Developing a new SADC Groundwater Management Programme 2021-2031:

Programme Proposal Document

GROUNDWATER MANAGEMENT INSTITUTE

August 2020

This report emanates from the project – “Consultancy Services for Capturing Lessons Learned and Developing a New SADC Groundwater Management Programme” commissioned by the Southern African Development Community Groundwater Management Institute (SADC-GMI) and executed by SRK Consulting.

SADC GROUNDWATER MANAGEMENT INSTITUTE (SADC-GMI)

Dean Street, University of the Free State
205 Nelson Mandela Drive,
Bloemfontein, 9300

South Africa

E-mail info@sadc-gmi.org Website www.sadc-gmi.org

Project team:

Darryll Killian (Project Lead), SRK Consulting

Natasha Anamuthoo (Project Manager), SKR Consulting

Lisl Fair (Knowledge Management Expert), SRK Consulting

Technical Experts: Tim Hart, Geralda Wildschut, Retha Eastes and Gert Nel

© SADC-GMI, 2020

Boxes, Tables, Figures, Maps, Photos and Illustrations as specified

Citation: SADC-GMI, (2020). *Developing a New SADC Groundwater Management Programme 2021-2031).* SADC GMI report: Bloemfontein, South Africa.

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by the Southern African Development Community-Groundwater Management Institute (SADC-GMI) as well as information collected under the parameters of the contract. The opinions in this Report are provided in response to a specific request from SADC-GMI to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

Acknowledgments

The following individuals and organisations are thanked for their contributions to the project:

SADC Ground Water Management Institute

Mr James Sauramba	Executive Director
Mr Brighton Munyai	Senior Groundwater Specialist
Ms Mampho Ntsekhe	Grants and Procurement Officer
Mr Thokozani Dlamini	Communications and Knowledge Management Specialist
Ms Sharon Mofokeng	Administration and Finance Officer
Mr Micah Majiwa	Governance and Institutional Consultant
Mr Kasonde Mulenga	Infrastructure Consultant
Mr James Manda	Monitoring and Evaluation Consultant

Board of Directors

Dr Patrice Kandolo Kabeya	SADC Secretariat – Botswana (Board Chairperson)
Ms Ana Isabel Fotine Mponda	Ministério de Obras Públicas Habitação e Recursos Hídricos, (Departamento dos Rios Internacionais) - Mozambique
Mr Eelco Lukas	Institute for Groundwater Studies (UFS) – South Africa
Ms Maria Amakali	Ministry of Agriculture, Water and Forestry – Namibia
Dr George V. Lugomela	Ministry of Water – Tanzania
Ms Zandile Kabini	Independent Non- Executive Director - Finance
Prof. John Mubangizi	University of the Free State
Mr Michael Marler	Independent Non-Executive Director - Business Development
Ms. Perle Du Plessis	SADC-GMI Public Officer

Project Team

Mr Darryll Kilian	Team Leader
Ms Natasha Anamuthoo	Project Manager
Lisl Fair	Knowledge Management Expert
Tim Hart	Donor Finance Consultant
Geralda Wildschutt	Organisational Development Consultant
Gert Nel	Groundwater Specialist
Retha Eastes	Institutional Business Analyst
Ashleigh Maritz	Project Support
Sasha Lunsche	Research Assistance

Stakeholder Contribution

The contribution of all stakeholders representing government institutions, private companies, civil society organisations, academia and research bodies proved valuable and is appreciated.

Special thanks is given to:

- SADC Secretariat and the SADC Sub-Committee on Hydrogeology for their guidance and support during the project.
- Focal points and professionals from the Member States for their technical input and insights.
- Sub-grantee representatives for their feedback on the implementation of infrastructure pilot projects.

Executive Summary

Water security in the Southern African Development Community (SADC) region has been subjected to the impacts of climate change and severe weather events. These impacts have negatively impacted on the livelihoods of a significant proportion of the region's population. The need to strengthen groundwater management and development in order to promote sustainable social and economic development within the region led to the establishment of the SADC Groundwater Institute (SADC-GMI) in 2011. The vision of SADC-GMI is to be a centre of excellence to promote sustainable groundwater management and provide solutions to groundwater challenges across the SADC region.

SADC-GMI is currently approaching the end of the implementation of the project, "*Sustainable Groundwater Management (SGM) in SADC Member States Project*", funded by GEF and CIWA through the World Bank. The SGM Project commenced in 2014 and will be concluded in June 2021, pending World Bank approval for a project extension.

SADC-GMI commissioned the project, *"Consultancy Services for Capturing Lessons Learnt and designing a new SADC groundwater programme",* to capture lessons learned from the previous project (SGM) and develop a new regional groundwater programme. The process of developing a new SADC groundwater programme builds on the lessons learned from the successful implementation of the SGM Project.

This report contains the bankable programme proposal through which SADC-GMI will endeavour to deliver on its mandate as a centre of excellence for groundwater management in SADC for the period 2021-2031. The programme has a SADC-wide regional footprint, but it is designed to contribute to the sustainable management of groundwater at multiple levels, ranging from regional to local. In this context there are many beneficiaries, some deriving direct benefit from the project and its activities and others enjoying indirect benefits. For most Member States, groundwater is a vital resource that contributes to water security, resilience to the impact of climate change and that supports socio-economic development. To this end, SADC-GMI proposes the following name for the future programme: ***Groundwater for resilience and socio-economic development in the SADC region 2021-2031.***

SADC-GMI has built up significant momentum in becoming a centre of excellence in groundwater management in the region. The organization has moved from its 'establishment phase' (first Strategic Plan's outcome), and now sees itself as a full-fledged organization with most structures in place. At a strategic, funding and operational level, SADC-GMI is sound and ready to embark on a new strategic direction for the next ten years. SADC-GMI is registered as a Non-Profit Company and Non-Profit Organisation in terms of South African law, which makes it a suitable implementing agency for many donor organisations because of the high standard of monitoring and reporting required of its directors.

SADC-GMI has aligned its current budget planning with its programme development and strategic business objectives. It recognises that to demonstrate and measure impact in building climate change resilience and socio-economic development, the programme and its activities will have to be implemented over a medium to long-term period. A 10-year programme, divided into two five-year periods, will allow SADC-GMI to account for the incremental and gradual change in key result areas. Based on current planning scenarios, SADC-GMI will require a minimum of US$30 million over the next 5 years (2021-2025) and an additional US$34 million for the subsequent 5 years (2026-2031), calculated at an average global inflation rate of 2.5% per annum.

Monitoring and evaluation (M&E) are important aspects of programme implementation. Donors, investors and lenders are requiring more informed and accurate M&E systems to ensure that funds are allocated and spent in a responsible manner. Various tools and methods already exist within SADC-GMI's organisational structure to contribute to the efficient implementation of SADC-GMI's M&E framework. The organisation has also built internal and external M&E capacity through various means during the implementation of the current SGM Project.

Risk is inherent in support to and implementation of development programmes and hence needs to be proactively identified and mitigated. SADC-GMI has been able to continuously mitigate several risk factors in the implementation of its current SGM Project. Since effective mobilization in 2016, SADC-GMI has effectively carried the SGM Project forward, mobilizing and consolidating regional relationships, building information resources and information networks, and supporting groundwater demonstration projects in Member States. Risks to effective implementation of the new programme are likely to be manageable as it builds on a largely sound institutional, operational and procedural base.

SADC-GMI will work on capacitating its own organization as well as partners in order to deliver on the new scope of work. The key result areas will guide the specific capacity needs as the team works towards meeting the intermediate indicators and overall programme development objective.

Table of Contents

Acknowledgments ii
Executive Summary iii
List of Abbreviations xi
1 Introduction and scope 1
1.1 Background Information on SADC-GMI 1
1.2 Learning from past experience 1
1.3 Purpose of this document 1
1.4 Programme overview 3
1.5 Structure of the report 3
2 Strategic context 4
2.1 Introduction 4
2.1.1 Regional overview 4
2.1.2 Groundwater resource availability and use 7
2.1.3 Groundwater management in SADC 7
2.2 Economic context 8
2.2.1 Macroeconomic outlook 8
2.2.2 Economic sector characteristics 9
2.2.3 Factors affecting economic growth 10
2.2.4 Impact of COVID-19 pandemic 10
2.3 Socio-political context 11
2.3.1 Demographic overview 11
2.3.2 Poverty and human development 12
2.3.3 Democracy and governance 14
2.3.4 Sustainable development 15
2.3.5 COVID-19 human health effects 16
2.4 Sectoral and institutional context 18
2.4.1 Water policy and law 18
2.4.2 Institutional arrangements for water governance 19
2.5 Higher level objectives to which the project contributes 20
2.5.1 Donor commitment to water management in SADC region 21
2.5.2 Linkages between SADC-region priorities and programme priorities 22
2.5.3 Water sector's vulnerability to climate change 23
2.5.4 Equitable access to groundwater for women and vulnerable groups 24
2.5.5 Groundwater for public health and WASH initiatives 25
3 Programme development objective (PDO) 28
3.1 Introduction 28
3.2 Operational principles (values) 28
3.3 PDO and Key Result Areas 29
3.3.1 Key result area 1 - Institutions 30

3.3.2 Key result area 2 – Information 30
3.3.3 Key result area 3 - Infrastructure 31
3.4 Programme beneficiaries 31
3.4.1 Proposed benefits 31
3.4.2 Local level beneficiaries 32
3.4.3 National level beneficiaries 33
3.4.4 Cross boundary and regional - level beneficiaries 34
3.5 PDO Level Results Indicators 35
4 Programme description 36
4.1 Introduction 36
4.2 Historical evolution of SADC-GMI 36
4.3 Programme components 40
4.3.1 Key result area 1: Institutions 40
4.3.2 Key result area 2: Information 40
4.3.3 Key result area 3: Infrastructure 41
4.4 Programme planning 42
4.4.1 Stakeholder consultation process during planning 42
4.4.2 Theory of change 43
4.4.3 Logical framework development 45
4.4.4 Impact and paradigm shift potential 45
4.4.5 Indicative time frames 46
4.5 Project financing 47
4.5.1 Description of financial elements of the programme 47
4.5.2 Diversified income planning 48
4.5.3 Expenditure planning 49
4.5.4 Budgeting 50
4.5.5 Financial management 53
4.5.6 Procurement 55
4.5.7 Governance, regulatory framework and taxation 56
4.6 Lessons learned and reflected in the programme design 57
4.7 Management and organisational development 59
4.7.1 SADC-GMI Board of Directors 59
4.7.2 SADC-GMI staff structure 59
4.7.3 Learning and knowledge management 62
4.7.4 Relevant research and development areas and topics 63
4.7.5 Benchmarking of existing knowledge products and integrated water resource management 66
5 Implementation 67
5.1 Introduction 67
5.2 Institutional and implementation arrangements 67
5.3 Institutional capacity building initiatives to strengthen partners and interventions 68

