from the sub-grant expenditure category. Project financing has been included in Activity A5 for the design of the Sub-Grant Scheme and Manual. The manual will outline the necessary requirements at the different stages of the sub-project cycle in a transparent and effective manner: i) formulation, ii) evaluation, iii) implementation and monitoring, and iv) reporting progress on results and outputs. The said manual will outline eligibility criteria, application and reporting procedures (on activities, results, fiduciary due diligence and accounting, environmental and social safeguards etc.) and include a model Sub-Grant Agreement. The Sub-Grant Manual will be reviewed for necessary updates on an annual basis.

62. The design of the sub-grant scheme has incorporated lessons learnt, including: the efficiency of sub-grants to enable new research, promote demand-driven results, the ability for sub-grants to enable public-private partnerships (e.g., with universities and NGOs), and including explicit economic, engineering, social and other technical criteria. The review and selection of sub-grant proposals will be done by the Sub-Grant Committee, reporting to the SADC GMI Board of Directors; and the management of the sub-grant scheme will be done by the Staff in SADC GMI.

47. **To strengthen the SADC GMI's capacity to manage technical specifications, supervise and carry out review of the complex activities, the project includes both long-term and on demand Technical Assistance (TA) opportunities.** Technical Assistance is seen as key to deepen the SADC GMI's engagement on technical groundwater issues as well as provide opportunities for partnership with national, regional and global agencies involved in groundwater. Project activities will allow for collaboration with other centers of excellence and thereby strengthen the Project's ability to partner with other groundwater agencies and initiatives.

C. Financial Management and Disbursements

48. The financial management assessment was carried out in accordance with the Bank's Operational Policy 10.00 and the Financial Management Manual issued by the Financial Management Board on March 01, 2010. The objective of the assessment was to determine whether the project's principle implementing entity (University of Free State, UFS) has acceptable financial management arrangements, which will ensure: (1) that the project funds are used only for the intended purposes in an efficient and economical way, (2) the preparation of accurate, reliable and timely periodic financial reports, and (3) safeguard of the assets.

49. The overall conclusion of the financial management assessment is that the project's financial management has an overall risk-rating of "**Low**" and the financial management arrangements satisfy the Bank's minimum requirements under the Bank's policy and procedures on financial management, OP/BP 10.00.

50. **Budgeting**. The budget preparation for the project will be done by the Director of Research Development who is a qualified chartered accountant. Once the budget is approved, it will be uploaded in PeopleSoft (financial system) and any proposed changes will be renegotiated with the GEF. This system has automated controls to prevent any processing if the funds are exhausted.

51. **Accounting**. UFS is using a computerised accounting system called PeopleSoft. The system is reliable to produce necessary reports required to manage and monitor the financial operations. The system is also flexible to create specific project accounts for recording and reporting on

project expenditures. For the small Sub-Grants, the UFS will establish a simple reporting mechanism and put in place a simple monitoring and control system for each grant. These mechanisms will be detailed in the Sub-Grant Manual. The sub-grants will be subject to external audit processes. Director of Research Development will be responsible for accounting and reporting on the grants operations.

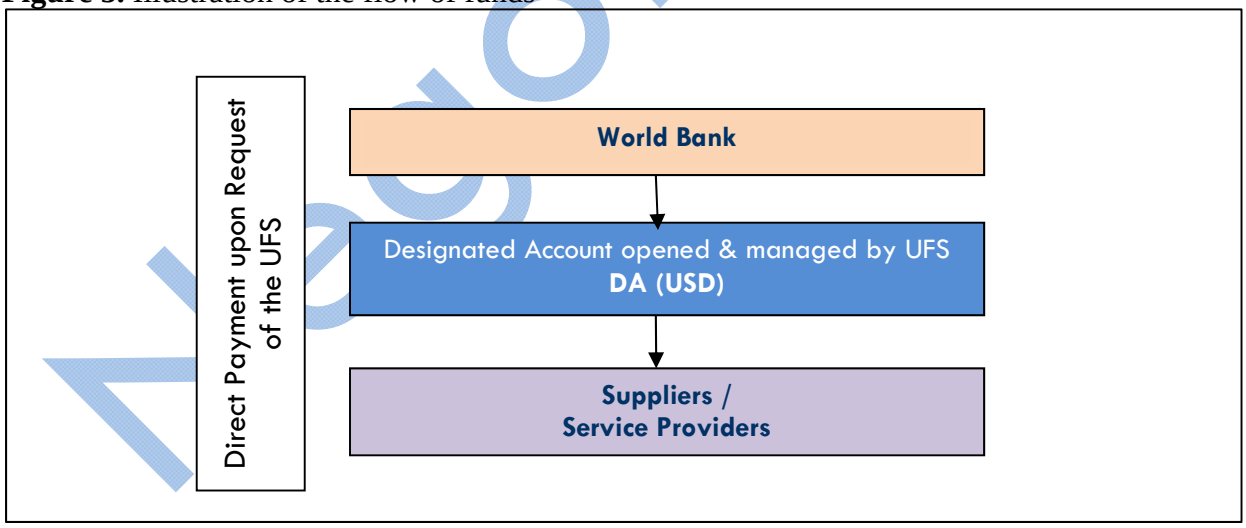
52. **Staffing, Internal Control and Internal Audit.** The overall responsibility for financial management matters for the project rests with the Director of Research Development. The project will use the UFS's internal control framework to ensure that funds of the project will be utilised for purposes intended. The review of framework indicated that it is adequate to manage the project. It is not envisaged that the project will use the entity's internal audit resources due to the size of the operations.

53. **Financial Reporting.** UFS will produce the required reports to manage and to monitor the project on regular basis. Interim Financial Reports (IFRs) will be produced on a quarterly basis. The contents of these reports should consist of financial reports, including statements of :(i) sources and uses of funds, (ii) uses of funds by project components and activities, (iii) Designated accounts Activity Statements, and (iv) statements of contracts subject to/ and not subject to the Bank's prior review.

54. As this is the small sub-grant for identified activities, project Specific Annual Financial Statements will be prepared and submitted to the Bank

55. **Funds Flow and Disbursement Arrangements.** Funds will flow from the Bank to the Designated Account (DA) opened and managed by UFS. Funds in the DA will be used to finance bank eligible activities of all the components of the project.

Figure 5. Illustration of the flow of funds



56. Disbursement of the funds will be based on quarterly interim unaudited financial reports (IFRs). These reports will include the reports and statements stated above.

57. An advance will be made to the Designated Account at the effectiveness of the Grant and the request of the Recipient. The advance will be meant to cover project expenditures for six months as indicated in the initial six-month cash flow forecast. After every subsequent quarter, the project will submit IFRs which will include a cash flow forecast for the following six month

period. The cash request at the reporting date will be the amount required for the forecast period as shown in the approved IFRs less the balance in the Designated Account at the end of the quarter.

58. The option of disbursing the funds for large payments through direct payments from the grant account will also be available. Withdrawal applications for such payments will be accompanied by relevant supporting documents such as copies of the contract, contractors' invoices and appropriate certifications. The university will also establish a simple monitoring, control and reporting mechanism and that will be spelt out in the grant manual. Accounting will be consolidated at the University level.

59. For larger grants (which the University will establish a thresholds), funds will be advanced on the basis of milestones based on contracts from the University to the Sub-Grant beneficiary to be verified prior to the disbursement of the next advance; and supporting documentation evidencing that a significant percentage of the previous advance has been accounted for. For small sub-grants funds may be advanced on a one time basis, provided that adequate monitoring and evaluation mechanism are in place, as spelt out in the Sub-Grant Manual.

60. **Auditing.** The project financial statements will be audited annually in accordance with International Standards on Auditing as promulgated by the International Federation of Accountants (IFAC). The audit report for the project specific activities will be submitted to the Bank within six months after the financial year-end. It will disclose the information on activities financed by the Grant. A detailed management letter containing the auditor's assessment of the internal controls, accounting system and compliance with financial covenants in the Grant Agreement, suggestions for improvement, and management response to the letter will be submitted to the Bank together with the audited financial statements. The Audit Terms of Reference (ToRs) will be developed, agreed between the UFS and prospective auditors, and cleared by the Bank prior to signing of the Grant Agreement, to ensure adequacy of the scope of the audit.

Table 5. Audit reporting requirements

Audit Report	**Due Date**
Project Specific Financial Statements	Within six months after the end of each fiscal year-30 June each year

Table 6. Eligible Expenditures (US$)

Category	**Amount of the GEF Grant Allocated** (expressed in USD)	**Amount of the CIWA Grant Allocated** (expressed in USD)	**Percentage of Expenditures to be Financed** (inclusive of Taxes)
(1) Works, goods, non-consulting services, consultants' services including audits, Training and Operating Costs for the Project (except Parts A.3, D.1 and D.2)	7,000,000	2,000,000	78% of Eligible Expenditures under the GEF Grant, and 22% of Eligible Expenditures under the CIWA Grant

(2) Subgrants under the Small Subgrant Scheme for Activities under Parts A.3, D.1 and D.2 of the Project	1,200,000		100%
TOTAL AMOUNT	**8,200,000**	**2,000,000**	

D. Procurement

61. **Procurement provisions and review thresholds.** Procurement for the proposed project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" published by the Bank in January 2011, and the World Bank's "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers," published by the Bank in January 2011.

62. A procurement capacity assessment has been conducted for the University of the Free State in October 2013 as the hosting institution for the Project and the SADC Groundwater Management Institute. UFS ascribes to competitive bidding and open and transparent procurement. Its internal procedures in some cases are similar to those of the Bank. As UFS staff have not had the opportunity to work on Bank financed projects, a detailed procurement and consultant selection training session will need to be organized. The findings of the Procurement Risk Assessment Management System (PRAMS) conclude that the implementing agency risk is rated as Moderate Risk.

63. Considering the types of procurements and consultant selections envisaged, the capacity of the UFS is deemed adequate provided (i) the training above is undertaken, (ii) selected contracts are subject to prior review (iii) enhanced procurement and technical support from the Bank is provided during the grant's implementation.

64. **Procurement of Works.** Works to be procured under this project are estimated in aggregate at US$200,000 million. This will include minor civil works to improve facilities to the SADC GMI's office. The procurement of works will be done using the World Bank's SBDs for all procurement under ICB and NCB as appropriate. Shopping procedures may also be used where applicable by inviting and comparing not less than 3 quotations from suitably qualified contractors. Direct Contracting may be used when competition is not advantageous with the World Bank's prior review and approval. Pre-qualification of contractors is not envisaged under this project as only minor works are expected to be carried out.

65. **Procurement of Goods.** Goods to be procured under this project are estimated in aggregate at US$400,000 million. The procurement of goods will be done using the World Bank's SBDs for all procurement under ICB and NCB as appropriate. Shopping procedures may also be used where applicable by inviting and comparing not less than 3 quotations from suitably qualified suppliers. UN Agencies and direct contracting may also be considered with the World Bank's prior review and approval.

66. **Procurement of Services** (other than consultants' services) to be procured under the project estimated in aggregate at US$200,000 million will include printing, services for contracts for installation and technical support of telecommunication and computerised systems and public awareness campaigns among others. The project will use the World Bank's SBDs for both ICB and NCB as appropriate. Shopping procedures may also be used where applicable by inviting and comparing not less than 3 quotations from suitably qualified suppliers.

67. **Commercial Practices.** Procurement of goods, works, services and consultant services under the small Sub-Grant Scheme involving the use of a financial intermediary for on financing to beneficiaries may, where appropriate, follow well-established private sector procurement methods or commercial practices that shall be acceptable to the Bank. These commercial practices will be explained in detail in the Sub-Grant Manual (developed under Component A5) of the project to be reviewed and approved by the Bank and should include adequate mitigation and control measures against fraudulent and corruption. Consideration will also be given whenever practical to the use of competitive methods as outlined in the Banks Procurement and Consultant Selection guidelines of January 2011. The management of the sub-grants will be based on detailed procedures stated in the Sub-Grant Manual acceptable to the Bank.

68. **Community Participation in Procurement.** Procurement of goods, works and services under the small Sub-Grant Scheme where appropriate may follow methods that entail Community Participation in Procurement that shall be acceptable to the Bank. These methods for Community Participation in Procurement will be explained in detail in the Sub-Grant Manual developed under Component A5 of the project to be reviewed and approved by the Bank and should include adequate mitigation and control measures against fraudulent and corruption and must ensure efficiency and value for money. Consideration will also be given whenever practical to the use of competitive methods as outlined in the Banks Procurement and Consultant Selection guidelines. The management of the small Sub-Grants will be based on detailed procedures stated in the Sub-Grant Manual acceptable to the Bank.

69. **Selection of Consultants.** Consultants' services required for firms and individuals are estimated in aggregate at USUS$4.80 million to cover consultancies for: (a) Specialist Technical Assistance support to the project; (b) technical reviews and evaluations; (c) subsector studies; (d) training module development; (e) surveys; (f) impact evaluations; and (g) project management services among others.

70. **Training.** This category would cover all costs related to the carrying out of study tours, training courses and workshops; i.e., hiring of venues and related expenses, stationery, and resources required to deliver the workshops as well as costs associated with financing the participation of community organisation in short-courses, seminars and conferences including associated per diem and travel costs. Training projects would be part of the Annual Work Plan and Budget and will be included in the procurement plan. Prior review of training plans, including proposed budget, agenda, participants, location of training and other relevant details, will be required only on annual basis.

71. **Operating Costs.** Incremental operating costs include expenditures for maintaining equipment and vehicles, fuel, project management costs, office supplies, utilities, consumables, allowable travel per diems and, allowable travel and accommodation expenses, workshop venues and materials. These will be procured using the Borrower's administrative procedures, acceptable to the World Bank.

72. **Works, Goods, Services and Consultant Services procured by beneficiaries of the small Sub-Grants**. The Sub-Grants Scheme includes in aggregate US$1.20 million for small grants of up to a maximum of US$70,000. Annex 2 on Detailed Project Description outlines preliminary implementation objectives and processing for the small sub-grants including eligible activities, expenditure, evaluation criteria and procedures.

73. **Assessment of the Project Implementing Entity's capacity to implement procurement.** The University of the Free State (UFS) as host institution of the SADC Groundwater Management Institute (SADC GMI) will take the lead on all procurements and consultant selections. The SADC GMI is still to be operationalised and therefore, the UFS systems will be used to implement the project. At UFS, the Provisioning Section under the Finance Department is tasked with all procurement related functions. It is headed by the Head Provisioning who reports to the Senior Director Finance and is in turn supported by some 23 staff with adequate qualifications and experience. All procurements of less than ZAR250,000 are done through obtaining three quotes (Shopping). Those costing ZAR250 to ZAR1.0 million are done through three closed tenders or open tendering. Those costing more than ZAR1.00 million are done through open tendering. A Tender Committee has been formed and approves all awards of open tenders. Procurements of less than ZAR250,000 are approved by the Chief Director, Director Finance (ZAR50,000) or Head Provisioning (<ZAR15,000). Delays in obtaining procurement clearances are therefore not envisaged. Over the last two years UFS has successfully handled funds from international partners of in excess of US$5.0 million equivalent. With the World Bank specific procurement and consultant selection training and the additional support during implementation, the capacity of UFS is deemed adequate.

74. **Procurement Supervision.** Given the regional context and the project risk above indicated, an annual Post Procurement Review will be conducted in addition to the semi-annual supervision missions by the World Bank. The annual Post Procurement Review will be carried out either by the World Bank or World Bank-appointed consultants. The frequency of procurement supervision missions will be once every six months and special procurement supervision for post procurement reviews will be carried out at least once every twelve months.

75. To enhance the transparency of the procurement process, UFS shall publish the award of Contracts procured under ICB procedures or selected under QCBS method, generally within two weeks of receiving the World Bank no-objection to the recommendation of award of Contract, in accordance with the Procurement and Consultant's Guidelines.

76. **Procurement Plan.** UFS developed a draft Procurement Plan for project implementation. The draft procurement plan for Goods, Works and Consultant Services by component can be found below. The Procurement Plan will be updated annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

PROCUREMENT PLAN

I. General

Project information: The Sustainable Groundwater Management in SADC Member States Project is supported by a US$8.20 million Grant from the Global Environment Facility (GEF) and a US$2.00 million Grant from the multidonor trustfund Cooperation on International Waters in Africa (CIWA). This recipient of the grants for this regional project is the Southern African Development (SADC) Secretariat in Botswana, but who applies the subsidiarity principle for

project implementation and hosting of the SADC Groundwater Management Institute (SADC GMI) to the University of the Free State, located in Bloemfontein in South Africa. The project is intended to run until June 30, 2019.

Bank's approval Date of the procurement Plan: TBC

Date of General Procurement Notice: TBC

Period covered by this procurement plan: 18 months from Project effectiveness.

II. Works, Goods and Non-consulting Services

A) Implementing Agency: the University of the Free State

Table A1. Prior Review Threshold: Goods, works and non-consulting services

	Procurement Method	Procurement Method Threshold $US	Prior Review Threshold
WORKS			
1.	ICB	>=$20,000,000	>=15,000,000
3.	NCB	>=$200,000 - <$20,000,000	As per procurement plan
4.	Shopping (Small contracts)	<$200,000	As per procurement plan
5.	Direct Contracting	N/A	All
Goods and Services (Excluding Consultants Services)			
1.	ICB	>=$5,000,000	>=3,000,000
2.	NCB	>=$100,000 - <$5,000,000	As per procurement plan
3.	Shopping	<$100,000	As per procurement plan
4.	Direct Contracting	N/A	All

Procurement Packages Subject to Bank Prior & Post Review with Selection Methods & Time

Table A2. Procurement Package

1	2	3	4	5	6	7
Ref No.	**Contract (Description)**	**Estimated Cost** (US$ '000)	**Procurement Method**	**Review by Bank (Prior/ Post)**	**Expected Bid-Opening Date**	**Comments**
1.	Office furniture	50	Shopping	Post	Aug 2014	
2.	ICT infrastructure	200	Shopping	Post	Sep 2014	
3.	Vehicles	120	Shopping	Post	Nov 2014	
4.	Website/ meta data base	60	Shopping	Post	Nov 2014	
5.	Layout /graphic profile	25	Shopping	Post	Oct 2014	
6.	Publications and folders	25	Shopping	Post	Nov 2014	
7.	Radio/television outreach	15	Shopping	Post	Feb 2015	

III. Selection of Consultants

Prior Review Threshold. Selection decisions subject to Prior Review by Bank as stated in Appendix 1 to the Guidelines Selection and Employment of Consultants.

Table A3. Prior Review Threshold: Consultants

	Selection Method	Selection Method Threshold	Prior Review Threshold
1.	QCBS	>=$300,000	>=$1,000,000 As per procurement plan
2.	FBS, QBS, LCS and CQS	<$300,000	As per procurement plan
3.	Single Source (Firms)	N/A	All
4.	Individual Consultants	N/A	>=$300,000 As per procurement plan
5	Single Source (Individual Consultants)	N/A	All

QCBS = Quality- and Cost-Based Selection (Section II of the Consultants' Guidelines)
LCS = Least Cost Selection (Para 3.6 of the Guidelines)
CQS = Selection based on Consultants' Qualifications (Para 3.7 of the Guidelines)
FBS= Fixed Budget Selection (Para 3.5 of the Guidelines)
QBS = Quality Based Selection (Para 3.2 of the Guidelines)

Short list comprising entirely of national consultants. Short list of consultants for services, estimated to cost less than US$300,000 equivalent per contract, may comprise entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. All Terms of Reference irrespective of the value of the consultancy assignment are subject to prior review.

Consultancy Assignments with Selection Methods and Time Schedule

Table A4. Procurement Package

1	2	3	4	5	6	7
Ref. No.	**Description of Assignment**	**Estimated Cost** (US$ '000)	**Selection Method**	**Review by Bank Prior/ Post**	**Expected Proposals Submission Date**	**Comments**
1.	Director	700	IC	Prior	June 2014	
2.	Technical specialist		IC	Prior	Aug 2014	
3.	IT/communication specialist		IC	Prior	Sep 2014	
4.	Programme Officer		IC	Prior	Oct 2014	
5.	Admin support staff		IC	Post	Aug 2014	
6.	Regional consultant on SOP	60	IC	Prior	Dec 2014	
7.	Intern. consultants TWM	50	IC	Prior	Feb 2014	
8.	Intern. consultants on Infr.	60	IC	Prior	March 2014	
9.	Intern. consultants on L-T Financing	40		Prior	April 2014	
10.	International consultants on PIM	20	IC		July 2014	
11.	Consultant work SubGrant Man	25	CQS	Prior	July 2014	
12.	Consultant study on GW mitigt.	40	CQS	Prior	Nov 2014	
13.	ICT support Consultant	50	IC		Feb 2014	
14.	Consultant study on TBA	400	QCBS	Prior	Dec 2014	
15.	Consultant study on TBA	400	QCBS	Prior	June 2014	
	Total	**1,850**				

Works, goods, services and non consultant services under Small Grants Program

1	2	3	4	5	6	7
No	**Description of Assignment**	**Estimated Cost** (US$'000)	**Selection Method**	**Review by Bank Prior/Post**	**Expected Proposals Submission Date**	**Comments**
1	Works, goods, services and non consultant services under Small Grants Program	1,200	Commercial Practices and/or methods for Community Participation in Proc.	Prior Review	Sub-Grant Scheme to be in place Feb 2014	15 No. grants each of not more than US$70,000

Implementing Agency Capacity Building Activities with Time Schedule

Ref No.	Expected outcome / Activity Description	Estimated Cost (US$)	Estimated Duration	Start Date	Comments
1.	Training courses at SADC GMI	1,250,000	18 months	Feb 2014	

E. Management of Environmental and Social (including safeguards)

77. The application of the Bank's operational safeguard policies was assessed as a part of project preparation. At Appraisal, it was confirmed that the project would be classified as Environmental Category B and that the safeguard policies triggered by the Project are: OP/BP 4.01 *Environmental Assessment*, OP/BP 4.11 *Physical Cultural Heritage*, OP/BP 4.12 *Involuntary Resettlement*, and OP/BP 7.50 *Projects in International Waterways*.

78. The nature of the Project's activities are primarily technical assistance in the form of analysis, research, advisory services, training, workshops and information sharing, among others. The Project will, however, dedicate resources to the promotion of infrastructure solutions to improving groundwater management. The types of infrastructure solutions that would be promoted include: managed aquifer recharge (e.g., small water retention structures such as sand dams/river bank infiltration/infiltration ponds), well drilling and exploration practices, groundwater monitoring stations, pollution control infrastructures, operation and management of groundwater wells, aquifer monitoring stations, and so forth. The activities to promote these types of infrastructures through: capacity building, tender/design documents, specifications, financing, maintenance training, and civil works for groundwater infrastructures to the extent appropriate by SADC GMI and Member States (through small sub-grant funded activities, see Component D in Annex 2).

79. Although the Project will not *directly* finance large or widespread groundwater infrastructure constructuction across the SADC Member States, activities to promote and demonstrate them renders the project as an Environmental Category B project, and triggers the operational safeguard policy on *Environmental Assessment* (OP/BP 4.01), *Physical Cultural Heritage* (OP/BP 4.11) and *Involuntary Resettlement* (OP/BP 4.12). The fourth safeguard policy triggered by the Project is *Projects on International Waterways* (OP/BP 7.50).

80. Along with the promotion of infrastructure solutions for more sustainable groundwater management, the Project will facilitate the management of environmental and social impacts from associated interventions. As part of project preparation a Simplified Environmental Management Framework (EMF) with an Environmental Management Plan (EMP) and a Resettlement Policy Framework (RPF) was developed, disclosed and consulted in line with due diligence requirements for OP/BP 4.01, 4.11 and 4.12. The EMF-EMP/RPF provide a framework

that Member States and Project implementing agencies can adapt to local circumstances and downstream investments. The EMF-EMP/RPF will also inform any demonstration or small-scale piloting of civil works under the Project (≤15), building the experience and achievements of the pilot-schemes under the previous SADC Groundwater and Drought Management Project (GEF/WB, 2005-2011).

81. OP/BP7.50 *Projects on International Waterways* is triggered because the planned investments relating to diagnostics of select transboundary aquifers within the SADC region. This project will also finance a number of technical assistance activities focusing on: pilot demonstrations for improved groundwater infrastructure that could take place in/over transboundary aquifers solely within SADC Member States. Guidance on scaling-up will include provisions for notification as prescribed through the Revised SADC Protocol on Shared Watercourses, relevant River Basin Agreements as appropriate. The OP/BP7.50 riparian notification process is satisfied, since all riparian SADC Member States are beneficiaries of the project and involved in project preparation and implementation represented on the SADC Subcommittee of Hydrogeology who is responsible for strategic project guidance. Thirteen Member States have submitted GEF Endorsement Letters acknowledging awareness of the key design elements and components of the project (GEF Requirement, on file). Furthermore, the Revised SADC Protocol on Shared Watercourses (2000) is in force and the SADC Secretariat, which oversees compliance with the Protocol is itself mandated to implement the project by SADC Member States. Under these circumstances, the requirement for notification of other riparians does not apply.

Table 7. Safeguard policies triggered by the project

WORLD BANK OPERATIONAL SAFEGUARDS POLICIES		
Environmental Assessment (OP/BP 4.01)	Yes	
Natural Habitats (OP/BP 4.04)		No
Pest Management (OP 4.09)		No
Indigenous Peoples (OP/BP 4.10)		No
Physical Cultural Resources (OP/BP 4.11)	Yes	
Involuntary Resettlement (OP/BP 4.12)	Yes	
Forests (OP/BP 4.36)		No
Safety of Dams (OP/BP 4.37)		No
Projects on International Waterways (OP/BP 7.50)	Yes	
Projects in Disputed Areas (OP/BP 7.60)		No

F. Monitoring and Evaluation

82. The Director of the SADC GMI will be responsible for the monitoring and evaluation (M&E) of the project and will be supported by project staff who will have reporting and communication responsibilities. The routines for M&E will be integrated into the existing frameworks for reporting agreed in SADC GMI Articles of Association and in line with its future Business Plan.