5.4 Strategic partnerships with actors committed to common goals 69
5.5 Symbiotic hosting agreements and location 70
5.5.1 Option one – Remain in current hosting scenario in Bloemfontein 70
5.5.2 Option two – Move to Gauteng-based location 71
5.6 Results monitoring and evaluation 73
5.6.1 Introduction 73
5.6.2 Overarching issues in M&E 74
Environmental and social safeguards 74
Gender equality and social inclusion 75
5.6.3 Implementation of M&E framework 76
5.7 Sustainability criteria 77
5.7.1 Continuity and self-sustainability 79
5.7.2 Skills transfer 79
6 Key risks and mitigation measures 79
7 Conclusions 83
8 References 85
Appendices 89
Appendix A: SADC-Hydrogeological Map 90
Appendix B: Gaps identified in groundwater management practices 91
Appendix C: PDO level results indicators 92
Appendix D: Key recommendations from the workshop 93
Appendix E: SADC-GMI Indicative Logical Framework 94
Appendix F1: Funding model considerations 95
Appendix F2: Ten step budget and planning process 96
Appendix F3: Scope of work for financial service provider 97
Appendix G1: BoD and staff compliment 98
Appendix G2: Current Organogram 99
Appendix G3: Scope of Work and Organogram 100
Appendix H: NPC, NPO and for-profit company 101
Appendix I: High Level M&E Framework 102

List of Tables

Table 3-1: SADC-GMI's revised values....28
Table 3-2: Concept plan framework....29
Table 3-3: Classification of beneficiaries....32
Table 4-1: SADC-GMI's ToC definitions....43
Table 4-2: SADC-GMI indicative timeframes 2021 to 2030....47
Table 4-3: Preliminary funding model....48
Table 4-4: Proposed diversification of donor funding....48
Table 4-5: Incremental annual budget over a 10-year period....50
Table 4-6: SADC-GMI preliminary budget....53
Table 4-7: SADC-GMI's proposed reporting and budgeting tiers....53
Table 4-8: SADC-GMI Legal frameworks and contractual agreements....56
Table 4-9: Lessons learned and reflected in the project design....58
Table 4-10: Knowledge products under consideration....63
Table 5-1: Potential partners for support of each KRA....70
Table 5-2: Proposed M&E tools, roles and responsibilities and feedback loops....77
Table 5-3: SADC-GMI sustainability criteria based on the six-capital framework....78
Table 6-1: Project risk assessment....80

List of Figures

Figure 1-1: SADC in the context of Africa....2
Figure 2-1: SADC Regional Map....6
Figure 2-2: Spatial representation of poverty gap in SADC....13
Figure 2-3: Access to basic water services in SADC....17
Figure 2-4: Regional water framework....18
Figure 2-5: Thematic analysis of regional gaps and opportunities....19
Figure 2-6: SADC Secretariat structure....20
Figure 2-7: Linkages between SADC-region priorities and programme priorities....22
Figure 3-1: Key success factors....29
Figure 3-2: Overview of SADC-GMI's fundamental project question, key result areas and beneficiaries....30
Figure 4-1: SADC-GMI current programme's strategic objectives and focus areas....37
Figure 4-2: Timeline evolution of SADC-GMI....38
Figure 4-3: Future evolution of SADC-GMI....39
Figure 4-4: Stakeholder consultation process during bankable project plan development....42
Figure 4-5: SADC-GMI's proposed theory of change....44
Figure 4-6: Proposed resilient financing approach....48
Figure 4-7: Conventional way of viewing NGO budgeting....51
Figure 4-8: New integrated way of viewing SADC-GMI budgeting....51

Figure 4-9: General shortfall illustrated by integrated budgeting 52
Figure 4-10: Specific shortfall integrated budgeting illustration....52
Figure 4-11 Proposed new organogram....61
Figure 5-1: SADC-GMI's current hosting arrangements in Bloemfontein 71
Figure 5-2: SADC-GMI proposed hosting and association options in Gauteng....72
Figure 5-3: SADC-GMI monitoring and evaluation framework....74

List of Abbreviations

AFD	Agence Française de Développement
AFDB	African Development Bank
AMCOW	African Ministers' Council on Water
ARD	Agriculture and rural development
AWS	Alliance for Water Stewardship
CA	Comprehensive Assessment of Water management in Agriculture
CAADP	Comprehensive Africa Agricultural Development Programme
CIPC	Companies and Intellectual Properties Commission
CIWA	Cooperation in International Waters in Africa Trust
CBA	Cost Benefit Analysis
CBD	United Nations Convention on Biological Diversity
CSIR	Council for Scientific and Industrial Research
DA	Designated Account
DANIDA	Danish International Development Agency
DBSA	Development Bank of Southern Africa
DFIs	Development Finance Institutions
DRC	Democratic Republic of Congo
ESG	Environmental, Social and Governance
ESS	Environmental and Social Safeguard
FAO	Food and Agriculture Organization
GDMP	Groundwater and Drought Management Project
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GESI	Gender Equity and Social Inclusion
GGRETA	International Groundwater Resources Governance in Transboundary Aquifers
GenARDIS	Gender, Agriculture and Rural Development in the Information Society
GIP	Groundwater Information Portal
GIZ	Gesellschaft für Internationale Zusammenarbeit
GMI	Groundwater Institute
GWA	Gender and Water Alliance
GWP	Global Water Partnership
IBRD	The International Bank for Reconstruction and Development
IGS	Institute for Groundwater Studies
IDA	International Development Association
IDEA	International Institute for Democracy and Electoral Assistance
IGRAC	International Groundwater Resources Assessment Centre
IGS	Institute for Groundwater Studies
IHP	Intergovernmental Hydrological Programme
IIRF	International Integrated Reporting Framework

IFRs	Interim Unaudited Financial Reports
IFRC	International Federation of Red Cross
IFPRI	International Food Policy Institute
IGRAC	International Groundwater Resources Assessment Centre
IIAG	Ibrahim Index of African Governance
ILO	International Labour Organisation
IUCN	International Union for Conservation of Nature
IWRM	Integrated water resources management
IWMI	International Water Management Institute
JSAP	Joint Strategic Action Plan
KRA	Key Result Areas
LIMCOM	Limpopo Watercourse Commission
LFA	Logical Framework Analysis
LLP	Lessons Learned Project
M&E	Monitoring and Evaluation
MEAs	Multilateral Environmental Agreements
NEPAD	New partnership for Africa's Development
NPC	Non-Profit Company
NPOs	Non-Profit Organisations
OKACOM	Okavango River Basin Water Commission
OPs	Operational Principles
ORASECOM	Orange-Senqu River Commission
PBO	Public's Benefits Organisation
PDOs	Project Development Objectives
PIDA	Programme for Infrastructural Development in Africa
POPs	Persistent Organic Pollutants
RBOs	River Basin Organisations
RDF	Regional (infrastructure) Development Fund
RICAS	Regional Integration and Cooperation Assistance Strategy
RSAP	Regional Strategic Action Plan
RSAPIII	Regional Strategic Action Plan for Integrated Water Resources Management III
RSAPIV	Regional Strategic Action Plan for Integrated Water Resources Management IV
R4D	Research-for-Development
SADC	Southern African Development Community
SADC-GMI	SADC Groundwater Institute
SADC-GMI LLP	SADC-GMI Lessons Learned Project
SADC GMI-GDRI	SADC-GMI Groundwater Resources Development Priority Intervention Areas
SADC-GIP	SADC-Groundwater Information Portal
SADC-GLA	SADC Groundwater Literature Archive
SARS	South African Revenue Service

SDGs	Sustainable Development Goals
SGM	Sustainable Groundwater Management
SIDA	Swedish International Development Cooperation Agency
SMME	Small, Medium and Micro Enterprise
SRK	SRK Consulting (South Africa) (Pty) Ltd
TBA	Transboundary Aquifers
TDA	Transboundary Diagnostic Analysis
TOC	Theory of Change
UFS	University of Free State
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-IHP	UNESCO Intergovernmental Hydrological Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Fund
UP	University of Pretoria
UWASNET	Uganda Water and Sanitation NGO Network
TBA	Transboundary Aquifers
TDA	Transboundary Diagnostic Analysis
WASH	Water, Sanitation and Hygiene
WBG	World Bank Group
WHO	World Health Organization
WIS	Water Information System
ZAMCOM	Zambezi Watercourse Commission

1 Introduction and scope

1.1 Background Information on SADC-GMI

Water security in the Southern African Development Community (SADC) region has been subjected to the impacts of climate change and severe weather events. These impacts have negatively affected the livelihoods of a significant proportion of the Southern African region's population (Figure 1-1). The need to strengthen groundwater management and development in order to promote sustainable social and economic development within the region led to the establishment of the SADC Groundwater Institute (SADC-GMI) in 2011. SADC-GMI's current mission is to be a centre of excellence to promote sustainable groundwater management and provide solutions to groundwater challenges across the SADC region.

SADC-GMI is currently approaching the end of the implementation of the project, "*Sustainable Groundwater Management (SGM) in SADC Member States Project*", funded by Global Environment Facility (GEF) and Cooperation in International Waters in Africa Trust Fund (CIWA) through the World Bank. The SGM Project commenced in 2014 and will be concluded in June 2021.

1.2 Learning from past experience

In response, SADC-GMI commissioned the project, *"Consultancy Services for Capturing Lessons Learnt and designing a new SADC groundwater programme",* to capture lessons learned from the SGM Project and develop a new regional groundwater programme. The objectives of the SADC-GMI Lessons Learned Project (LLP) were two-fold. Firstly, it aimed to prepare a background document on the emerging issues and lessons learned from implementation of the SGM Project. The second objective was the development of a ten-year (split into two five-year periods) bankable project proposal document (this report) for the implementation of a new SADC groundwater programme from 2021 to 2031.

SADC-GMI finalised the lessons learned, and emerging issues report in May 2020 and disclosed the results at an online stakeholder workshop on 19 June 2020. The evolving concept framework for the bankable project proposal document was also presented to participating stakeholders and partners.

1.3 Purpose of this document

This report contains the bankable project proposal through which SADC-GMI will endeavour to deliver on its mandate as a centre of excellence for groundwater management in SADC for the period 2021-2031. This report also presents SADC-GMI's proposed plan for building resilience and sustainable socio-economic development through institutional capacity building, the generation and dissemination of information and establishing innovative infrastructure in Member States.

Figure 1-1: SADC in the context of Africa

1.4 Programme overview

The new SADC Groundwater Management Programme follows on the lessons learned from the successful implementation of the SADC-GMI SGM project from 2014 to 2020. The new programme focuses outward and towards deeper impact in endeavouring to answer the question 'Groundwater for what?' through its project development objective (PDO) and three key result areas. These key result areas are underpinned by SADC-GMI's revised values, a network of supporting stakeholders as well as an articulated Theory of Change (ToC). In general, the programme focuses on building capacity in institutions, generating and disseminating information and promoting innovative groundwater infrastructure programmes for resilient livelihoods in member states. The programme is proposed within the governance of overarching regional structures such as the SADC Secretariat and the SADC Sub-Committee on Hydrogeology. The implementation of the programme will be enabled through institutional and organisational arrangements established by SADC-GMI.

1.5 Structure of the report

This report contains the following 9 chapters:

- Chapter 1 – Introduction and scope of the report;
- Chapter 2 – Strategic context;
- Chapter 3 – Project development objectives;
- Chapter 4 – Program description;
- Chapter 5 – Implementation;
- Chapter 6 – Key risks and mitigation measures;
- Chapter 7 – Conclusions and recommendations; and
- Chapter 8 – References.

Supporting information is provided in appendices A-I

2 Strategic context

2.1 Introduction

This chapter provides an overview of the regional, economic, socio-political, sectoral and institutional contexts within the SADC region. It further explores donor commitments to water in the region and unpacks the linkages between SADC regional and program priorities within the water sector. The chapter concludes by examining the equitable access to groundwater for women and vulnerable groups as well as groundwater for public health and Water, Sanitation and Hygiene (WASH) initiative's in SADC.

2.1.1 Regional overview

The SADC region includes 16 Member States namely, Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe (refer to Figure 2-1). The climate of the SADC region ranges from arid to sub-humid with varying rainfall conditions. Rainfall patterns have a significant effect on the availability of groundwater and its reserves. Groundwater makes up 8,5% of water use in the SADC region, although this percentage varies from country to country. It is estimated that over 70% of its 345 million people depend on groundwater as the primary source of water. The groundwater of the region is facing degradation from various land-use activities and over-abstraction in some areas (SADC-GMI, 2018).

Comprising a total area of almost 6,7 million square kilometres, Southern Africa is endowed with abundant agricultural, mineral and other natural resources. Despite a highly variable rainfall and susceptibility to drought, countries within the region rely heavily on their renewable and non-renewable natural resources for economic development and livelihoods (SADC, 2012). The region's land mass is bordered by the Indian Ocean in the east and the Atlantic Ocean in the west and defined by a group of 16 mainland and island states stretching from the northern border of Congo and Tanzania to the southern tip of South Africa. These states are members of the SADC, which was established in 1992 (Figure 2-1).

Southern Africa is located along the Tropic of Capricorn and is host to various climate zones, including tropical, desert, and moderate type C climates. Extensive agricultural activity can be found south of the Tropic of Capricorn, where moderate climates prevail. The climate of the SADC region ranges from arid to sub-humid with varying rainfall conditions. Rainfall patterns have a significant effect on the availability of water resources. More than 70% of the region's surface water resources are shared between countries. SADC has 15 international shared rivers. The Congo River basin is the largest and the Congo is also the longest river in SADC. The second largest is the Zambezi River, which extends to eight (8) Member States. The region also has a number of large lakes: Lake Victoria, Lake Tanganyika and Lake Malawi/Nyassa (Pietersen & Beekman, 2016).

Groundwater is an essential resource for sustainable development within the SADC region, yet its functioning in the hydrological environment is poorly understood compared to surface water due to its unseen value which contributes to its mismanagement (Pietersen & Beekman, 2016). Groundwater plays a fundamental role to providing water security, resilience to droughts and supports social and economic development. Human wellbeing, livelihoods, food production, ecosystems and natural habitats, industries and growing cities across the region are directly reliant on groundwater.

To date, groundwater has been a reliable source of water throughout the region to meet the demand for water as a result of rapidly expanding populations and economic growth (including expansion of industries and commercial farming). Other contributing factors, which highlight the importance of groundwater's role and need for governance, include widespread poverty; gender inequality and food

insecurity; the continuing need for a basic domestic water supply in both rural and informal urban areas; rapid urbanisation; and the need for drought security. The prevalence of drought in the region is expected to be intensified by climate change with greater groundwater drought vulnerability being reported across the 30 known transboundary aquifers (TBA) (Lautze et al., 2018). Despite its importance and critical role in water and food security in the region, groundwater has not featured prominently in water resources discourses. In practice, groundwater is often managed separately from surface water even though these two resources are linked as part of the overall hydrological cycle, thereby compromising the sustainability of water resources. There is therefore a need to advocate for inclusion of groundwater in water resources planning through measures such as conjunctive management of water resources.

To effectively manage groundwater at a local and regional level and to ensure its long-term sustainability, a balance between the exploitation of the resource (in terms of quality, quantity and understanding linkages to other natural resources) with increasing demand needs to be established.

It is also important to strengthen institutions by improving policy and legislative frameworks whilst promoting scientific research, knowledge creation and information dissemination. Sustainable infrastructure solutions are becoming increasingly important for sustainable management of groundwater. The ecological role of groundwater needs to be acknowledged and factored in for the sustainable management of water resources.

Figure 2-1: SADC Regional Map

2.1.2 Groundwater resource availability and use

Groundwater is an essential resource for sustainable development within the SADC region, yet its functioning in the hydrological environment is poorly understood compared to surface water due to its unseen value which contributes to its mismanagement (Pietersen & Beekman, 2016).The SADC region has a varied and complex geological history (Macy, 2010). Appendix A features the aquifer types based on the groundwater flow regime: unconsolidated intergranular; fissured; karst; layered; and low permeability formations. Based on research conducted by Döll and Fiedler (2007), groundwater availability in SADC is estimated at 13% of the total water availability of 7,199 m3/capita/annum. Higher levels of groundwater availability occur in DRC, Angola, Zambia, Botswana and Madagascar, with lower availability being found in Lesotho, South Africa, Malawi and Zimbabwe as well as the island states. Groundwater availability, however, will be less than estimated when the presence of poor natural groundwater quality and pollution is taken into account. It is estimated that over 70% of its 345 million people depend on groundwater as the primary source of water (Pietersen and Beekman, 2016). Despite varying dependency on groundwater across SADC Member States, groundwater usually provides a critical buffer between dry and rainy seasons.

Groundwater plays a fundamental role to providing water security, resilience to droughts and supports social and economic development. Human well-being, livelihoods, food production, ecosystems and natural habitats, industries and cities across the region are directly reliant on groundwater. Groundwater of the region is facing degradation from various land-use activities and over-abstraction in some areas (SADC-GMI, 2018). This situation is exacerbated by the expansion of commercial farming and industries as well as growing urban populations. Sectoral water use varies from country to country, but for the SADC region as a whole, the agriculture sector (including irrigation) is the largest water user with 82%. This is followed by the domestic sector with 14% and the industry sector (including mining) with 4%. Groundwater use is only a fraction (1.4%) of the total (potentially) available groundwater resources, which creates an opportunity for further development (Pietersen and Beekman, 2016). In regional capital cities such as Dar es Salaam, Gaborone and Lusaka, groundwater is the dominant source of water. In response to reoccurring severe droughts, some SADC Member States are actively integrating groundwater into their water resource management policies and laws as in the case of Botswana and South Africa.

2.1.3 Groundwater management in SADC

An overall assessment of groundwater management in most of the SADC Member States has found to be insufficient to support the sustainable management and development of groundwater resources (Pietersen & Beekman, 2016). Although there is a good understanding of aquifer systems at the regional level, information systems to manage groundwater data are disparate and institutions for managing groundwater within an environment of scarce financial and human resources. Much of the focus with regards to water resource management and development is placed upon surface water resources, often because of the limited understanding of groundwater as an essential resource to underpin socio-economic development.

Information systems for managing groundwater data hardly exist in some of the SADC Member States, often as a result of a limited understanding of the nature, extent and importance of these resources. Regulations to protect groundwater resources are often not in place and where these are in place, often no enforcement or sanction of unlawful activities takes place. This is often exacerbated by limited coordination with other sectors such as energy and mining. Furthermore, the implementation of groundwater management action plans, where developed, is often limited and resource constrained (Pietersen & Beekman, 2016).

There have been numerous efforts to understand and support the management of groundwater in a SADC context through past and present projects and programmes being implemented by SADC-GMI, including the Groundwater and Drought Management Project (GDMP) (2005-2012) and Sustainable Groundwater Management in SADC Member States (2014-2021). The latter has served as an umbrella programme that implemented the following short-term projects:

- Capacity needs assessment to determine priority challenges for capacity building initiatives in Member States;
- The SADC Groundwater Grey Literature Archive and its enhancement through the SGM Project;
- SADC Groundwater Information Portal (SADC-GIP) hosting the SADC hydrogeology map; (operational since June 2018) and further upgrade through the SGM Project;
- Assessment of Groundwater Resources Development Priority Intervention Areas in the SADC Region (SADC GMI-GDRI) through the SGM Project;
- The first conjunctive management TBA research in the Shire TBA (Malawi/Mozambique) that produced a Transboundary Diagnostic Analysis (TDA), Joint Strategic Action Plan (JSAP) and Position Paper on Principles for Conjunctive management in SADC;
- Research study underway in the Eastern Kalahari TBA (Botswana/Zimbabwe) to produce TDA and JSAP;
- Study on deep aquifer exploration in Malawi;
- Initiation of 12 pilot groundwater infrastructure projects under the sub-grant scheme currently in progress with four projects completed;
- Establishment of Nations Focal Groups in five Member States in the SADC Region;
- Development of Operations and Maintenance training manuals for groundwater infrastructure; and
- Development of a training manual on the preparation of project proposals to access funding for groundwater related infrastructure.