83. The M&E framework for the Project will build on the agreed-upon results framework (Annex 1) and includes results indicators agreed for the GEF-5 focal area for International Waters, the CIWA multidonor trustfund, and, where applicable, the World Bank's core

indicators. The M&E reporting requirements will also be incorporated into the Project Implementation Manual and into quarterly Progress Reports to the Bank (reporting on results indicators can be done twice per year, in parallel to supervision support of the Bank's team).A mid-term review will be held approximately 2.5 years after project effectiveness. The Bank and the implementing agencies will undertake an implementation completion report upon the project's closing.

G. Role of Partners

84. Thanks to global and regional initiatives, there are currently resources of hydrogeological mapping and groundwater data for southern Africa along which pay greater attention to groundwater governance and capacity-building challenges. The Project aims to build a platform, through the SADC GMI as an interlocutor, to connect groundwater-experts, decision-makers, and representatives from groundwater-dependent sectors (such as mining or agriculture) as well as other interested stakeholders. Through the Project's Component A, the SADC GMI will enable the establishment of a center of excellence that is located within the region. This will translate into more effective coordination and collaboration among different global and regional initiatives.

85. **UNESCO**. One of UNESCO's International Hydrological Programmes (IHP), led jointly with the International Association of Hydrologist (IAH), and in collaboration with regional partners, is the Internationally Shared Aquifer Resources Management (ISRAM) initiative. Since 2000, ISARM has provided inventories of transboundary aquifers, guidelines, and tools. With the support of the GEF, UNESCO is thereby able to provide technical expertise and enable sharing of knowledge across sectors and countries. UNESCO is also leading on promoting a high-level network of multidisciplinary experts to address the complex issues of transboundary aquifers (e.g., TWAP-Groundwater Component: GEF financed Transboundary Waters Assessment Programme).

86. In southern Africa, UNESCO-IHP (in cooperation with IGRAC, see below) has recently been given support from the Swiss Agency for Development and Cooperation (US$0.5 million) to include the Stampriet-Kalahari/Karoo Aquifer as one of three global case studies in the Groundwater Resources Governance in Transboundary Aquifers Project. The Project will promote research and cooperation through improved knowledge and recognition of groundwater, cross-border dialogue and cooperation, shared management tools and the facilitation of governance reform.

87. The UNESCO Chair in Hydrogeology is located at the University of the Western Cape's Institute for Water Studies, Cape Town. On behalf of the African Ministers' Council on Water (AMCOW) and UNESCO in Windhoek, Namibia, the UNESCO Chair has been promoting training and research on groundwater.

88. **GEF Groundwater Governance: A Global Framework for Country Action.** Together with the GEF, UNESCO, IAH and the World Bank, FAO is leading the GEF Groundwater Governance Project. Its aim is to "raise awareness of the paramount importance of sustainable groundwater resource management in averting the impending water crisis, while influencing political decision-making toward better stewardship of groundwater resources worldwide". The GEF Groundwater Governance project focus on human behaviour that determine groundwater use and abuse with the view of reversing groundwater depletion and unsustainable management

by adopting groundwater resources governance that shifts management from institutions to individual water users. As a final result, the project will develop a global "Framework of Action" (FA), consisting of a set of effective governance tools: guidelines for policies, legislation, regulations and customary practices. The FA will aim to foster the evaluation of groundwater as a key natural resource, and of the social, economic and ecological opportunities that sustainable groundwater management could provide through an interdisciplinary dialogue. Overall, the project promotes regional groundwater governance diagnostics and provides policy makers with science-based guidelines for informed decision making through training, consultations and country case studies (for example South Africa and Tanzania). For example, the consultation in sub-Saharan Africa completed in May 2012 emphasised, amongst others: the need to learn from the groundwater users who used to live with water; that attention need to be given to effective decentralisation of the application of groundwater policies and principles; the avoidance of duplication in laws and regulations (harmonisation); that capacity building should constitute a pillar of any policy; and, that decisions makers at all levels aware of the economic value of groundwater and how it supports the ecosystems.[36]

89. **International Groundwater Resources Assessment Center, IGRAC**. With the support of UNESCO, WMO & the Netherlands Government, IGRAC promotes to include groundwater fully in the assessment of global freshwater resources in order to encourage and enhance the conjunctive and sustainable utilisation of both groundwater and surface water. Relevant project activities include: 1) the creation of a Global Groundwater Information System (CGIS), including a participative Global Groundwater Monitoring Network (SADC-workshop Nov 2012) and 2) the establishment of guidelines, protocols, and contributions to transboundary groundwater assessment programmes. Together with UNESCO-IHP, IGRAC is executing the Groundwater Component of the GEF-TWAP and the SDC-funded Groundwater Resources Governance in Transboundary Aquifers Project. In both projects IGRAC is providing technical support and setting up the information management systems. Together with BGR and other partners (African Groundwater Network/Cap-Net, ANBO, IWMI) and largely based on GW-MATE (World Bank) expertise, IGRAC recently initiated developing a course on Groundwater Management for (African) River Basin Organisations. The first course was conducted for ORASECOM in September 2013.

90. **Africa Groundwater Network & CAP-Net**. Advocating and raising awareness on the value and potential of groundwater in Africa is the priority of the Africa Groundwater Network (AGW-Net). AGW-Net contributes to capacity building at multiple levels, encouraging information sharing by building networks between surface and groundwater practitioners, while fostering academic cooperation. AGW-Net is part of the global initiative Capacity Building for Integrated Water Resource Management (CAP-Net).

91. **WaterNet.** The regional network, WaterNet, promotes training, research and outreach on IWRM to academics, technical experts and government officials in southern and eastern Africa. With annual conferences and an online-presence, WaterNet aims to strengthen regional institutions and human capacity. WaterNet works on behalf of SADC and together with national and international initiatives.

[36] http://www.groundwatergovernance.org/fileadmin/user_upload/groundwatergovernance/docs/Nairobi/Final_Report_Nairobi_opt.pdf (May 2012).

92. **The SADC Grey Literature Archive**[37]. With support of the British Geological Survey, GIZ, UKAid and AusAid, SADC has developed a Groundwater Grey Literature Archive. The archives have collected and organised historical documents (dating from the 1890-1970).38

93. **SADC Hydrogeological Mapping Project and SADC Water Information Sharing Hub.** Also with the support of GIZ, UKAid and the EU, a SADC Water Information Sharing Hub has been set up, presenting among others, the SADC Hydrogeological Mapping Project.39

94. **The International Atomic Energy Agency (IAEA)** has made significant contributions to various national groundwater resource assessments. This support could be extended to the role of the environmental isotopes analysis to transboundary aquifers.

[37] http://www.bgs.ac.uk/sadc/reportSearch.cfm
[38] Additional efforts have been made by organisations such as IAH and IGRAC on meta-data base of literature and other information. The GMI has a unique opportunity to provide a platform for sharing the collective data and sources.
[39] http://www.sadcwaterhub.org/content/sadc-hydrogeological-mapping-project-final-report

ANNEX 4: OPERATIONAL RISK ASSESSMENT FRAMEWORK (ORAF)

Sustainable Groundwater Management in SADC Member States Project

Appraisal

<table>
<tr><td colspan="5">Project Stakeholder Risks</td></tr>
<tr><td rowspan="2">Description :
There is a risk of insufficient coordination and consultation among key agencies involved in project implementation, at regional and Member State level; as well as among parallel groundwater initiatives in the region. Furthemore, stakeholders may not prioritise groundwater as surface water issues supersede groundwater challenges (e.g., RBOs).</td><td>Rating</td><td colspan="3">Moderate</td></tr>
<tr><td colspan="4">Risk Management:
With the operationalisation of the SADC Groundwater Management Institute (SADC GMI), there is an opportunity to build a platform for cooperation and communication among key stakeholders, beneficiaries and parallel initiatives. The SADC GMI will have clear reporting lines to the SADC Secretariat as well as focal points and focal groups at national level. Moreover, the Articles of Association of the SADC GMI (registered as a not-for profit company in South Africa, June 2011) outlines the governance structure where the SADC GMI has a Board of Directors (consisting of at least 3 Directors, including the head of the SADC Water Division and the Director of the Institute for Groundwater Studies at the University of the Free State). The Articles also outline the obligations and roles of Members of the SADC GMI, including selected representatives from the SADC Member States serving on the SADC Subcommittee on Hydrogeology. Management of risks related to surface water prioritisation will be mitigated through the continued awareness raising of groundwater and promotion of groundwater into existing institutional frameworks (such as river basin agreements and worksplans).</td></tr>
<tr><td colspan="2">Resp: client</td><td>Stage: Implementation</td><td>Due Date: Not yet due</td><td>Status: SADC GMI will hold Board of Directors meetings in early 2014.</td></tr>
<tr><td colspan="5">Implementing Agency Risks (including Fiduciary Risks)</td></tr>
<tr><td colspan="5">Capacity</td></tr>
<tr><td rowspan="2">Description :
There is a risk that the GMI is slow to operationalise and rapidly meet the expected role of an interlocutor of groundwater issues in the region and implementer of the project.</td><td>Rating:</td><td colspan="3">Low</td></tr>
<tr><td colspan="4">Risk Management:
During preparation, substantial effort has made by the SADC Secretariat, the University of the Free State (hosting agency of SADC GMI) and the Bank to consolidate the readiness of GMI to take on the project responsibilities.

A Roadmap for initiating the operationalisation of the SADC GMI has been completed and will be presented for the Board of Directors during early 2014.</td></tr>
<tr><td colspan="2">Resp: WB, client</td><td>Stage: Preparation/ Implementation</td><td>Due Date: ongoing</td><td>Status: ongoing</td></tr>
<tr><td colspan="5">Governance</td></tr>
<tr><td>Description:</td><td>Rating</td><td colspan="3">Low</td></tr>
</table>

There is a risk of unclear governance structures as the project is implemented by the SADC GMI and the University of the Free State in South Africa (using the latter's fiduciary processes and systems), on behalf of the SADC Secretariat in Botswana. There is risk of weak governance in the implementation of the Sub-Grant Activities under Component A3 and Component D1&2	Risk Management: An MoU between the SADC Secretariat and the University of the Free State has been drafted and is expected to be signed in early 2014. SADC GMI will apply for SADC subsidiarity status as an output of the Project. The governance obligations are outlined and agreed in the SADC GMI (Memorandum & Articles of Association, notarily approved in June 2011). The Sub-Grant Manual will be prepared and completed, satisfactory to the Bank, before any withdrawals can be made from the expenditure category for the Sub-Grants. The review/selection process of the small competitive grants will be done in accordance with Grant Agreement provisions for sub-grants; meaning adequate fiduciary systems are in place, accounting, environmental and social compliance and monitoring of results (including audits upon the request of the Project Implementing Entity or the World Bank).			
	Resp: client	Stage: Impl.	Due Date : ongoing	Status: ongoing
Project Risks				
Design				
There is a risk that project activities do not meet expectations of SADC Member States.	Rating:	Low		
	Risk Management : Project design builds on previous GEF financed SADC Groundwater and Drought Management Project, and is fully aligned with SADC Mandates, Protocol/Strategy/Policy on water and shared watercourses, as well as the SADC Regional Strategic Action Plan III (2013-2015)			
	Resp: client	Stage: Implementation	Due Date: ongoing	Status: ongoing
Social & Environmental				
There is a risk that the infrastructure promoted as part of Component D (small scale, localised civil works) could have social and environmental impacts. Any demonstration/pilot civil works may have the risk of negative social and environmental impacts. Activities in transboundary aquifers (TDAs and SAP – see component C) will address issues related to international waters (OP/BP7.50).	Rating:	Low		
	Risk Management : Though the grants are not envisaged to directly finance large scale infrastructure interventions, civil works will be promoted for more sustainable and efficient groundwater management across SADC Member States. These will be promoted together with guidance on management of environmental and social impacts. A simplified Environmental Management Framework has been drafted and has been consulted and disclosed. Any work related to transboundary aquifers will follow the standards and routines for notification as guided by the Revised SADC Protocol and World Bank OP/BP 7.50 Projects on International Waterways. Of the 15 SADC Member States, 13 Government representatives (the GEF Focal Points) have submitted formal Endorsement Letters for the Project. The OP/BP7.50 riparian notification process is satisfied, since all riparian SADC Member States are beneficiaries of the project and are represented on the SADC Subcommittee of Hydrogeology who is responsible for strategic project guidance (instead of riparian notification letters).			
	Resp: WB / client	Stage: Preparation/ Implementation	Due Date: ongoing	Status: ongoing
Program & Donor				
Risk of incompatible donor support to implementing agencies challenging the achievement of PDO.	Rating:	Moderate		
	Risk Management: The Bank has been active in consultation with the International Cooperating Partners for Water resources in SADC			

	Region (in particular GiZ, UKAid, AusAid, USAID, WMO and others). Outreach for coordination has also been established with UNESCO-IHP, IGRAC, IAH, as well as academic institutions globally and in the region. Consultation will continue from the Bank's side, and led primarily through the consultation and outreach activities of the SADC GMI during implementation.			
	Resp: Client, WB	Stage: Implementation	Due Date: ongoing	Status: ongoing
Delivery Monitoring & Sustainability				
Description : There is a risk that results are not monitored or evaluated satisfactorily. There is a risk that the SADC GMI will not be financially sustainable after the completion of the Project.	Rating:	Moderate		
	Risk Management: As part of preparation, the results indicators relevant for the GEF and CIWA grants have been identified and incorporated into the Project's Results Framework (RF). The RF will also be adopted into the regular reporting as part of the Project's progress reporting during implementation. Furthermore, activities related to supporting Member States in undertaking impact evaluation have been included in the project. The risk of financial sustainability of the SADC GMI will be mitigated by, amongst others, dedicated study & plan to seek and secure grants and revenues for the institute (see Component A). The SADC GMI is also envisaged to partners with academic institutions to obtain research grants, as well as engage with private sector agencies in the provision of sector services on groundwater challenges.			
	Resp: client	Stage: Implementation	Due Date: not yet due	Status: Project activities include mitigation measures
Project Team Proposed Risk Rating				
Implementation	Rating:	Low		
Comments: The overall risk rating of the project for implementation is deemed 'Low' considering investments into the SADC GMI, alignment with the priorities of the SADC Secretariat and the SADC Member States, and endorsed hosting arrangements and fiduciary management at the UFS.				
Overall Risk Ratings:				
Implementation	Rating:	Low		
Comments: Same as above				

ANNEX 5: IMPLEMENTATION SUPPORT PLAN

Sustainable Groundwater Management in SADC Member States Project

1. **Strategy and Approach for Implementation Support.** The regional nature of the Project, involving 15 SADC Member States as well as multiple stakeholders from the local to the global levels, and from the public sectors to the private and academic, makes the Project unique. Together with the complexities of implementation arrangements (Annex 3), this means that the Bank's Implementation Support (IS) would prioritise operational, technical, and communication expertise. Technical support will focus on groundwater management issues, brokerage of potential partnerships, strengthening linkages to national level investment into groundwater, ICT and effective governance/institution-building and communication.

2. **Implementation Support Plan**. The team missions will work towards ensuring that the work-plans are realistic and proceed effectively, in order to provide assistance and 'trouble-shooting' of any emerging bottlenecks in consolidating the governance structure of the project and of the SADC Groundwater Management Institute, and also to monitor factors that undermine the sustainability of the project (such as insufficient financing and weak institutional capacity). Another focus for implementation and support missions will be to ensure that the engagement and outreach with national focal points and national focal groups are effective in supporting activities at the Member States level and that networks of groundwater practitioners are both strengthened and encouraged. The Bank will also provide support in reviewing key procurements from both technical and fiduciary standpoints.

3. Two supervision missions will be scheduled each year, and the Bank team will explore opportunities to effectively collaborate with cooperating partners and regional initiatives. Regular contact will be maintained with the Head of the Water Division at the SADC Secretariat's Directorate for Infrastructure and Services, the Director of the SADC GMI, and the Director of the University of the Free State's Institute for Groundwater Studies. Progress will be monitored against an agreed work plan and through quarterly joint reporting in an agreed format. Although the team's staff members are spread across offices in Pretoria, Washington, D.C. and Gaborone, the team comes together for missions and maintains regular communication.

Table 8. Implementation Support staff and skills required per year

Skills Needed	Weeks/Yr	No. of Trips	Comments
Task Team Leader	12	As required	Country office/HQ-based
Groundwater Specialist	6	As required	Country office-based
Hydrologist/Water Resources Specialist	4	As required	HQ-based/Consultant
ICT Specialist	4	As required	HQ-based/ Consultant
Communication Specialist	2	As required	Country office-based
Operations Analyst	6	As required	Washington DC-Based
Team Assistant	8	As required	Country office-based
Environment Specialist	3	As required	Washington DC-Based
Social Specialist	3	As required	Washington DC-Based
Procurement Specialist	2	As required	Country office-based
Financial Management Specialist	2	As required	Country office-based

ANNEX 6: TECHNICAL ASSESSMENT OF GROUNDWATER IN SADC

Sustainable Groundwater Management in SADC Member States Project

A. Background

1. Groundwater is a fundamental resource for social, economic and environmental sustainability in the 15 Member States of the Southern African Development Community (SADC). Human wellbeing, livelihoods, food production, ecosystems and natural habitats, industries and growing cities across the region are directly reliant on groundwater. All Member States experience rising demand for water as a result of rapidly expanding populations and economic growth. Climate change is predicted to cause exacerbated water-stress with greater groundwater drought vulnerability across transboundary aquifers and countries. The Project, *Sustainable Management of Groundwater in SADC Member States* will support decision makers, planners, implementers and research communities in southern Africa to manage present and future groundwater complexities and challenges at national, transboundary and regional levels.

2. **Groundwater and hydro-meteorological variability.** The region covered by the SADC Member States stretches from the Democratic Republic of Congo (DRC) and Tanzania at the equator, down to the southern tip of South Africa at 30° south latitude, and as far east as Mauritius at 57° longitude. Weather and rainfall conditions vary greatly; for example, from over 4,000 mm/year of average annual rainfall in the tropics of DRC to less than 50 mm/year and high evaporation in the arid conditions of the south-western deserts of Namibia. Surface waters in southern Africa are well documented in comparison to its groundwater systems. Despite data-challenges and subsequent ambiguities, it is estimated that the SADC Member States have 2,491m^3/capita/year in renewable groundwater resources (i.e., a total of 647km^3 in annual average).[40] This is a higher per capita amount than Europe and Asia separately.

3. Groundwater occurrence and resource potential in the basement crystalline, sedimentary basin and alluvial aquifer systems are better understood than in the volcanic and high relief mountain aquifers, reflecting both the relative accessibility of the available groundwater and the level of dependency of communities on that groundwater. According to the International Groundwater Resource Assessment Centre (IGRAC), the following groundwater provinces dominate the region:

- *Basement Provinces.* Precambrian crystalline basement rock forms continental-mass outcrops in 100x300 km wide bands inland from the Atlantic coast in towards Angola, Namibia, South Africa and the DRC. In large areas, groundwater is present at shallow depths. These basement provinces also dominate most of Tanzania, Malawi and Zimbabwe.
- *Sedimentary Basin Provinces.* In the depression-zones of the DRC and Kalahari basins, there are consolidated and unconsolidated sedimentary formations. The Karoo basin (predominantly in Namibia, South Africa and Botswana) is a vast raised plateau of coarse sandstone. Thick and extensive sedimentary layers can contain groundwater at substantial depths.
- *Volcanic Provinces.* A complex geology characterises the east Africa Rift Valley. Vast basalt effusions are particularly prominent in parts of Malawi, Tanzania, South Africa and

[40] Regional Groundwater Valuation Study, SADC (2011).

Botswana within the Rift valley. Groundwater quantity and quality can be affected by volcanism.

- *High-Relief Folded Mountain Provinces.* In South Africa, the Cape Fold Belt is an example of this province. Folded rocks are arranged in complex structures and contain fragmented groundwater.
- *Local alluvial aquifers* along rivers and coastlines which have important shallow aquifers recharged by rainfall and river water inflow.

4. Across the 12 continental SADC Member States (excluding Madagascar, Mauritius and the Seychelles), over 37 transboundary groundwater systems have been identified. Although some have been researched in detail, scientific information and knowledge on the characteristics and processes of these groundwater systems is lacking or difficult to obtain.

Table 9. Main Transboundary Aquifers in the SADC Region

Aquifer	Countries	Aquifer	Countries
Coastal Sedimentary basin	Angola; DRC	Ncojane Aquifer	Botswana; Namibia
Congo Intra-cratonic basin	Angola; DRC	Sand River Aquifer	Botswana; Zimbabwe; South Africa
Kagera Aquifer	Tanzania; Uganda	Nata Karoo Sub-basin/Lower Caprivi	Angola; Botswana; Namibia; Zambia
Kilimanjaro Aquifer	Tanzania; Kenya	Northern Kalahari-Karoo basin/Okavango basin	Angola; Botswana; Namibia; Zambia
Karoo Sandstone Aquifer	Mozambique; Tanzania	SE Kalahari-Karoo basin/Stampriet Orange River	Namibia; Botswana; South Africa
Rovuma Basin/Karoo Sandstone	Mozambique; Tanzania	Karoo Sedimentary Aquifer	Lesotho; South Africa
Pungwe Basin/Medium Zambezi Aquifer	Mozambique; Zimbabwe	Tuli Karoo Sub-basin/Gaborone to Shashe river	Botswana; South Africa
Save Alluvial Aquifer	Mozambique; Zimbabwe	Tosca Dolomite	Botswana; South Africa
Limpopo River basin	Mozambique; South Africa; Zimbabwe	Panda (Nyamandlovu) Aquifer	Botswana; Zimbabwe
Incomati/Maputo River basin	Mozambique; Swaziland; South Africa	Shire Valley Aquifer	Zambia; Zimbabwe; Mozambique
Umbeluzi/Rhyolite-Breccia Aquifer	Mozambique; Swaziland	Ramotswa Dolomite Basin/Ramatlabana/Molopo	Botswana; Namibia; South Africa
Coastal Sedimentary basin	Angola; Namibia	Coastal Sedimentary Basin	Namibia; South Africa
Cuvelai Etosha basin	Angola; Namibia	Eiseb Graben; N Kalahari-Karoo basin	Namibia; Botswana

5. **Social and economic importance drivers.** In southern Africa, it is estimated that over 70% of its 250 million people depend on groundwater as the primary source of water. Access to and quality of groundwater directly affects wellbeing of households and livestock, and productivity of small-scale subsistence farming for the vast majority of people living in SADC Member States. At community level, responsibility for the collection of water and management of livestock and food lies with women. Consideration to gender dimension of the access and use of groundwater is important for the sustainability and development impact of groundwater investments. Only 23% of SADC's population access water from reticulated supplies with surface waters. Formal or improved groundwater provides water to approximately 37% of the population, and over 40% of people rely on informal (unimproved) sources which are generally unsafe and often prone to drought (from both ground and surface waters).

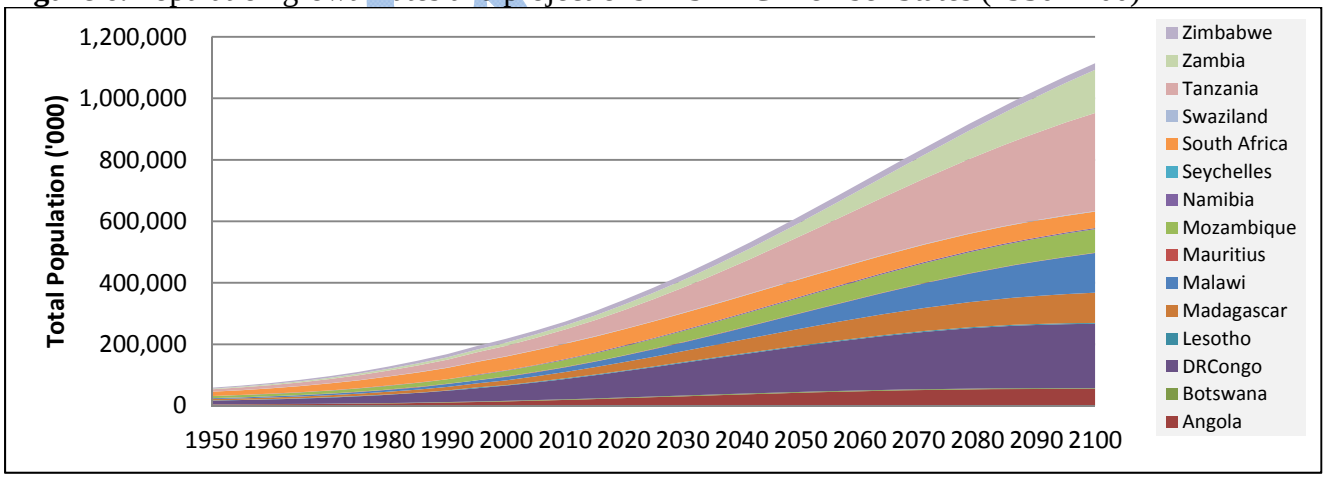
6. The expansion of industries and commercial farming has exacerbated the importance of groundwater as key to economic growth. In capital cities, such as Lusaka and Gaborone, factories and urban populations rely on groundwater as the sole source for water. With further

urbanisation and economic activities, demand will increase. Compared to surface water, groundwater is becoming more important as a source for water supply in recent years: from improving water services in small and growing towns to supplementing private and public water supply in larger cities. Groundwater is equally important for agricultural productivity and food security. At present, the agricultural sector is estimated to be the biggest water user (83%) and 12% of the water used in agriculture is generated from groundwater. A growing number of private-sector feasibility studies and investments show accelerated interest and use of groundwater for developing commercial agriculture across the region. Groundwater development in each SADC Member State largely reflects the respective importance of the resource. Member States such as Namibia, Botswana and South Africa are heavily dependent on groundwater and are actively integrating its use into their water resource management policies. Others, who rely mostly on surface water, have little data or comprehension of their groundwater resources.

7. In 2011, the SADC Secretariat commissioned a study on the economic valuation of groundwater resources. The methodology assessed the economic value of groundwater from the perspective of agriculture, mining, hydropower, groundwater dependent ecosystems (GDE) and human use against a number of future development scenarios. The valuation illustrated the striking economic importance of groundwater. For example, the Kuseb, Swakop and Omaruru aquifers in Namibia have an estimated net present value over 25 years in the order of US$1,300,000,000. Yet groundwater is not granted equal attention in national policy planning.