These SADC-GMI initiatives contribute to the evolving understanding of groundwater pressures and challenges in the SADC region. Appendix B highlights the gaps that have been identified through the SADC-GMI projects and programmes.

Recent stakeholder surveys conducted as part of a SADC-GMI's Lessons Learned and Emerging Issues Project highlighted the fragmented nature of groundwater monitoring, mapping and management practices in the SADC region. They also noted the urgent need for groundwater data coordination, integration and management standardisation in the region (SADC-GMI 2020). In addition to the many challenges facing groundwater management across the SADC region, there are a range of emerging issues that need attention. Key amongst these is the impact of climate change on groundwater availability, strengthening conjunctive water management, cohesive regional standards on transboundary water management and groundwater stewardship for livelihood creation.

2.2 Economic context

2.2.1 Macroeconomic outlook

Southern Africa contributes over 25% to the continent's gross domestic product (GDP), second after West Africa. However, despite the region's comparative economic size, GDP growth has been sluggish. It has fallen from 4% in 2010 to about 0.7% in 2019, lower than any other region in Africa (African Development Bank, 2020). The region's economic outlook for 2020 has been severely affected by the outbreak of the COVID-19 (coronavirus) pandemic. Regional GDP is anticipated to contract by 4.9% in the baseline case, mainly driven by the deep recession in South Africa induced by a fall in commodity prices, the COVID containment measures, weather-related events and the structural issues related to public utilities and State-Owned Enterprises. It is however projected that

growth in Africa will rebound to around 3% in 2021, although regional variability is likely to persist (African Development Bank, 2020a).

2.2.2 Economic sector characteristics

SADC Member States have different characteristics - they vary in economic size, resource potential, human capital, political environment and official languages. Angola, South Africa and Zambia are the three biggest economies and contribute about 81% of the region's GDP, while Lesotho and eSwatini together account for approximately 1%. South Africa contributed about 68% to the SADC region's GDP, the second largest in Africa, but has been declining steadily since 2014. The country's real GDP grew at an estimated 0.7% in 2019, down from 0.8% in 2018, driven by the contraction of agriculture and mining (Southern Africa Economic Outlook, 2020). The dominance of large economies such as South Africa places pressure on some neighbouring countries who suffer backwash effects from regional growth dynamics (African Development Bank, 2020).

In terms of the structure of the Southern African economy, services make up the largest share, largely driven by South Africa's contribution. Between 2010 and 2017 services contributed on average about 60% to the GDP, followed by mining and quarrying at 14.4% and manufacturing at 11%. Industry's contribution to regional GDP remained static at around 34% in 2017. Between 2010 and 2018 South Africa contributed an average of 70.4% to manufacturing output in the region, though its growth in manufacturing and its share of manufacturing output has been declining since 2016. Manufacturing output in Angola and Zambia have shown a steady increase since 2010 (African Development Bank, 2019). The agricultural sector in the region contributed on average approximately 4% to GDP between 2010 and 2017. While South Africa's share declined from 34% in 2010 to 23.6 percent in 2017. Since 2013, Angola has been producing and contributing more than South Africa. In 2018, the country was the region's top producer at 26.4%, compared with South Africa's 23.2%. The agricultural sector continues to be vulnerable to variable weather patterns causing flooding and droughts. Mining and quarrying are dominated by Angola, followed by South Africa, Zambia, and Botswana. The four countries accounted for about 96 % of the 2017 output. Angola's presence in the sector since 2010 is gradually increasing, Botswana's has been steady, Zambia's growing and South Africa's falling. These sectoral changes point to the evolving roles of natural resources such wider resource governance, volatility of commodities and increased cost pressures (African Development Bank, 2019).

A notable characteristic of employment in the SADC region is that of all females employed, 57.3% are employed by the informal sector, whereas 54% of employed males are employed in the informal sector (ILO, 2020). Although reliable figures are hard to come by because the informal sector is often lumped together with services and/or agriculture in the private sector, it is estimated that approximately 40% of the private sector is made up by the informal sector. In turn, the private sector contributes on average about 70% to the GDP of the region (African Development Bank, 2019). This indicates that the informal economy in SADC contributes significantly to the GDP of the region and is not a marginal, temporary phenomenon, but rather the economic hub where the majority of livelihoods in the region is earned. Parallel to the often-unrecognised role of the informal economy in Southern Africa, the contribution of small-scale family farms to the regional GDP, food security and employment is largely unquantified and underestimated (Moya, 2016). Viewed together, these two factors make a strong case for groundwater management decision makers to invest in promoting socio-economic growth through agricultural activities.

Significant variations in the economic impacts of COVID–19 are expected across countries, depending on their sectoral structure and initial conditions. Tourism-dependent, oil-exporter and other resource-intensive economies are expected to be hardest hit due to the worldwide travel restrictions and the collapse of commodity demand and prices, notably for oil. For countries in these groups, growth in

2020 is expected to contract, on average by more than 4%. Less resource-intensive and diversified economies are expected to be more resilient to the shock (African Development Bank, 2020a).

2.2.3 Factors affecting economic growth

The economic environment in Southern Africa has been affected by a number of factors, including inflation, commodity prices, currency exchange rates, trade deficits and public debt.

Although inflation in the region has slowed to single digits in many SADC Member States, they remain high in relation to other countries in the world. The increase in global oil prices in 2019 has fed into the domestic prices of importing countries along with the depreciation of the South African rand, which has dragged along the Southern Africa Customs Union currencies. Due to volatility in commodity prices, uncertainty and rising debt levels amidst the COVID-19 pandemic in emerging markets such as South Africa, most national currencies have experienced significant depreciation against the US Dollar between 2018 2020 (African Development Bank, 2020a). At the regional level, exports have fallen short of imports since 2013, contributing to exchange rate depreciations. The SADC region's current account deficit worsened from an average of 2.1 percent of GDP in 2017 to 2.9 percent in 2018. Despite a general global recovery in commodity prices in 2019, the recent weak economic performance in South Africa has slowed export growth in SADC countries. Between 2011 and 2019, Botswana was the only country that consistently ran large positive current account balances, followed by eSwatini (African Development Bank, 2020).

The many development goals in the SADC region come with big challenges. Massive state expenditure prior to the COVID-19 pandemic in a dynamic financing landscape saw rapidly increasing public debt. COVID–19 adds to the debt burdens of African economies and heightens the likelihood of a widespread and far-reaching sovereign debt crisis if this increased debt is not properly managed. Many countries in Africa, including in SADC, entered the crisis period with high debt-to-GDP ratios, which are projected to increase further by up to 10% beyond the pre-COVID–19 trajectory in 2020 and 2021 (African Development Bank, 2020a). Furthermore, tighter global financial conditions and weaker investor sentiment toward emerging markets contributed to a reversal in capital inflows and to higher financing costs.

General government expenditure has been rising steadily and is expected to continue its gradual upward trend, particularly in response to the COVID-19 pandemic. In 2017, it was recorded at 30.1% of GDP. In most countries, recurrent expenditure as a proportion of GDP is higher than government gross capital formation. The region's fiscal balance is in deficit and remains above the 3% economic convergence target set by SADC, with the majority of Southern African countries reporting budget deficits in 2019 (African Development Bank, 2020). This fiscal position is expected to worsen in 2020 in light of the dramatic slowdown in economic activity caused by the COVID-19 pandemic. In response, many SADC governments are releasing stimulus packages in an attempt to shore up impacted sectors and limit job losses (African Development Bank, 2020a).

2.2.4 Impact of COVID-19 pandemic

The COVID-19 pandemic has taken a toll on human life and brought major disruption to economic activity across the world. Despite a late arrival, the COVID-19 virus has spread rapidly across the Southern African region since the first cases were confirmed in South Africa in early March 2020 (National Institute of Communicable Diseases, 2020). Economic growth in Sub-Saharan Africa is projected to decline from 2.4 percent in 2019 to -2.1 to -5.1 percent in 2020, triggering the first recession in the region in 25 years (World Bank, 2020). The coronavirus is hitting the region's three

largest economies, namely Nigeria, South Africa, and Angola, in a context of persistently weak growth and investment. In particular, countries that depend on oil and mining exports would be hit the hardest.

Policymakers throughout the region are currently focused on implementing strategies to save lives and protect livelihoods. These strategies include short-term relief measures and medium-term recovery measures aimed at strengthening health systems, providing income support to workers and liquidity support to viable businesses. However, financing of these policies will be challenging amid deteriorating fiscal positions and heightened public debt vulnerabilities (Zeufack et al, 2020).

From a public health perspective, the spread of the virus in Africa depends largely on the preparedness of countries to separate and treat infected patients. Given the SADC region's high vulnerability to disease and low healthcare system preparedness, there is a major risk of a public health emergency. The Global Health Security Index, a comprehensive assessment of a country's health system capabilities, shows that most African countries are rated as least prepared. Only 21 of 54 African countries are classified as being more prepared from a clinical perspective to deal with epidemic threats with international implications. The other 33 are ill-equipped and least prepared to respond to the outbreak (African Development Bank, 2020a). In the context of the SADC region's public health vulnerability, prevention remains crucial. For this, access to sanitation and washing hands is the first line of defence to prevent the spread of COVID19. The resource most sorely needed to achieve this in large parts of the SADC region, is groundwater.

2.3 Socio-political context

2.3.1 Demographic overview

SADC has a total population of approximately 345 million, which equates to a population density of 620 people per square kilometre. The estimated population has grown by 2.5% per annum with the largest population share being attributed to the DRC (26.6%) followed by South Africa (16.7%) and Tanzania (15.7%) (SADC, 2018). Around 54% of the Southern African region's population lives in rural areas. The upper middle-income countries, Botswana (59%) and Mauritius (43%) had the lowest rural population shares. Of the lower middle-income countries, South Africa's rural population is lowest at 35% and eSwatini's highest at 78% (African Development Bank, 2019).

Life expectancy at birth, as a measurement for quantity of life, is an indicator with high correlation to the health status of a population which invariably impacts on growth and productivity. During 2018, the average life expectancy in SADC Member States was 61 years whereas between 2000 and 2009 it was 52.8. Although life expectancy has improved over the last ten years in all SADC Member States except in South Africa, there are significant variations across the region. Mauritius and the Seychelles continue to have the highest life expectancy at 73 years, whereas the lowest life expectancy is found in Lesotho at only 46.7 years (SADC, 2018). The general improvement in life expectancy emphasises the need for equitable access to WASH facilities and adequate public health services to all.

Prevalence of HIV refers to the percentage of people ages 15-49 that are infected with HIV. During 2018 SADC Member States had an average HIV prevalence rate of 11.3% (SADC, 2018). The rates are on a declining trend for the decade (2000 to 2009) under review, except for Swaziland where the rate has increased. Children and youth constitute the majority of the population and are considered both a demographic bonus and a major challenge. In Sub-Saharan Africa, AIDS is the leading cause of death among adults aged 15-59 with the number of orphans from all causes having risen by more than 50% (30.9 million in 1990 to 48.3 million by the end of 2005) in sub-Saharan Africa. An estimated 12 million children aged 0-17 have lost one or both parents to AIDS making the region home to 80% of all the children in the developing world who have lost a parent to the disease (UNICEF, 2006). The

current HIV and AIDS pandemic threatens to make the situation even worse over the next two decades.

The labour force participation rate measures the proportion of a country's working-age population working or actively looking for work. The lowest percentage of women participating in the work force is in Mauritius, South Africa and Namibia both have a relatively low percentage of working-age population, male and female, working or looking for work. The highest percentage of labour force participation for both female and male is found in Tanzania, (86% and 93% respectively). Unemployment rates as a share of total labour force by gender are higher among females than males in all SADC countries. Unemployment among young women is especially high in South Africa, Namibia and Lesotho. The average unemployment rate for 2010–18 was 27% in eSwatini, followed by Lesotho at 26% and South Africa at 26%. Ironically, Madagascar has the lowest unemployment in the region, at 2%, followed by Zimbabwe at 5%. Youth unemployment (ages 15–34) has been about as high as the overall unemployment with Madagascar (3%), Malawi (8.1%), and Zimbabwe (8.3%) having the lowest youth unemployment (AfDB, 2019).

SADC aims to achieve its goals and objectives through mainstreaming of gender in all its programmes and enhancement of the role of women in development. In all SADC countries (where data available) bar Botswana, the percentage of women in national parliament has increased over the last decade with Member States achieving an average of 23% in 2018 (SADC, 2018). Women are underrepresented in paid employment (outside the agricultural sector). Looking at the proportion of males and females who are employers rather than employees, the proportion of females is lower than that of males in all SADC countries.

2.3.2 Poverty and human development

Africa has one of the fastest rates of improvement in human development over the past two decades but also has the lowest average levels of human development compared to other regions in the world. Seventeen African countries, of which five fall within the SADC region have attained medium and high human development. Mauritius and Seychelles are among the African countries with the highest human development levels in Africa. Countries with initially low levels of human development are making large gains including Angola, Mozambique, the United Republic of Tanzania and Zambia (UNDP, 2016). Mauritius (65), Botswana (101), and South Africa (118) were the three highest-ranked countries On the Human Development Index in 2017, while Mozambique (180), Malawi (171), and Lesotho (159) ranked the lowest (African Development Bank, 2019).

Poverty and underdevelopment remain daunting challenges for social and human development. The poverty headcount ratios for 2010–2015 show that 64% of the Zambian and 60% of the Lesotho population lived below the national poverty line of $1.90 a day, compared with Mauritius, the only country with poverty at less than 10%. The population below poverty line of $1.90 a day is around 17% in South Africa, while the poverty gap is only 5% of the poverty line. The intensity of poverty (using the poverty gap ratio at $1.90 in 2011 purchasing power parity-adjusted international dollars per day) is highest in Madagascar, followed by Malawi, Lesotho, and Zambia (African Development Bank, 2019). Figure 2-2 provides a spatial representation of how the poverty gap at $1.90 a day, (reflected as a % of the population), varies by country across the SADC region. The shade of the country corresponds to the magnitude of the indicator. The darker the shade, the higher the value.

Some factors that contribute poverty include the high prevalence of disease, in particular HIV and AIDS, malaria and tuberculosis; social and civil conflict; natural disasters, such as recurrent droughts and floods that reduce food security; unemployment; and low industrial growth and productivity, which is reinforced by high levels of migration of skilled labour out of the region.

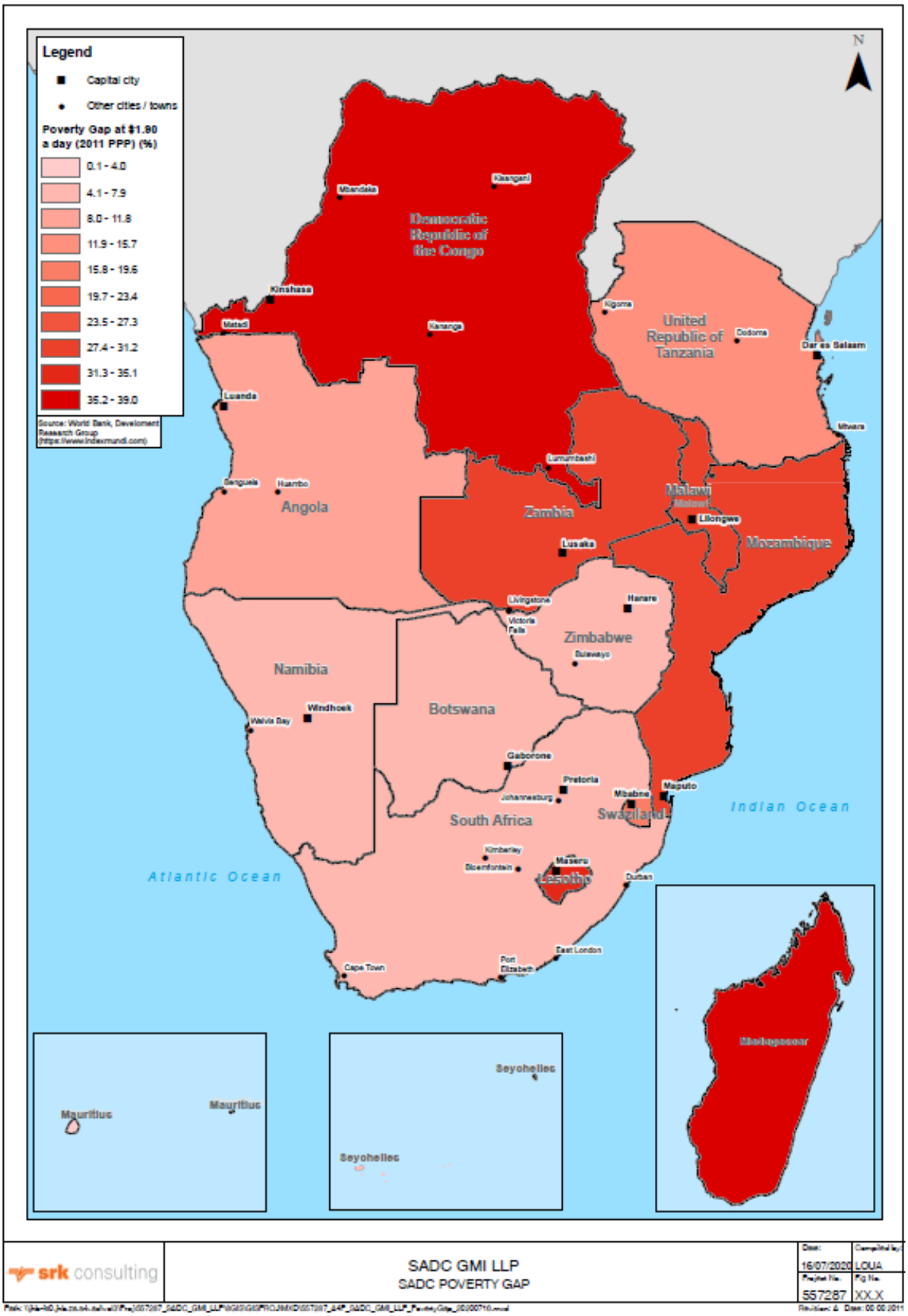


Figure 2-2: Spatial representation of poverty gap in SADC

2.3.3 Democracy and governance

Africa has experienced a remarkable democratic expansion in the last few decades, particularly since the early 1990s when many countries in the region introduced multi-party elections. In 1975, 41 countries were non-democracies while only 3 countries were classified as democracies. By 2018, the share of democracies had increased fivefold to 20 countries, making democracy the most common (41%) regime type in the region (IDEA, 2019). Of the 20 countries categorized as democracies, the large majority have mid-range levels of Representative Government, with only Mauritius presenting a high level of Representative Government. Africa also has the largest share of hybrid regimes in the world, with more than one-third of countries (18) in this category. The latest country to regress into hybridity is Tanzania, in 2018. While the region has witnessed a rise in the number of transitions from ruling to opposition parties, many countries have failed to enact key reforms that would enhance the integrity of electoral processes (IDEA, 2019).

In the SADC region, multi-party democracy has more popular support than any other form of governance. Yet democratic values and practices remain shallowly rooted, and progress toward open, transparent governance is slow. As in most countries in Africa, SADC democracies are based on Constitutions that place limits on presidential terms. Opposition parties however pose a weak system of checks and balances while the executive remains dominant and, in some cases, has unfettered powers. There have been positive moves in a number of SADC Member States to deal with corruption and uphold human rights. SADC countries are well-represented when it comes to human rights reporting. Angola, Botswana, Democratic Republic of Congo (DRC), Mauritius, Namibia and South Africa are among the 14 countries in Africa that are up to date on reports relevant to the African Charter on Human and Peoples' Rights (African Union, 2019).

There has been an overall improvement in African governance since 2008, which is partly due to economic growth development in some countries. However, democracy and political governance remain weak and pose an obstacle to good governance. Although there has been a broadly positive move towards democracy, 35 governments still have discriminatory laws, representing 64% of the 55 AU Member States. Just over half of the African countries assessed have mechanisms for public participation and official strategies to deal with corruption. When it comes to human rights, many African countries have established legal frameworks to protect and promote human rights (African Union, 2019).

Most of the violent conflicts and crises are rooted in governance deficits. Internal armed violence is significantly higher in low-income and lower-middle-income countries than in upper-middle-income or wealthy countries. The African Union identified 21 conflicts in the 55 Member States in 2018. The majority of the SADC Member States demonstrate a high level of peace and security although there are several countries with internal conflicts and other forms of unrest. The SADC Declaration and the Treaty define the SADC Vision as that of a "Shared Future" in an environment of peace, security and stability, regional cooperation and integration based on equity, mutual benefit and solidarity. In order to achieve a shared future and its commitments to international charters and protocols, SADC Heads of State and Government established the SADC Organ on Politics, Defence and Security Cooperation in June 1996. In 2001, Member States signed the Protocol on Politics, Defence and Security Cooperation.