8. Over the next 25 years, the population of southern Africa is expected to double (see UN projects below). Rapid economic growth across Member States is expected to endure in the medium-term future; with primary drivers including strong investment, favourable commodity prices, and generally prudent macroeconomic management. The average GPD growth for sub-Saharan Africa is expected to rise to 5.7% in 2014.[41] With economic and population growth comes growing water demand and associated pressures on groundwater. Equally, the integration of groundwater with other sectors, such as agriculture and hydropower, will be increasingly important.

Figure 6. Population growth rates and projections in SADC Member States (1950-2100)



[41] Regional Economic Outlook, IMF (2013).

9. **Pollution of groundwater.** Expanding commercial agriculture (especially horticulture) in some parts of the region has led to the contamination of aquifers with fertilizer derived nutrients.[42] Activities in the domestic, agricultural, mining, industrial and urban sectors also degrade groundwater resources. The widespread use of on-site sanitation in rural and urban areas causes contamination of shallow aquifers in fractured or karst bedrock with pathogens and nitrates. Additionally, groundwater has been over-drawn in some urban and peri-urban areas. For example, the joint practices of waste disposal and uncontrolled drilling of boreholes in Lusaka greatly contribute to a simultaneous drop in water levels and increase in the contamination of the unconfined aquifer underlying the city. The same holds for Dar es Salaam were shallow private wells are threatened by contamination from domestic pollution deriving from latrines and waste dumps. Mining activities can also lead to the contamination of aquifers with bacteria and other contaminants as well as the extensive loss of water. They may even lead to the destruction of some aquifers to the detriment of other users. Pollution from mineral processing has resulted in contamination of aquifers with arsenic in Zimbabwe, and heavy metals and sulphates in shallow groundwater systems in Botswana.

10. **Groundwater and drought.** About a third of SADC's population lives in drought prone areas and over half are negatively affected by drought. The direst conditions are present across south-western Africa, where groundwater is often the only source of water. Groundwater is also essential for wildlife and other biota in dryland areas. Consequentially, these areas that often attract tourism (e.g., the Okavango basin). Groundwater drought occurs when there is a decline in recharge, levels, storage and discharge. When there is groundwater drought in the arid parts of southern Africa, livelihoods are destroyed, raising risks for social upheaval and distressed ecosystems and natural habitats. After droughts, groundwater systems take longer to recover. In some cases groundwater levels never return. For example, in parts of the Limpopo Province in South Africa, annual recharge has been insufficient to allow levels to recover to the pre-1992 drought. The lack of hinders the understanding and remedial actions needed when groundwater systems systematically weakened through drought.

11. One of the key advantages of groundwater is its reliability. After surface rivers and streams have dried up, groundwater can still be accessed through wells, springs and boreholes. Because aquifers react much more slowly to changes in rainfall, they can bridge surface water deficits and provide a buffer between dry and wet seasons. The buffering capacity is not without limits. Under certain conditions - for example rising dry season demand and reduced recharge from rainfall - some groundwater sources may fail, and a groundwater drought may occur. Managed aquifer recharge (MAR) and storage, however, can be sharply increased through a systematic mapping and design of water buffering solutions.[43]

12. **Natural eco-systems and groundwater.**[44] Ecosystems in the region are greatly dependent on groundwater. It is clear that the impact of groundwater drought is likely to be greatest in natural wetland ecosystems such as the Okavango Delta in Botswana, the Zambezi, and the Kafue. Flood plains like those of the Luangwa in Angola and Zambia could also be affected.

[42] For example, fertilizers contaminate shallow alluvial aquifers with nitrates in the middle stretches of the Kafue Valley, Zambia. Nitrates have entered shallow aquifers in Kutama and Sinthumule districts, South Africa as a result of modern agricultural practices under dryland cropping and excessive drawdown for irrigation has affected aquifers in districts such as the Lomagundi Dolomite aquifer, Zimbabwe.

[43] See "Profit for Storage, the cost and benefits of water buffering" on: www.bebuffered.com

[44] GDE in SADC were mapped under component 2 of the GDMP 2005-2011.

Lake Malawi/Nyassa/Niassa and Lake Chilwa in Malawi and Mozambique may feel consequences. The Oshana River system in Namibia, the sand river systems in eastern Botswana, southern Zimbabwe and northern South Africa, as well as the Dambo/Mbuga/Vlei valley systems in Zimbabwe, Zambia and Tanzania, could suffer consequences.

13. Overall, there are five recognised wetland systems: palustrine, riverine, lacustrine, estuarine and marine systems. Each of these exists throughout the region, representing specific and usually highly localised ecosystems, to include human dependence on the ecosystem services provided by the wetlands. These services include habitat for fish and other food stocks, provision of fibre and natural medicines, crops for cattle grazing, and (in some cases such as the Okavango Delta and Kruger National Park) support for wildlife upon which tourism industries depend.

14. While these ecosystems have been researched, investigations have mostly addressed botanical/wildlife/natural environment issues. The nature of groundwater dependent ecosystem interaction has not been reliably established, and is often not considered in wetland system studies. The extent to which these wetlands and other ecosystems are dependent on groundwater is not known and constitutes a fundamental knowledge gap. However, there is qualitative evidence that the existence of many of such ecosystems (and thus the existence of all flora, fauna and human activity that are part of them) may be threatened by changes in groundwater levels, groundwater discharges and/or groundwater quality.

15. **Strategic importance of transboundary groundwater systems.** Large transboundary aquifers (TBA) are at the heart of the strategic importance of groundwater in SADC Member States. Across Africa, approximately 37 transboundary aquifer systems have been identified. More than 20 of these are shared groundwater systems are located in the SADC region and all are larger than local aquifers. In several instances, there is competitive demand and use of groundwater between countries. TBAs are exposed to pollution which, in some rural communities, has reached critical levels, with outbreaks of waterborne diseases and the abandonment of wells featuring as prominent consequences. A lack of shared management, monitoring and exchange of groundwater information contributes to mismanagement, which in turn can be a potential source of conflict.

16. In southern Africa, there has been an increase of legal agreements and institutional frameworks to enable transboundary cooperation and integrated water resource management in shared watercourses over the past two decades. At the regional level, the Revised SADC Protocol on Shared Watercourses (2000) informed the ratification of a number of basin level agreements and establishment of river basin organisations (RBOs). Groundwater is considered part of 'watercourses' in the Revised SADC Protocol, as well as a number of river basin agreements. Transboundary agreements also emphasise management issues such as the control of abstraction and pollution, the protection of recharge areas, and shared management of common water resources. In spite of this, the operationalisation of commitments is often superseded by surface water priorities. This is equally the case for investments into the establishment and strengthening of river basin organisations.

17. Incorporating groundwater management into the integrated river basin approach (as part of IWRM) needs careful attention to the geohydrological relations between surface and groundwaters, as well as impact of socioeconomic drivers. Groundwater and surface waters interaction may differ across areas and scales, within national and/or transboundary basin or groundwater system scales. The table below outlines an approach to reconciling river basin

management with groundwater management priorities that applies to the range of groundwater systems and challenges in southern Africa.

18. Building linkages and synergies between national-, regional-, and river basin-level institutions and investments is needed to address conjunctive ground and surface-water management challenges. By strengthening a platform for transboundary cooperation, SADC Member States could optimise scarce human and financial resources, build joint understanding of groundwater challenges, and achieve mutual benefits in the management and development of water resources.

Table 10. Hydrologically consistent approach to reconciling river basin catchments with groundwater bodies for IWRM[45]

Hydrogeological condition	Water resource management implication
A. Important aquifers of limited extent compared to river basin in either humid or arid region	Independent local groundwater management plans required, but these should recognise that aquifer recharge may result from upstream riverflow, and downstream baseflow will often be dependent on aquifer discharge.
B. River basin underlain by extensive shallow aquifer system	Surface water/groundwater relations (and their management) require fully integrated appraisal to avoid double resource accounting and various problems (including salt mobilisation on land clearance, soil water logging and salinisation from irrigated agriculture etc.).
C. Extensive deep aquifer systems in arid regions	Groundwater flow system dominates: there is little permanent surface water and, thus, it is not helpful to adopt a river basin approach.
D. Minor aquifers of shallow depth and patchy distribution predominate	Limited groundwater interaction with river basin and (despite socioeconomic importance of minor aquifers for rural water supply) integrated groundwater/surface water planning and management is not really essential.

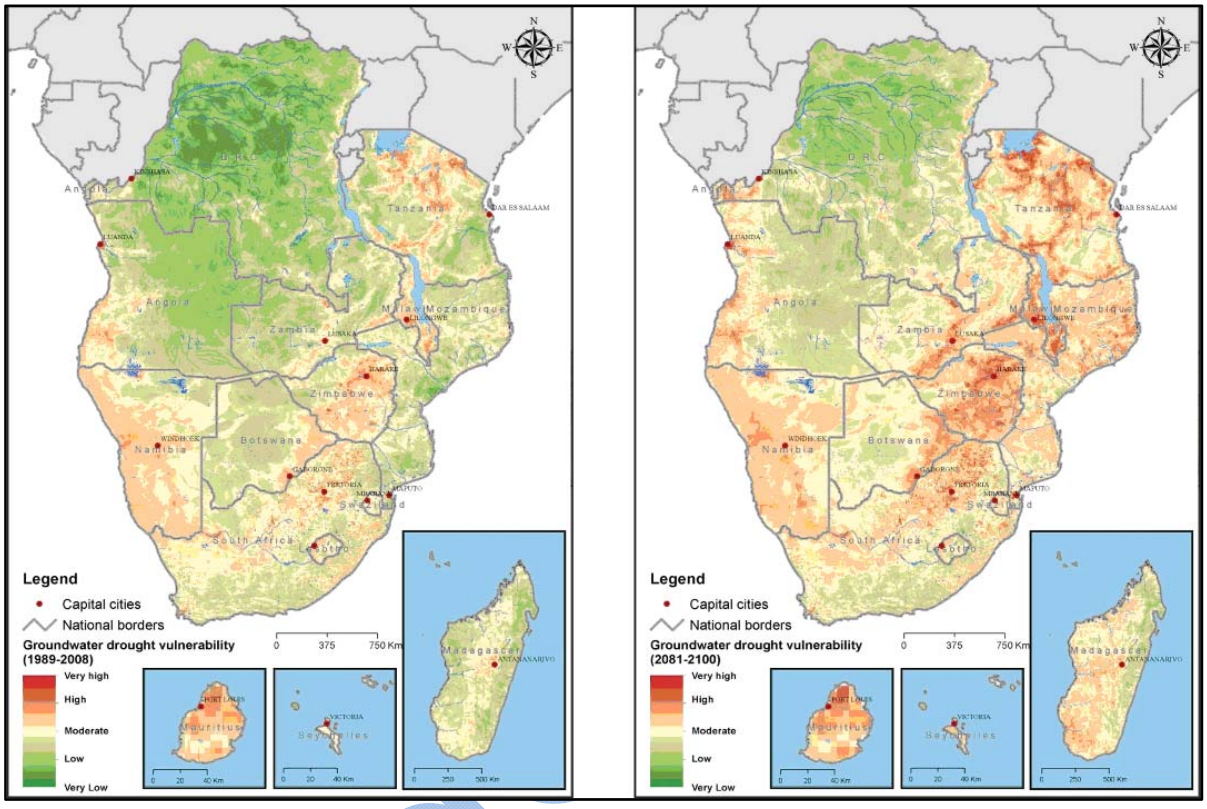
19. **Climate change.** The impact of climate change in southern Africa will pose substantial challenges to water resource management. The region is already known for climatic variability that translates into reoccurring drought and flood conditions with varying frequency and magnitude - from the deserts of Namibia to the floodplains of Mozambique. With climate change comes greater variation in rainfall and increases in temperature. By 2050, temperatures are expected to rise with 1.5-2.0°C on average in the north of the SADC region, and by 2.5-3.0°C in the south (compared to 1961-1990 average). Research by NOAA has indicated that dramatic warming of the Indian Ocean can make monsoons 10-20% drier, contributing to prolonged and more severe droughts. Figure 7 below illustrates a comparison of groundwater drought vulnerability of future climate change compared to present situation.

20. Climate change will predictably impact the use and recharge patterns of aquifers. This will impact GDEs and the extent to which communities and cities can access waters at the end of the annual dry seasons. More extreme weather and water-related events will affect the vulnerability of livelihoods and ecosystems. Longer dry seasons or prolonged droughts can strain the resilience of communities and natural systems and cause greater competition for groundwater sources.

[45] Foster & Ait-Kidi. *IWRM: How does groundwater fit in?* Hydrogeology Journal (2012). http://www.gwp.org/Global/About%20GWP/Publications/Articles/Article_SF.pdf

21. Aquifers can provide an opportunity to introduce a number of adaptive measures to climate change. Examples include managed aquifer recharge (MAR), storage, protection and expansion of recharge through flood and runoff capture. Recent developments on MAR and water buffering in many countries can be used to enhance the use of aquifers for drought resilience.