Against the backdrop of mounting demand for access to finite groundwater resources, which are expected to grow by 25% between 2010 and 2025 in developing economies, sustainable and cooperative governance of TBAs will remain key to global peace and security in its water scarce regions (UNESCO, 2012). The UNESCO World Water Assessment Programme (2006) has determined that there is enough water available to meet human need, but poor resource management consistently undermines attempts to properly allocate and conserve the global water supply. As a

result, there have been ongoing discussions about whether competing user groups, such as agriculture and industry, and the aforementioned water security threats will lead to conflict or inspire cooperation. Comprehensive governance of groundwater resources and cooperation between aquifer states are critical to preventing and mitigating the threats and a potential escalation in armed conflict over access to groundwater resources.

Southern Africa's major challenges on governance relate to the persistent deficits in skills and professionalism affecting all elements of public service. This means that economic opportunities and human development for the region may not be difficult to sustain for future generations, given the extensive environmental degradation for many of its member countries. Poor funding and weak capacity of institutions involved in service delivery needs to be resolved. This would involve strengthening governance and capacities across all the mainstreaming sectors (UNECA, 2015).

2.3.4 Sustainable development

SADC Member States have committed themselves to integrated and sustainable development. This commitment is reflected by the SADC Treaty establishing the organisation, and active participation in the negotiations and ratification of major Multilateral Environmental Agreements. This commitment is also demonstrated through their active participation in the negotiations and ratification of major Multilateral Environmental Agreements (MEAs). The SADC Region has endeavoured to put in place mechanisms for the implementation of MEAs such as the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), United Nations Convention on Biological Diversity (CBD), Basel/Bamako Convention; Persistent Organic Pollutants (POPs) and Ramsar Convention.

In May 2013, the African Union Member States signed the 50th Anniversary Solemn Declaration, which laid the foundations for the development of Agenda 2063: The Africa We Want. The framework covers 20 Goals and 39 Priority Areas that converge with the Sustainable Development Goals (SDGs) of Agenda 2030. The Ibrahim Index of African Governance (IIAG) analyses progress on both these frameworks and focusses on key governance dimensions such as Safety and Rule of Law, Participation and Human Rights, Sustainable Economic Opportunity and Human Development (MIF, 2019).

Mauritius (83.8) and Seychelles (78.8) ranked amongst the top five countries in 2017 in the IIAG education category. Mauritius (93.2) and Seychelles (89.2) also ranked among the top five countries in the IIAG health category, with Madagascar (51.1) ranking amongst the top worst performing countries. The largest deteriorations since 2014 were however noted for Seychelles (-10.6) and Angola (-6.8). The highest scoring countries in the gender category included Madagascar (73.5), Seychelles (73.2) and South Africa (71.3). Since 2014, Seychelles (+12.3), have made most progress in gender (MIF, 2019).

Against the Access to Justice category, Swaziland (+21.3) has been among those most improved, while Namibia (-12.4) has seen some of the largest declines. In terms of the Independence of the Judiciary score, Botswana (-15.6) and DRC (-11.4) has deteriorated the most. Countries that have seen a decline in the Property Rights category included South Africa (-16.7), Swaziland (-12.5) and Namibia (-10.6). With regards to Transparency and Accountability, Tanzania and Zimbabwe have improved their score between 2014 and 2017. Six countries have deteriorated every year since 2014, including DRC, Namibia, South Africa and Zambia. The fact that performance in this area of the IIAG remains so low means corruption continues to distort effectiveness of the public and private sectors and this will continue to affect delivery of the targets of both agendas. In terms of national security, Mauritius and Seychelles are receiving the highest possible score of 100.0, followed by Botswana with a score of 99.9 and Namibia with a score of 99.7 (MIF, 2019).

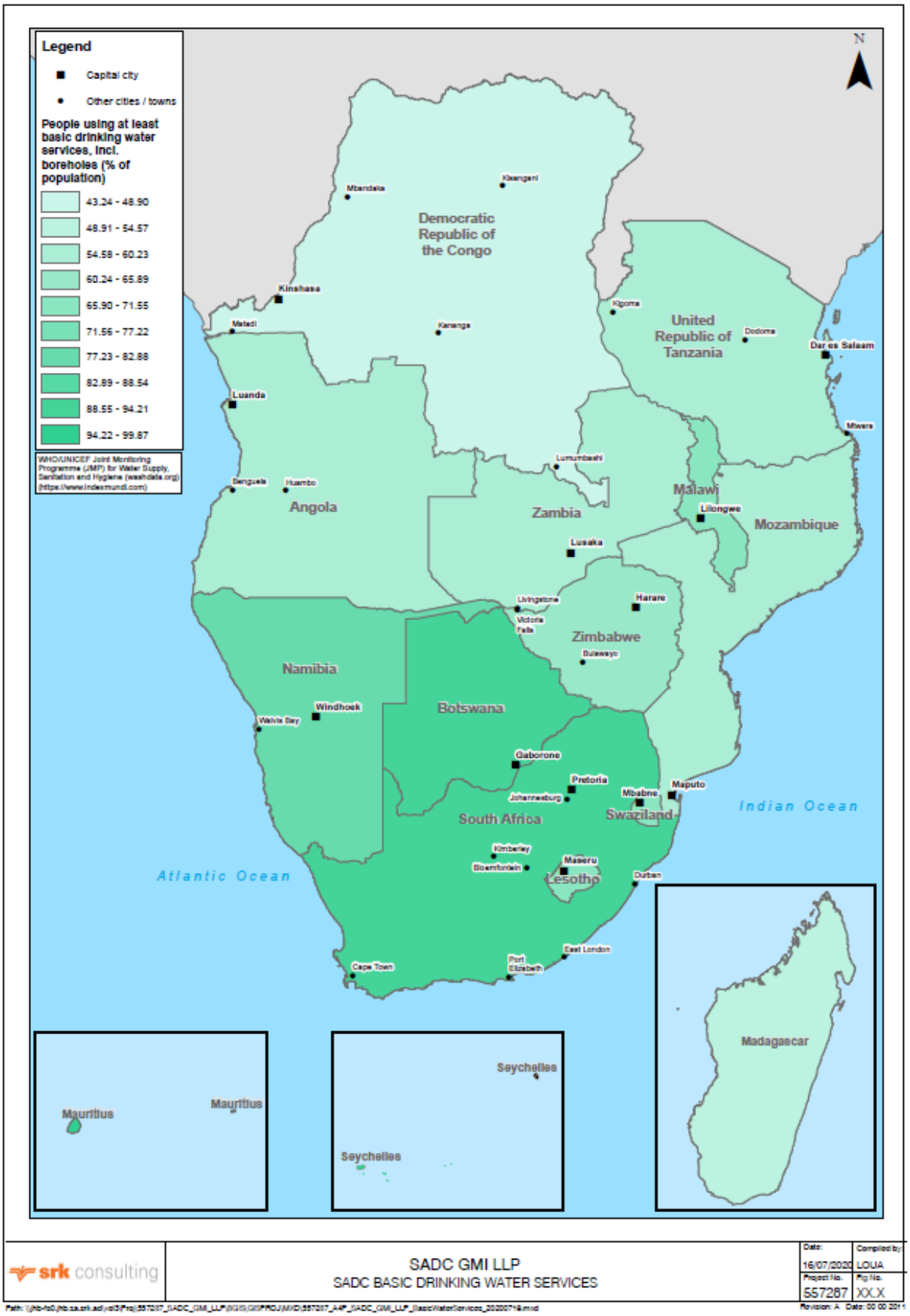
While encouraging progress is being made in resource conservation and management in the region, land degradation, deforestation, loss of biodiversity, pollution, inadequate access to clean water and sanitation services, and poor urban conditions continue to threaten sustainable development. These environmental challenges and social conditions undermine sustainable socio-economic development in the region.

2.3.5 COVID-19 human health effects

As the effects of the COVID-19 pandemic gain momentum and infections rise, the weaknesses in the health systems in SADC countries have become more evident throughout Africa. As in the rest of Africa, SADC countries lack physicians, hospital beds and the necessary health infrastructure to adequately respond to the pandemic (UN, 2020). Given the SADC region's high vulnerability to disease and low healthcare system preparedness, there is a major risk of a public health emergency. The Global Health Security Index, a comprehensive assessment of a country's health system capabilities, shows that most African countries are rated as least prepared. Only 21 of 54 African countries are classified as being more prepared from a clinical perspective to deal with epidemic threats with international implications. The other 33 are ill-equipped and least prepared to respond to the outbreak (African Development Bank, 2020a). In the context of the SADC regions public health vulnerability, prevention remains crucial. For this, access to sanitation and washing hands is the first line of defence to prevent the spread of COVID19. The resource most sorely needed to achieve this, is groundwater.

As the pandemic exacerbates the burden on already weak health systems, governments must ensure that existing health services are protected, not just repurposed, for COVID-19. In addition to these risks, the situation is exacerbated by the prevalence of underlying health conditions among the population, including HIV/AIDS, tuberculosis, malaria and malnutrition. Minimal testing and reporting capacity mean that official numbers do not provide a full picture of the COVID-19 caseload (United Nations, 2020).

Frequent and proper hand hygiene is one of the most important measures that can be used to prevent infection with the COVID-19 virus. Public health officials recommend washing hands with soap and water for at least 20 seconds to eliminate viral particles on the hands. However, that recommendation is difficult to follow in African states where access to water is restricted (World Bank, 2020). The WHO/UNICEF Joint Monitoring Programme (2017) reported that only 34% of the African population has access to handwashing facilities (Figure 2-3). However, there is a lack of access to basic water services, including boreholes in many countries in SADC. Among the highest-ranking SADC countries are Madagascar (50.54% in 2015), Tanzania (47.95% in 2017), Namibia (44.60% in 2017) and South Africa (43.99% in 2017). Lesotho is ranked the lowest, with 2.12% as measured in 2017, followed by DRC (4.47%) and Malawi (8.70%).



Source: WHO/UNICEF Joint MonitoringProgramme (JMP) for Water Supply,Sanitation and Hygiene (washdata.org)

Figure 2-3: Access to basic water services in SADC

2.4 Sectoral and institutional context

2.4.1 Water policy and law

Most SADC countries have legal frameworks in place to support Integrated Water Resource Management principles. In most of the counties the water laws were promulgated within a time period of ~10 years (between 1998 and 2007). The regulatory instruments to support judicious use of groundwater, however, are either lacking or are not enforced (SADC- GMI, 2019). Instruments such as groundwater protection zoning are hardly used; water use licenses never enforced, and fines never imposed.

In order to promote regional integration and coordination, SADC Member States have adopted strategies and policies to guide sustainable management and development of water resources in the region. This evolving regional water framework comprises the Revised Protocol on Shared Watercourses in 2000 and the Regional Water Policy, adopted in 2005. These were operationalised through the Regional Water Strategy adopted in 2006 and the Regional Strategic Action Plan (RSAP) on Integrated Water Resources and Development Management, which was first approved by SADC Summit in August 1998 to run in five-year phases. The RSAP IV as the current plan is due to end in 2020. These legal, policy, strategy and planning instruments support the development and governance of water resources and provide the key pillars of the regional water framework in SADC as indicated in Figure 2-4.

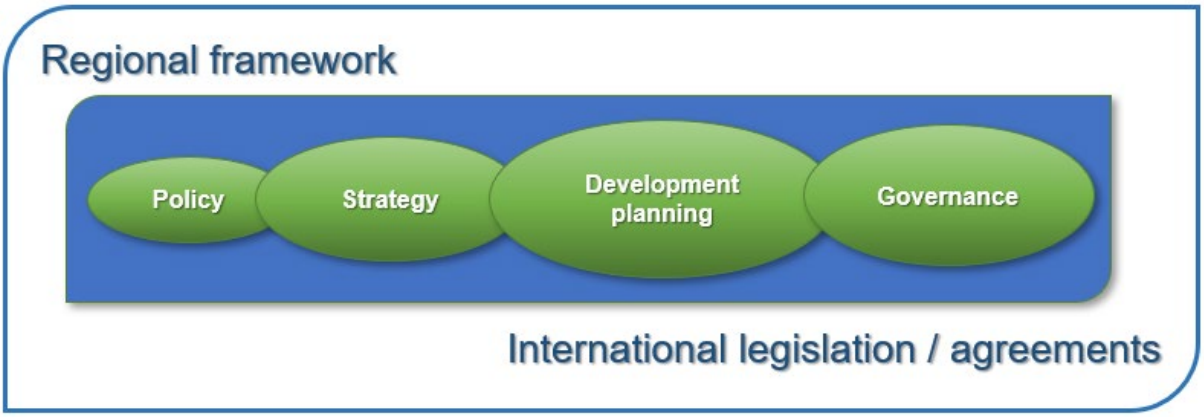


Figure 2-4: Regional water framework

Groundwater resources and management are not featured prominently in this framework. A review of the regional legal framework was undertaken as part of the Regional Gap Analysis process by SADC-GMI (SADC-GMI, 2019), which provided an overview of the existing gaps in policy, legislation, strategy, guidelines and the institutional frameworks within the SADC region. The objective of this review was that it would assist in ultimately advancing the groundwater narrative and bring it up to par with surface water in terms of policy, legal and institutional frameworks thereby enhancing sustainable groundwater management at a national and regional level in the SADC Region. The gaps and opportunities identified in the 2019 Regional Gap Analysis are summarised in Figure 2-5.

Figure 2-5: Thematic analysis of regional gaps and opportunities

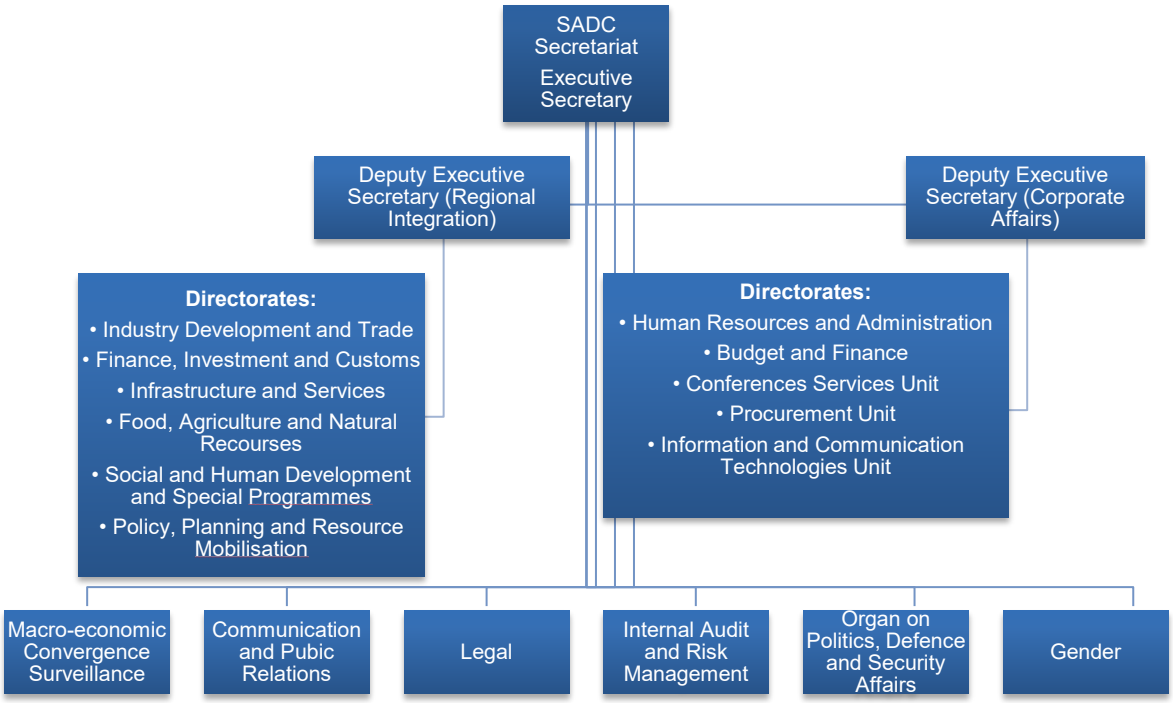
2.4.2 Institutional arrangements for water governance

There are no explicit groundwater agencies responsible for groundwater management in the SADC Member States. Rather groundwater management is accommodated in a Directorate/Division or a sub-Directorate within a government department. Most country legislation requires the participation of stakeholders in the management of groundwater resources through Catchment Management Agencies or Councils. Implementation and proper functioning of the institutional framework as required by the legislation has been slow or non-existent in most SADC countries. The most widespread use of groundwater is for village level 'garden-scale' irrigation of vegetables and seedlings, which helps to improve food and nutritional security at a local scale (Pavelic et al., 2012). There is limited coordination between Departments of Agriculture to both control groundwater use and to prevent groundwater contamination from agricultural activities. The same lack of coordination applies to government agencies responsible for urban and industrial development. At best there is coordination with government departments responsible for rural water supply. The lack of institutions for groundwater management and coordination with other sectors is increasing the risk of groundwater depletion and pollution and puts communities at risk.

At regional level, the SADC Secretariat is the Principal Executive Institution of SADC, responsible for strategic planning, facilitation and co-ordination and management of all SADC Programmes. It is headed by the SADC Executive Secretary and is located in Gaborone, Botswana. Figure 2-6 presents the institutional organogram of the SADC Secretariat, which is arranged into eight (8) directorates, and

eight (8) stand-alone units responsible for cross-cutting issues. Linked to this structure at national level are the SADC National Committees and SADC National Contact Points, who are responsible for technical matters in the respective Member States.

Within the SADC Secretariat, responsibility for increasing and facilitating cooperation in water lies with the Water Division. The Water Division falls under the Directorate for Infrastructure and Services and is responsible for coordinating and facilitating the implementation of regional water related activities in close collaboration with the Member States of SADC under the guidance of the Revised Protocol on Shared Watercourses.



(Source: SADC website)

Figure 2-6: SADC Secretariat structure

2.5 Higher level objectives to which the project contributes

"Among the many things I learnt as a president, was the centrality of water in social, political and economic affairs of the country, the continent and the world."
Nelson Mandela

Water permeates every aspect of life and water stress inevitably leads to human stress. These water-related stressors often disproportionally affect the most vulnerable in society. Groundwater is often more reliable, in closer proximity to water users, less vulnerable to pollution and contamination and perceived to be more resilient to climate change impacts than surface water (Lapworth et al., 2017). Groundwater is critically important for livelihood activities such as agriculture and small, medium and micro enterprises, as well as industry. The economic impact of poor water and sanitation infrastructure is estimated cause up to a 5% annual loss in gross domestic product in Africa. This is without taking account of the negative economic impact of droughts and floods and the effects of climate change (African Studies Centre, 2020).

Within groundwater management, transboundary aquifer cooperation and management is of particular importance. Water is an economic enabler, and competition for scarce water resources is increasing across Southern Africa. Integrated transboundary aquifer management can contribute not only to

equitable distribution of water resources, but also to cross-border socio-economic development and peace and stability in the countries sharing common groundwater resources.

It is evident that an integrated approach to water management, and groundwater management in particular, is sorely needed. This section discusses several overarching issues or higher-level objectives to which the proposed SADC groundwater management programme will contribute.

2.5.1 Donor commitment to water management in SADC region

There has been a long-standing commitment by international development finance institutions (DFI) to global priorities and regional programmes to strengthen water resource management in Africa. This assistance is provided in the form of multi-lateral and bilateral technical and financial support to programmes and projects. Leading DFIs include the World Bank, European Union, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Danish International Development Agency (Danida), the Swedish International Development Cooperation Agency (Sida), Agence Française de Développement (AFD) and Global Environment Facility (GEF), amongst others. These institutions mostly provide assistance to regional and national structures and programmes using tailored cooperation strategies.

For example, the World Bank Group (WBG) has provided dedicated support to Africa since 2005 and has a large portfolio of active operations and projects across the continent, including the SADC region. The WBG Regional Integration and Cooperation Assistance Strategy (RICAS) for Africa covering 2018 – 2023 provides the framework strategy for development engagement (WBG, 2017). These strategies are designed to address the many African challenges such as climate change, water resource management, food security and poverty alleviation. It is therefore necessary to match and align new development programmes and projects with the priority areas of DFI strategies and development frameworks.