Figure 7. Groundwater drought vulnerability, present (left) and future (right)[46]



22. **Institutional capacity and frameworks**. Groundwater is not prominently featured in water legislation or policies at the national level in southern Africa. The resource is normally not considered in water planning, and there is a shortage of skills and tools within governments to monitor compliance with standards and abstraction. Institutionally, groundwater is often fragmented across different sectors such as agriculture and the urban water supply, leading to a lack of integrated management. These factors contribute to neglect, mismanagement and an absence of conjunctive management of ground and surface-water. Substantial efforts have, however, been made to strengthen institutional groundwater capacity with the support of international initiatives (see coordination section below). Developing policy guidelines and tools was also outputs of the GEF-financed *SADC Groundwater and Drought Management Project* (2005-2011). Lessons learnt from previous support across initiatives show that there is a need to advocate and follow up on implementation and adherence to policies, laws and standards at the national level.

23. Strengthening institutions is equally important to improving policy and legislative instruments. The SADC Member States have endorsed the mandate of the SADC Secretariat to

[46] SADC Groundwater Management Decision Support Guidelines based on IPCC SRES A1B (2011).

support national governments and transboundary cooperation on shared watercourses. In 2011, the SADC Subcommittee on Hydrogeology (which consists of representatives from SADC Member States) committed to the establishment of a regional center of excellence in groundwater – i.e., the Groundwater Management Institute for southern Africa (GMI). The GMI could fulfill a critical function for the promotion and implementation of institutional frameworks at the national and transboundary levels.

24. **Scientific research, knowledge and information exchange.** Among SADC Member States, research on groundwater receives meager funding and political support in comparison to other areas of science. At the international level, groundwater mapping is for the most part available as a result of long-term commitment by governments (with support from Germany, UK, France, the EU and the Netherlands among others). The integration of available information has also been made possible through initiatives by UNESCO/IGRAC, the International Hydrologist Association (IHA), and BGR (Bundesanstalt für Geowissenschaften und Rohstoffe). For example, the International Groundwater Resource Assessment Centre (IGRAC) facilitates the exchange of global groundwater knowledge. Despite such initiatives, there is a dearth of information at the local, national, and transboundary levels. Quantitative information on the characteristics of aquifers (recharge, flow regimes, quality etc.) is still meager and available information is not always as easily accessible as is shown. Some countries have more developed research programmes, such as South Africa, and in parallel to this, regional initiatives do advanced knowledge-creation and sharing. There remains, however, a need to build on achievements, create linkages between the existing initiatives, improve access to existing information and develop and link technical staff from SADCMember States to training programmes, and to enable the sharing of information.

25. **Sustainable infrastructure solutions.** Appropriate infrastructure will be increasingly important for sustainable management of groundwater. The majority of investments in groundwater infrastructure are reactive rather than proactive. With growing water demand, investments in new boreholes and wells are expanding quickly in many parts of the SADC region. Drilling for groundwater is often uncoordinated and unregulated. Due to the lack of maintenance and rehabilitation, it is not uncommon that infrastructure systems fail to operate after a short period of time. For example, UNICEF has estimated that a total of 36% of installed hand pumps in sub-Saharan Africa are not operating at any point in time and breakdown rates are as high as 60%. Sustainable groundwater is specifically important in drought-prone areas. To bridge dry and wet seasons, enhanced managed aquifer recharge and water buffering techniques (such as sand dams) can facilitate recharge of shallow aquifers which provide water to communities that are vulnerable and exposed to drought. Experiences and good practices in the SADC region, and in other semi-arid regions like the Sahel and Horn of Africa, should be shared to provide a broader portfolio on technical solutions and the guidelines to plan and develop them.

B. SADC & Water Resource Management

26. **The strategic rationale for the Project builds on supporting the vision and work-programmes of the intergovernmental organisation of SADC, and in supporting the implementation and adherence to the Revised SADC Protocol on Shared Watercourses of 2000.** In accordance with the 1992 SADC Treaty (Article 21), the Member States shall “through appropriate institutions of SADC, coordinate, rationalise and harmonise…sectoral policies and strategies, programmes in projects in areas of cooperation”. Recognising the important role of

water in fostering economic growth and cooperation, the SADC Member States signed the "Protocol on Shared Watercourse Systems in the Southern African Development Community Region" on August 28, 1995. The Protocol was later repealed and replaced by the Revised Protocol on Shared Watercourses. This was intended to align the Protocol with the provisions of the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses that had been adopted in April 1997. The Revised Protocol was signed by all SADC Member States on August 07, 2000 and is a legally binding agreement. The objective of the Revised SADC Protocol is "to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourses". To achieve its objective, the Protocol states that SADC Member States are to pursue: the establishment of agreements and institutions; promotion of sustainable, equitable and reasonable utilisation of shared watercourses; development and management of water; harmonisation of legislation and policies; and the promotion of research, information exchange, capacity building and application of appropriate technologies.

95. In 2005, the SADC Regional Water Policy and Strategy (RWP) was developed to provide strategic guidance and to incorporate principles of Integrated Water Resource Management (IWRM)[47] that had advanced since the ratification of the Revised Protocol. The RWP promotes a sustainable balance between water resources development, economic growth, food security, and the preservation of ecosystems. Moreover, the RWP emphasised the need for regional integration and cooperation between Member States and between water-related sectors (Policy statements 3.2.1-3.3.1). The Regional Water Policy provided a strategic and policy framework for the development of Regional Strategic Action Plans for IWRM.

96. **The SADC Regional Strategic Action Plan, RSAP III (2011-2015).** The RSAP serves as a work-plan for the implementation of the Revised Protocol and the Regional Water Policy, outlining concrete projects. The current SADC RSAP III (2011–2015) acknowledges the importance of groundwater to the region as a whole. A dedicated Groundwater Management Programme of Action (GMP, Programme No. 11) in the RSAP lists the following four priority project interventions:

- *Policy and Institutional Framework*: Minimum harmonised structures are established for institutional, legal and policy measures to improve groundwater management at the national and regional levels. Interactions between groundwater and surface water are also strengthened and institutionalised.
- *Transboundary Aquifer Management*: Transboundary Diagnostic Analyses and Strategic Action Plans are developed to reach an informed consensus on the factors affecting transboundary aquifers.
- *Awareness Raising on Groundwater Management*: An information and data management platform is established to integrate local and regionally applicable tool for enhancing management of shared aquifer systems. The information disseminated is derived from the SADC Code of Good Practices. The construction of subsurface dams will also be promoted.

[47] IWRM reflects the process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital eco-systems, Global Water Partnership (2005).

- *Regional Cooperation and Groundwater Management*: Provisions on groundwater management are included in shared watercourse agreements to strengthen regional cooperation and increase the resilience of these agreements to changing circumstances brought about as a result of climate change. The recent UN articles on groundwater management will be further examined and considered to be incorporated into the groundwater management agenda in the region.

97. The Project will help implementation of the above priority interventions. Therefore, the Project strengthens the agreements reached by Member States through established mechanisms for regional cooperation. The Project will also be aligned with, and strengthen, the institutional structures for cooperation on shared watercourses. SADC's institutional structure for managing and advancing the shared watercourses and IWRM-agenda is elaborated in Annex 3. Member States have also pursued cooperating at the regional level on a number of shared development challenges that are associated with groundwater. During implementation, opportunities to align with these would be explored (e.g., the SADC Protocol on Gender and Development[48]).

C. Groundwater management in SADC Member States

98. Groundwater availability, characteristics and dependency varies across the 15 Member States of SADC as outlined in previous sections. Importantly, the absence of sufficient, accurate and timely data on groundwater creates ambiguities in understanding the characterisation and renewable flow of groundwater. In the SADC region, effective rainfall (rainfall minus actual evaporation) varies from arid, where it is low and erratic and where evaporation exceeds rainfall except during rare prolonged and intense rainfall events), to tropical and reasonably consistent (where annual rainfall exceeds annual actual evaporation). Therefore, describing groundwater a the regional and national scale will range from limited to a lot. Also, basement aquifer systems are poorly permeable, shallow and situated beneath vast erosion surfaces, or plateaux, that cannot promote groundwater transport within the aquifer which limits the reliability of per capita renewable groundwater. For example, although there may be enough groundwater in an aquifer to support everybody's needs, it cannot readily be accessed because a dense network of abstraction points would be needed (prohibited by both cost and environmental constraints).

99. Despite the hydrogeological differences across Member States, and that the role of groundwater may differ between countries, a number of groundwater management challenges are shared. For example, countries such as Zambia, Namibia, Botswana and South Africa are experienceing a rapidly increasing demand for groundwter from the mining sector. Equipped irrigation is a major user of groundwater, often constituting over 60% of water use (e.g., South Africa). In all Member States, groundwater pollution is a growing concern. The rapid expansion of on-controlled drilling of boreholes and construction of shallow on-site sanitation is causing nitrate-contamination of aquifers. The table below provides a brief overview of different groundwater considerations across the SADC Member States (completed as part of consultation and completion of the Valuation of Groundwater Study done under the previous Groundwater and Drought Management Project).

[48] http://www.genderlinks.org.za/page/sadc-protocol-policy

Table 11. Overview of groundwater uses and pressures in SADC

Member States	Uses	GDEs	Pressures
Angola	• Few readily available statistics • Irrigation accounts for 65% of total abstracted water but percentage of groundwater abstracted for irrigation is not known	Little readily available information	Little readily available information
Botswana	• Supplement of village water supply • Irrigation – approximately 44% of irrigated land uses groundwater as its only source of supply. • Livestock maintenance • Diamond mining	• Okavango Delta • Kalahari pans	• Pollution (e.g., Ramotswa Dolomite) • Potential overuse by villages • Mining – contamination of heavy metals and sulphate • Amount of cattle kept has increased remarkably in recent decades impacting groundwater availability, particularly in the Kgalagadi area bordering Northern Cape Province of South Africa
DRC	Little readily available information	Little readily available information	Little readily available information
Lesotho	• Water bottling activities • Rural water supply • 10% of urban domestic water supply • Irrigation potential around Maputsoe, but low elsewhere	• Wetlands in the highlands supply most rivers and are reliant on GW	• Contamination around urban areas (from landfills, septic tanks and pit latrines)
Madagascar	• Public water supply (e.g., Majunga and Toliary) • Agriculture	Little readily available information	Little readily available information
Malawi	• Urban water supply (e.g., Madisi, Salima, Karonga, Nkhotakota and Ngabu • Rural population depends on groundwater for domestic use and for irrigation of vegetable gardens • Livestock production • Irrigation schemes (Greenbelt initiative) – potential for groundwater use • Limited use for mining	• Lake Chiuta • Vwaza marsh • Lake Chiwuta • Dambos in Lengwe National Park, Kasangu National Park, Nyika National Park and Liwonde National Park • Small dambos across the country	• In urban and peri-urban (e.g., Blantyre, Lilongwe, Mzuzu and Zomba) groundwater threaten by contamination from faecal pollution from pit latrines, dumping of wastes and land landfill sites • Agrochemicals • Alluvial shore aquifers face pollution • Mining (potential pressure)
Mauritius	• Irrigation- groundwater contributes to around one quarter of total irrigated land within the country	Little readily available information	Little readily available information
Mozambique	• Drinking water supply in a number of urban centres • Main source of drinking water in rural areas • Xi xi, Tete, Pemba fully dependant on GW	Little readily available information	• Salt water intrusion linked with tourist developments along coast • Biological contamination

Member States	Uses	GDEs	Pressures
Namibia	• Urban water supply (Caprivi strip) • Rural / domestic • Livestock – largest user of groundwater • Irrigation • Mining (West coast water use for uranium production Swakob river) • Tourism • Aquifer Storage and Recovery (ASR) • Recharge of saline water	• Oshana	• Karst Aquifer – (mining, agriculture) • Windhoek – pollution
Seychelles	• Bottled water activities, abstraction for industrial purposes • Irrigation of orchid farms • Agricultural – during very dry conditions • Domestic water supply (e.g., La Digue Island) • Saline intrusion protection and limiting water use	• Ladite island	• Ladite island water is polluted; • Potential over extraction to meet water demand
South Africa	• Irrigation, which comprises two thirds of the total groundwater abstraction. • Northwest dolomite (DLMT) aquifer systems used for irrigation/domestic supplies; • Domestic and municipal water supply. Groundwater is main source of water for about 60% of both rural and urban residents. 75% of RSA's population linked to groundwater resources; Several thousand small, rural (2-5 bores) well fields operating as sole source; 208 Towns depend on groundwater • Livestock • Industrial / mining	• Langebaan Lagoon • Kogelberg biosphere • Verlorenvlei • Wadrif Salt Pan • Jakkalsvlei	• Major aquifers exposed to land use pollution (DLMT); • All aquifers to some extend over-utilized during their life time which harms the aquifer's characteristics; • Acid Mine Drainage (AMD) becoming a management challenge and polluting the surface water resources; and • Agriculture / nitrates e.g., Kutama and Sinthumule districts of Venda • DMLT eye's (springs) drying-up which impacts on the downstream ecological status/domestic uses (Dinokana, Grootfontein case); • Table Mountain Group aquifer to be used for bulk water supplies; • Karoo aquifer springs on intermittent status
Swaziland	• Coal mines • In the Lowveld boreholes presently utilise about 42% of the estimated potential recharge	• Springs swamps in high veld • 5 major river systems (3 from RSA and 2 start in marshy areas in Swaziland	• Maloma (in low veld) • Low veld – dropping levels and potential issues in future and move to surface water sources
Tanzania	• Urban and rural water supply. Primary source of water for many areas and the most viable water resource in the central and northern parts of the country/the drier regions of Dodoma, Singida, Shinyanga, Tabora, Mwanza, Mara, Arusha, Coast and Southern Kilimanjaro. • Sugarcane production. • Tourism / Wildlife - Ngorogoro Crater, Srengetti, Kilamajaro • Masi for community water supplies (supply and cattle) • Mining, gold production (Lake Victoria)	• Lake river banks and wetlands that surround lakes (i.e. Lake Victoria), Revuma, rafiki river	• Temeke in Dar es Saalm – use of shallow aquifers by community • GW and mangrove swamps: Fisheries, livelihoods
Zambia	• Municipal water supply (e.g., Lusaka, Kabwe and Ndole) • Lusaka possible option to halt shallow abstraction and resulting effects on floods • Mpongwe (north copper belt)	• Kafue flats • Zambezi	• Lusaka - unauthorized settlements, waste disposal practices and uncontrolled drilling of boreholes contributing to drop in water levels and an increase in contaminants • Kafue Valley – nitrates from fertilizers
Zimbabwe	• 70% of country's rural population relay on groundwater • Urban and peri-urban domestic water supply • Irrigation	• Motopos	• Harare – Peri urban development drilled bore holes • Excessive drawdown e.g., Lomagundi Dolomite aquifer • Mining – arsenic contamination

100. Groundwater is generally not granted sufficient recognition in water laws, policies and regulatory instruments in SADC Member States. A recent review of water legislations in SADC showed that all Member States have some form of water law, but only a few make reference to groundwater specifically.49 Also, effectiveness of existing legislation is undermined by inconsistencies between different sector-legislations and between surface and ground water.50

101. A few Member States have separate legal provisions for surface and groundwater (e.g., Botswana and Lesotho) while some have a dedicated groundwater policy (e.g., South Africa). Other Member States have water laws and policies reflecting an integrated water resources approach. Water legislation in the SADC region is, however, often outdated with respect to groundwater management needs. Although harmonisation of water laws and policies is a priority commitment in the Revised SADC Protocol on Shared Watercourses as well as the SADC Regional Water Policy and transboundary basin agreements, the implementation of harmonisation has still not included groundwater.

102. Depending on water-needs and available funding, the level of investments into groundwater management and exploration is different among Member States. Financing for groundwater is often external (e.g., multi- and bilateral support) bringing inherent challenges in sustaining staff capacity, financial resources and administrative ownership.

D. International waters conventions in the SADC Region

103. Globally, there are only a fraction of legal agreements that are specific for transboundary groundwater systems. One of these agreements covers the Nubian Sandstone Aquifer in northeast Africa, requiring data collection and exchange. Otherwise, groundwater is often addressed as one of many water-related issues in international treaties on shared rivers.

104. The Revised SADC Protocol and the Regional Water Strategy has informed agreements and institutions on shared watercourses. Since the mid-1990s, when the original Protocol was ratified, there has been a move towards basin or regional-wide cooperation on shared waters and away from bilateral arrangements. Today, there are transboundary basin agreements and river basin organisations in place in many of the region's major shared rivers.

105. Groundwater features to some extent in a number of river basin agreements. For example, in the Zambezi Watercourse Commission Agreement of 2004 (ZAMCOM), the watercourse is considered "the system of surface and ground waters of the Zambezi constituting by virtue of their physical relationship a unitary whole flowing normally into a common terminus, the Indian Ocean".

106. The ZAMCOM Agreement also states that "Member States shall take all appropriate technical, legislative, administrative and other measures in the utilisation of the Zambezi Watercourse in order to…prevent, reduce or control pollution of the surface and ground waters of the Watercourse and to protect and enhance the quality status of the water and associated ecosystems for the benefit of present and future generations".

[49] Groundwater Governance: A Global Framework for Country Action *Thematic Paper 6 Legal and Institutional Frameworks* K.Mechlem. (2012).

[50] In Zambia, for example, water resources were recently governed by the Water Act of 1949 from the times of colonial rule. The 1949 Act did not make provisions for groundwater and as such, created an incentive for groundwater use over surface-water (the latter requiring permits). The Water Resource Management Act was approved by parliament in 2011.

107. In the case of the interim Tripartite Incomati and Maputo Rivers Agreement of 2002, the country obligations go further where signatories should ensure that "groundwater abstraction facilities, regardless of the use or destination of the water …[should not exceed]… above 3,5 million m^3 per year".

108. The inter-dependence between river and groundwater flows is a priority for transboundary cooperation on shared watercourses. This is important in shallow alluvial aquifers. Surface water flows can contribute directly into groundwater resources, often in high-flow or high-rainfall periods/events. Equally, groundwater can be the 'influent' to surface flows. Understanding the transmission between the two is particularly important with respect to drought, pollution and the sustainability of groundwater dependent ecosystems and community livelihoods.

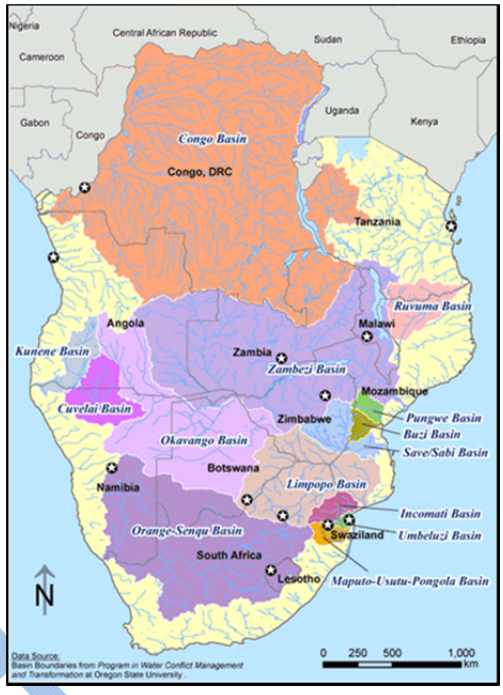


Figure 8. Transboundary river basins in SADC[51]

109. Despite the importance of transboundary groundwater cooperation in the context of river basins, there is little data collected and exchanged across Member States on shared aquifers. Moreover, the protocols, mechanisms and IT-solutions for groundwater data-exchange need strengthening in the context of river basin organisations.

Table 12. Convergence of SADC Water Conventions (McIntyre, 2013).

	UNWC	2000 SADC Protocol	ORASECOM Agreement	Incomati-Maputo	ZAMCOM Agreement
Equitable Utilisation	Arts. 5,6	Art. 3(7)(8)	Art. 7.2	Art. 3(b)	Arts. 12, 13,14.1
Duty of Prevention	Art. 7	Art. 3(10)	Art. 7.3	Art. 3(c)	Art. 14.2, 4
Duty of Co-operation	Art. 8	Art. 3(5)	Art. 7.1	Arts. 4,5,7	Art. 14.5
Environ / Ecosystem	Arts. 20-3	Art. 3,	Art. 7.12-15	Arts. 6, 8	Art. 14.3
Prior Notification	Arts. 11-16	Art. 4	Art. 7.5-10	Art. 13	Art. 16
Consult / Negotiate	Art. 17	Art. 4	Art. 8.1	Art. 15(1)	Art. 16.5
Exchange Information	Art. 8	Art. 3(6)	Art. 7.4, 7.11	Art. 12	Art. 15
Dispute Settlement	Arts. 30-33	Art. 7	Art. 8.2-3	Art. 15	Arts. 20-21

[51] For a full list of transboundary cooperation in SADC, see http://www.icp-confluence-sadc.org/transboundary-river-basins-sadc-region.

63. **Global conventions for cooperation on shared waters influence regional water conventions in SADC.** The United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses provides a 'common language' behind the shared understanding that cooperation on international waters is underpinned by the equitable and reasonable utilisation of resources (Article 5), the prevention of significant transboundary harm (Article 7), and the duty of cooperation (Article 8). Although the 1997 Convention is yet to come into force, it informed the development of several regional and basin-level agreements. With respect to groundwater, the Convention narrows its definition as being part of a "system of surface and groundwaters".

E. SADC Groundwater and Drought Management Project (2005-2011)

64. The Project is informed by the achievements of the previous World Bank-supported SADC Groundwater and Drought Management Project (GDMP). The GDMP was implemented between 2005 and 2011, with a total of US$7 million from the GEF. The priority interventions of the Project were: piloting drought management plans and infrastructures in the Limpopo basin; developing economic valuation and drought vulnerability studies along with awareness raising and decision support guidelines; and the establishment of the then called "Groundwater Management Institute for Southern Africa" (GMISA). The GDMP was successful in reaching and engaging policy and technical decision-makers at the national and local levels in SADC Member States. For example, the strategic guidance of the Project was provided by the SADC Subcommittee on Hydrogeology which functioned as a project steering committee, establishing a level of ownership among Member States and the endorsed institutional structures of SADC. Outputs such as outreach and communication on groundwater, Decision Support Guidelines, economic valuation studies, drought vulnerability mapping, and the local drought-management pilots were considered especially important. The GDMP also managed to set the foundation for the GMI for southern Africa. A host institution was selected by the Member States, and the Articles and Memorandum of Association for the GMI were endorsed and legally registered. However, these achievements were completed at the end of the Project and there was an administrative obstacle in transferring the funds to ensure the operationalisation of the GMI.

Table 13. Summary of main knowledge products under GDMP

Component	Activity	Implementer
Component 1: Pilot projects	Development and testing of 4 pilot schemes designed and constructed in the Limpopo River Basin: reports	Well Field/BGS
Component 2: Regional Groundwater Drought Management Support: consultancy studies	Regional Groundwater Vulnerability Mapping *1)	GEUS/CSIR
	Mapping Groundwater Dependent Ecosystems*1)	
	Valuation of Groundwater *1)	Atkins/ENTEC
	Transboundary Monitoring Study for development of real time regional GW monitoring network and guidelines for shared monitoring	Well Field/BGS
	Regional Awareness Creation: - GW awareness campaigns - Graphic profile, - Web site - Media releases - Policy Brief (Policy Primer)	GDM- PMU
	Compilation of Groundwater Data and Statistics of the SADC Region	Hans Beekman
	Development of Policy Level SADC Policy Framework Review s	GWMATE

	Development of Policy level Decision Support Guidelines and Materials	Metago
Component 3: Establishment of the GMI	Establishment of the SADC Groundwater Management Institute (SADC-GMI) Various reports	GMDP-PMU / PEGASUS

Note: Most final reports were submitted in 2010.
*1) These studies include proposed pilot studies in selected member states

F. World Bank commitment to regional programmes in Africa

65. The World Bank has had a long-standing commitment to global priorities and region-wide programs to strengthen water resource management. The 2008 Regional Integration Strategy for Africa provides a coherent and strategically focused framework to guide the Bank Group's assistance in support of regional integration and regional programs in the provision of regional public goods. The strategy acknowledges that regional approaches to the management of shared waters can provide improved water security and more sustainable management of these resources than achievable through national action. It further recognises that effective management is all the more urgent given the potentially disruptive impact of climate change on water resources availability and increasing water demand resulting in potential conflicts arising from limited supplies. In addition, the Bank has been increasingly providing support to complex groundwater projects and other research. The Bank's Strategy for Africa also recognises that many African challenges (such as climate change, water resource management and food security) are best addressed through cooperation and integration at the regional level.

66. The World Bank's Country Partnership Strategies for the individual SADC Member States all include a strong focus on water and recognition of the role of water in fostering the goals of economic cooperation. For example, the Country Brief Note for Namibia states that "Groundwater sources are facing increasing pollution from pesticides and excess fertilizers" and that the country is facing groundwater depletion. The Interim Strategy Note for Angola recognised the weakness of water sector institutions, while that for Botswana alludes to the fact that in the long run water will be the scarcest commodity and is critical to the country's development. Country Water Resources Assistance Strategies for Mozambique and Zambia highlight the important role of groundwater while the productive development of groundwater resources is being supported in several of the SADC Member States, including Tanzania and Malawi.

67. In several of the SADC Member States, there are a number of World Bank supported water resource management projects (primarily through the World Bank International Development Association – IDA) where groundwater features as an integral part of water resource management and where the Project can provide reinforcing support. These projects include: the Mozambique Water Resources Development Project; the Tanzania Water Sector Support Project, the Zambia Water Resources Development Project; the Zambia Water Sector Improvement Project, the Lesotho Water Sector Improvement Project, and the Malawi Shire River Basin Management Programme, among others.

ANNEX 7: GEF INCREMENTAL COST ANALYSIS

Sustainable Groundwater Management in SADC Member States Project

To avoid repetition, Annex 6 contains detailed information about the technical and institutional baseline of the Project – hence the focus on outlining its incremental contribution in Annex 7.

A. Context

1. Groundwater is a fundamental resource for social, economic and environmental sustainability in the 15 Member States of the Southern African Development Community (SADC). Human well-being, livelihoods, food production, ecosystems and natural habitats, industries and growing cities across the region are directly reliant on groundwater. All Member States experience rising demand for water as a result of rapidly growing populations and economic growth. Climate change is predicted to cause exacerbated water-stress with greater groundwater drought vulnerability across transboundary aquifers and countries. The proposed Project intends to support decision makers, planners, implementers and the research communities in southern Africa to manage current and future groundwater challenges at the national, transboundary and regional levels.

B. Alignment with relevant national and regional priorities for groundwater management

2. In the 15 Member States, groundwater management is often granted the same attention and priority as surface waters when it comes to water policies, legislation and management strategies; as well as monitoring, regulation of abstraction and pollution, and infrastructure planning. As shown in previous Annexes, however, different Member States have advanced capacities to manage groundwater – often reflecting the urgency and management challenge at stake (for example, comparing drought prone Botswana and water-rich DRC). Equally, the groundwater management threats may differ from salt-water intrusion in island states or Member States with high coastal populations such as Mozambique and the Seychelles to growing urbanisation pressures in groundwater-dependent cities such as Lusaka and Harare. The scope of activities detailed in Annex 2 is intended to align with the management challenges that Member States face.

3. At the regional level, the SADC has developed action plans and articulated priorities for the management of groundwater with the support, input and adoption of the SADC Member States. The Regional Strategic Action Plan III for Integrated Water Resources Management (2011-2015) has a specific Programme for Groundwater Management; i.e. Programme No. 11). The proposed GEF-funded Project is aligned and will help implementation of these activities. Annex 6, Section B elaborates on the details of this programme.

4. At the international level, global initiatives such as UNESCO-IHP, IAH, FAO and other GEF funded projects are equally aligned with the Proposed Project (See Annex 3, Section G on the Role of Partners). There is also a network to link practitioners to practical solutions, including African Groundwater Network under the Cap-Net initiative.

D. GEF Incremental Costs Reasoning and Rationale

5. The "baseline scenario" indicates that a total of approximately US$2.5 billion identified projects supporting water resources management across southern Africa. Of this, approximately US$42 million has been identified as co-financing that is relevant for the Project, as defined by the GEF (and not project co-financing in World Bank terms). The project presents an opportunity to build a regional and more coordinated framework for support to groundwater management – a sector that rarely receives dedicated and priority investment funds in the region.

6. The GEF resources of US$8.20 million will be blended with the US$2 million Grant from the Cooperation on International Waters in Africa (CIWA) to enhance the benefits under a baseline scenario of US$42.61 million.

7. Overall, the incremental cost reasoning lies in the Project's potential to provide: i) an interlocutor for groundwater decision and policy-makers, technical staff in Ministries, researcher and NGOs; and ii) a center of groundwater excellence in the region for the region with the ability to research and disseminate findings on critical groundwater challenges and promote solutions to manage them.

8. The baseline of co-financing on groundwater in the SADC region includes small to large investments in expanding groundwater use for human and economic purposes. Recognition of the importance for building technical capacity to plan and monitor groundwater (for purposes such as conjunctive management of groundwater with surface water and associated sectors including agriculture and mining), also forms a substantive part of the baseline. However, several initiatives in are often local or national in scale with limited capacity to broaden impact at the cross-sector, basin or regional levels. With respect to transboundary aquifers, there are a limited number ongoing Transboundary Aquifer Diagnostics.

9. The CIWA support to the baseline is geared towards two key objectives: strengthening the regional institution and enabling cooperation through effective communication (e.g., building focal groups and bringing stakeholders together); and targeted Transboundary Aquifer Diagnostics in at least four priority aquifers.

Table 14. Overview of incrementality of Project Components

Program Components	**Co-financing** (US$m)	**Incrementality to Baseline**
A. Operationalising the SADC Groundwater Mgmt Institute A1. Coordination & administration (incl. Operational staff) A2. Raising awareness, knowledge management and communication A3. National Focal Groups A4. Regional capacity building & training A5. Mobilising and soliciting financing	$0.80	The baseline co-financing does not include support for operationalising the SADC GMI. The incremental value of the Component is to build the center of excellence, in the long-term and with financial sustainability. In addition, the SADC GMI is directly reporting to the SADC Member States [Activity A2 is CIWA-funded with the specific objective of strengthening the regional institution and cooperation through strategic communication]

B. Strengthening institutional capacity for groundwater management B1. Legal, policy and regulatory frameworks B2. Compliance & Advocacy B3. Guidelines, standards and management tools B4. Groundwater monitoring and data management B5. Transboundary cooperation	$7.87	The baseline contains efforts to building institutional capacity, yet there is a need for a comprehensive regional approach. The Component has the potential to provide consistency, optimising best practice, and bring key stakeholders together at the transboundary level.
C. Advancing knowledge on transboundary & national groundwater C1. Support to Transboundary Aquifer Management C2. Support research on groundwater challenges C3. ICT platform for knowledge sharing	$8.34	Groundwater in the SADC region is a comparatively well documented and the baseline includes unique research activities. The component, however, provides a central location ('reference point') where knowledge can be linked to or sourced, as well as the ability to develop new studies on critical groundwater issues. [Activity C1 is CIWA-funded to meet the objective of advancing knowledge and cooperation on transboundary waters through TDA and SAPs]
D. Promoting groundwater infrastructure mgmt & development D1. Infrastructure for improved groundwater utilisation management and protection D2. Impact evaluation & Learning D3. Operational support for groundwater infrastructure development D4. Support to securing funding for infrastructure development	US$25.31	Financially, the baseline co-financing for Component D will contain the largest sums of investment. The incremental value of the Component lies in the potential to broaden and optimise the capacity for SADC Member States to develop sustainable groundwater infrastructure solutions. For example, stark challenges lie in the failure of pumps across the region and the slow development of managed aquifer recharge through small scale infrastructures that can be essential during drought. Component D can provide the added value of promoting already available knowledge and tools for improving groundwater infrastructure.

10. **Running costs of the Project.** The project management costs related to the Project are included in the cost estimates of the above components. The operating costs for the running of the Project will be clearly monitored on a quarterly basis where the University of the Free State will be compensated for expenses such as office space, administrative support and internet connections. Component A will cover the costs associated with key Project staff.

F. Global Environment Benefits

11. The global environment benefits associated with the Project relate to the more sustainable groundwater management that can be achieved across the vast areas of the 15 SADC Member States. In addition to the environmental challenges related to competing use of groundwater or growing risk of pollution and over use, water availability in southern Africa is expected to suffer from the negative impacts of climate change. According to the UNFCC, major perennial rivers in the region will become seasonal as a result of climate change. This may intensify the drilling of boreholes and deep wells to satisfy unmet demand. The immediate impact will be felt by poor communities. There is therefore a need to ensure that existing water use (either from shallow aquifers, deep wells or fossil/confined aquifers) is brought under sustainable management.

12. The SADC region is well known for its richness in biodiversity and forest ecosystems. Globally acknowledged parks of international importance are found in most of the SADC Member States. The contribution of nature based tourism provides important revenues that provide a sustainable financing framework and opportunities for rural communities. Land degradation will ensue as vegetation cover dissipates, following drying streams, which depend on the groundwater discharge. The environmental impact and the disruption in livelihood of poor communities will be extensive. Given the potential future scenarios, and given the important role of groundwater in biodiversity protection, sustainable land management and the adaptive role it is expected to play in reducing the full impact of climate change, the global environmental benefits of the project are substantial.

G. Consistency with GEF Strategic Priorities

13. The GEF funded Project contributes to the GEF-5 International Waters (IW) Strategy. In particular, the activities supports:

- IW-1, Outcome 1.1: Implementation of agreed Strategic Action Programs (SAPs) incorporates transboundary IWRM principles (including environment and watershed management) and policy/ legal/institutional reforms into national/local plans.

  ➔ Output: National and local policy and legal reforms adopted

- IW-1, Outcome IW 1:4 - Climatic variability and change as well as groundwater capacity incorporated into updated SAP to reflect adaptive management.

  ➔ Output: Enhanced capacity for issues of climate variability and change and groundwater management

- IW-3, Outcome IW 3:1 - Political commitment, shared vision, and institutional capacity demonstrated for joint, ecosystem-based management of water bodies and local ICM principles.

  ➔ Output: National inter-ministry committees established; transboundary diagnostic analyses and strategic action Programmes; local integrated catchment managment plans

- IW-3, Outcome IW 3:3 - IW portfolio capacity and performance enhanced from active learning/Knowledge Management/ Experience Sharing.

  ➔ Output: Active experience/sharing/learning practiced in the IW project portfolio

14. CIWA will contribute to the following two activities in the Project:

- **A2**: Working through the SADC structures & the SADC GMI, the CIWA funded activities create a long term platform for cooperation & information sharing in the region for the region. CIWA can enable SADC GMI to become an interlocutor and center of

excellence on sustainable groundwater management in southern Africa through effective and strategic communication and awareness raising.

- **C1**: Transboundary Aquifer Diagnostics and Strategic Action Plans can help address challenges related to shared groundwater in face of competing demand, risk of pollution and climate variability.

15. The CIWA results areas that the two above mentioned activities will contribute to are:

- Transboundary institutions strengthened to improve regional cooperation.
- Improved strategic analyses conducted and knowledge products developed to illustrate the evidence base for cooperation needs and challenges.
- Strengthened transboundary institutions with improved analytic tools, knowledge products, data, forecasting, and/or capacity for improved water and climate risk management.

ANNEX 8: TEAM COMPOSITION

Sustainable Groundwater Management in SADC Member States Project

World Bank staff and consultants who worked on the project		
Name	*Title*	*Unit*
Louise Croneborg	Water Res. Management Specialist, Task Team Leader	AFTN2
Albert Tuinhof	Sr. Groundwater Specialist	Consultant/Acacia
Marcus Wishart	Sr. Water Resources Specialist	AFTN2
Chitambala John Sikazwe	Procurement Specialist	AFTPC
Tandile Msiwa Ngetu	Financial Management Specialist	AFTFM
Edith Mwemda	Legal Counsel	LEGES
Jose Janeiro	Sr. Finance Officer	CTRLA
Liliane Yomekpe	Programme Assistant	AFCRI
Anna-Mary Esterhuizen	Team Assistant	AFMBW
Gaamangwe Thato Thipe	Programme Assistant	AFMBW
Melanie Jaya	Programme Assistant	AFCS1
Samuel Taffesse	Sr. Operations Officer, Team Lead (2012)	AFTFW
Ron N. Hoffer	Sr. Advisor Water Policy/Environment	Consultant/EPA
Paula Lyttle	Sr. Social Specialist	AFTCS
Hrishikesh Patel	GIS Specialist	AFTN1
Stephen Ling	Natural Res. Management Specialist	AFTN3
Gerard Verhoef	Sr. Governance Specialist	Consultant

SADC Secretariat, University of the Free State staff and SADC Member States repr. who worked on the project		
Phera Ramoeli	Sr. Programme Coord., Head of Water Division	SADC Secretariat: Infr. & Services
Nthabiseng Liphapang	Legal Counsel	SADC Secretariat: Legal
Edson Chikati	Financial Management Officer	SADC Secretariat: Budget & Finance
Snowden Madi	Procurement Officer	SADC Secretariat: Budget & Finance
Dumsani Mndzebele	Sr. Programme Officer, Infrastructure	SADC Secretariat: Infr. & Services
Barbara Lopi	Communications Expert	SADC Secretariat: Infr. & Services
Joy Phiri	Sr. Administration Assistant	SADC Secretariat: Infr. & Services
Glen Talor	Senior Director: Research Department	University of Free State
Werner Nel	Deputy Director, Research Development	University of Free State
Daniel Vermeulen	Director	University of Free State-IGS
Eelco Lukas	Researcher/Scientific Programmer	University of Free State-IGS
Gerrit van Tonder	Professor	University of Free State-IGS
Narcisco A. Ambrosio	Head of Hydrog Section/SADC SC on Hydrogeo.	Government of Angola
Thato Setloboko	Head of Dept./SADC SC on Hydrogeo.	Government of Botswana
Bienvenu Muluwa	Chief Hydrogeologist/SADC SC on Hydrogeo.	Government of Dem. Rep. of Congo
Khahliso Leketa	Sr Hydrogeologist/SADC SC on Hydrogeo.	Government of Lesotho
Zione Uka	Chief GW Dev Officer/SADC SC on Hydrogeo.	Government of Malawi
Rajeshwar Pokhun	Princ Hydrological Officer/SADC SC on Hydrogeo.	Government of Mauritius
Lucas Chairuca	SADC SC on Hydrogeo.	Government of Mozambique
Aina N Ileka	Chief Hydrogeologist/SADC SC on Hydrogeo.	Government of Namibia
TBC	Head of Hydrogeology/SADC SC on Hydrogeo.	Government of Seychelles
Zacharia Maswuma	Director/SADC SC on Hydrogeo.	Government of South Africa
Musawenkhosi Mwelase	Chief Hydrogeologist/SADC SC on Hydrogeo.	Government of Swazliand
Mwashiti Rashid	Hydrologist/SADC Subcom. on Hydrogeo.	Government of Tanzania
Simon Kango'onba	Ass Director/SADC Subcom. on Hydrogeo.	Government of Zambia
Robert Mutepfa	Chief Hydrog Eng./SADC Subcom. on Hydrogeo.	Government of Zimbabwe

ANNEX 9: MAP

Sustainable Groundwater Management in SADC Member States Project

Source: Transboundary aquifers delineation at the courtesy of IGRAC 2012

All maps used in PAD have been cleared by World Bank Map Department (February 27, 2014).