At continental level, the African Union's Agenda 2063 provides a blueprint and master plan for transforming Africa into the global powerhouse within a 50-year period. The First Ten-Year Implementation Plan of Agenda 2063, spans from 2014 to 2023. This provides a strategically focused framework to guide development assistance in support of regional integration and promote goals, priority areas and targets that the continent aims to achieve at national, regional and continental levels. Some of the past and current initiatives it builds on include: the Lagos Plan of Action, The Abuja Treaty, The Minimum Integration Programme, the Programme for Infrastructural Development in Africa (PIDA), the Comprehensive Africa Agricultural Development Programme (CAADP), The New partnership for Africa's Development (NEPAD), Regional Plans and Programmes and National Plans (African Union Commission, 2015).

At regional level, the SADC Protocol on Shared Watercourse fosters closer cooperation for judicious, sustainable and co-ordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation. This strategic objective is operationalised through the Regional Indicative Strategic Development Plan (RISDP) 2015-2020, a coherent and strategically focused implementation framework guiding the regional integration agenda of SADC since 2005. It is designed to provide clear strategic direction with respect to SADC programmes, projects and activities in line with the SADC Common Agenda and strategic priorities, as enshrined in the SADC Treaty of 1992. Article 26A of the 2001 Agreement Amending the SADC Treaty provided for the establishment of a special fund known as the SADC Regional (infrastructure) Development Fund (RDF). The SADC Water Fund is the key financing instrument under the RDF for the development and integration of the water sector in the region. The Development Bank of Southern Africa (DBSA) was appointed as the Project Executing Agency to implement the Fund.

Many DFIs provide technical and development assistance in the water sector on issues including water supply, sanitation, water resource planning and management, training and capacity building, technical research and mapping and monitoring and evaluation. Cooperation programmes and projects are developed around a set of agreed key objectives and comprise a number of components covering a combination of development areas. This approach to development assistance by DFIs is evident in recent programmes and project in the water sector in SADC Member States. Against the background of the United Nations Sustainable Development (SDG) Goal 6 to 'ensure availability and sustainable management of water and sanitation for all by 2030' (United Nations, 2015), and existing regional commitments, DFI support to water resource management in Africa, and the SADC region in particular, is likely to continue attracting technical assistance and funding.

Against this background of international commitment to groundwater management in Africa, SADC-GMI has commissioned several studies to map the donor landscape to its key objectives. These reviews have indicated several avenues through which SADC-GMI could diversify its funding support-base. From a technical perspective, it will serve SADC-GMI well to actively monitor shifting donor priorities, the performance of similar organisations as well as actively seek out partnerships to accelerate innovation and implementation in groundwater management

2.5.2 Linkages between SADC-region priorities and programme priorities

SADC-GMI operations within a regional and developmental context in water-related programmes are well developed, but not always well coordinated. Several institutions, bodies, non-governmental organisations, government departments and donors share SADC-GMI's focus on water in general and groundwater in particular. Areas of synergy between these organisations include the impact of climate change on water resources, the food, agriculture, water and energy nexus, land access issues, transboundary cooperation and the importance of gender equity and social inclusion in access to water.

Figure 2-7 indicates high level linkages of SADC-GMI's priority areas have with other regional institutions, partners, government bodies and international partners with a regional focus. SADC-GMI has a growing partnership network and aims to increasingly align programme and project objectives with partners to deepen impact and avoid duplication.

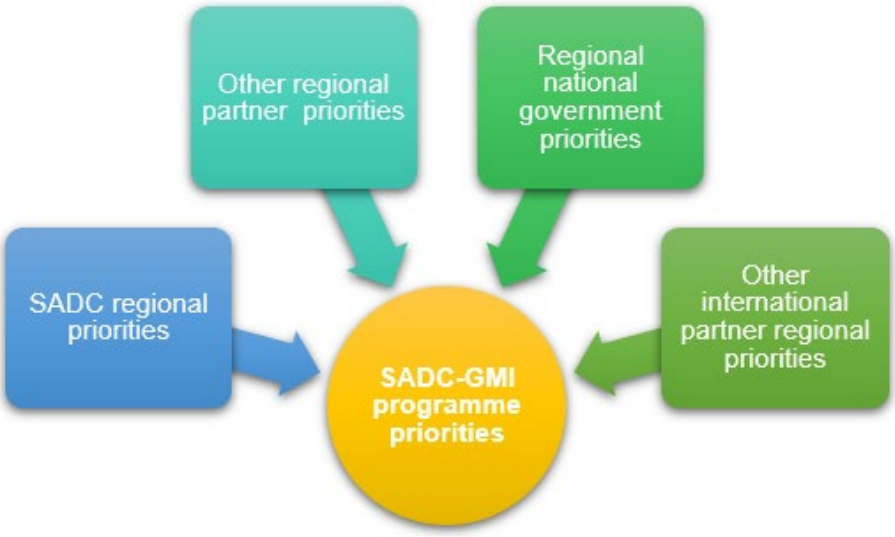


Figure 2-7: Linkages between SADC-region priorities and programme priorities

In SADC-GMI's network map, the following organisations have been identified who have a regional interest and whose programme priorities align with those of SADC-GMI:

- **SADC regional bodies** – includes the Food, Agriculture and Natural Resources (FANR) Directorate, the Social and Human Development and Special Programmes (SHDSP) Directorate, the SADC Gender Unit and the associated programmes and projects managed by these bodies.
- **Other regional partners** – includes the African Union Water and Sanitation Programme in Africa, the Secretariat of the African Ministers' Council on Water (AMCOW); WaterNet, Africa Groundwater Network, Gender and Water Alliance (GWA), Climate Resilient Infrastructure Development Facility (CRIDF), RBOs; Transboundary organisations; academic institutions, non-governmental organisations and private companies with interest in groundwater.
- **National government departments responsible for water** – include various government departments in respective Member States with a mandate for surface and groundwater management.
- **International partners with a regional focus** – include Alliance for Water Stewardship (AWS), International Water Management Institute (IWMI), Resilient Waters Program, British Geological Society, International Groundwater Resources Assessment Centre (IGRAC) and UNESCO-IHP through the Groundwater Resources Governance in Transboundary Aquifers (GGRETA) project.

2.5.3 Water sector's vulnerability to climate change

Water availability and security in the SADC region has been subjected to the impacts of climate change and severe weather events that threaten to destroy water points and sanitation facilities and contaminate water sources. These impacts have negatively impacted on the livelihoods of a significant proportion of the region's population. Furthermore, higher temperatures and more extreme, less predictable, weather conditions are projected to affect availability and distribution of rainfall, snowmelt, river flows and groundwater, and further deteriorate water quality. Low-income communities, who are already the most vulnerable to any threats to water supply are likely to be worst affected (UNESCO, UN-Water, 2020).

On an institutional level, in order to provide access to sustainable water and sanitation services it is critical to ensure that climate change adaptation measures build climate resilience. Adaptation measures can include any intervention or activity identified, strengthened or introduced on community level that helps citizens of SADC Member States adapt to the new climatic reality caused by rapidly changing weather patterns. One factor that can strengthen climate resilience is healthy ecosystem services that rely on well-functioning river basins. Effective country-driven climate change adaptation should reflect the importance of groundwater management in reducing vulnerability and building climate resilience (IUCN, 2015).

The need to strengthen groundwater management and development in order to promote sustainable social and economic development within the region led to the establishment of SADC-GMI in 2011. SADC-GMI has delivered on its mandate to promote groundwater management over the last five years A future SADC-GMI driven groundwater programme will include a strong focus on climate change resilience through groundwater capacity building in institutions, the generation and dissemination of groundwater information (for example for use in early warning systems) and developing and upscaling innovative groundwater infrastructure projects.

On an institutional level, in order to provide access to sustainable water and sanitation services it is critical to ensure that climate change adaptation measures build climate resilience. Adaptation measures can include any intervention or activity identified, strengthened or introduced on community level that helps citizens of Member States adapt to the new climatic reality caused by rapidly changing weather patterns. One factor which can strengthen climate resilience is healthy ecosystem services that rely on well-functioning river basins. Effective country-driven climate change adaptation should

reflect the importance of groundwater management in reducing vulnerability and building climate resilience (IUCN, 2015).

SADC-GMI's proposed new programme seeks to mitigate the effects of climate change, pollution and rapidly growing water demand in Southern Africa through strengthening of institutional and technical capacity to implement national reforms and to facilitate cooperation on shared aquifers in the region. It also endeavours to generate and disseminate information that can strengthen capacity to adapt to climate change impacts and seek to support resilient livelihoods through innovative groundwater infrastructure projects in communities. The project implements priority actions in the work-programme for groundwater in the SADC Regional Strategic Action Plan for Integrated Water Resources Management (RSAPIII, 2011–2015) (replaced by the RSAPIV (2016-2020) in alignment with the Revised SADC Protocol on Shared Watercourses of 2000 and river basin agreements across the region.

2.5.4 Equitable access to groundwater for women and vulnerable groups

In the light of water as a scare resource and its implications for livelihoods, health and economic well-being, issues of gender and vulnerability should be key considerations in the design of all intervention.

Water scarcity is an established fact and estimated to affect more than forty per cent of the global population and is projected to rise. Over 1.7 billion people are already living in river basins where water use exceeds recharge. The World Health Organisation (WHO) (2019) estimates that by "2025, half of the world's population will be living in water-stressed areas" (WHO, 2019).

While addressing the pressing challenges of water scarcity, gender mainstreaming must form part of the solution. The Dublin Principles for Water adopted gender mainstreaming as a requisite for sustainable water management in 1992, and The GWA argues that while gender mainstreaming in water management has been recognized for more than a decade, this did not translate into practice. Comprehensive Assessment (CA, 2020) describes effective mainstreaming as "the process of assessing the implications for women and men, of any planned action, including legislation, policies or programs, in any area and at all levels" (CA, 2020). Therefore, the design, implementation and monitoring and evaluation phases of programmes must include a gender focus.

According to GWA equitable access to and control over water is a basic right for all, as well as a critical factor in promoting poverty eradication and sustainable livelihoods. Hawkins et al., (2018) confirm that socially defined gender roles in water management can create disparities and inequalities in water access, use, and labour, making consideration of gender issues an important component of groundwater governance.

Women's roles in agriculture and groundwater for their agriculture needs must be incorporated in any programme design. In Sub-Saharan Africa, the roles and responsibilities for water often leave women worse off, since women are frequently water carriers, but left out of decision-making of land access, ownership or infrastructure-related development. Gender mainstreaming in its application should ensure equitable access to decision-making about water for both men and women.

A body of research has shown that a failure to recognize gender issues, affects agricultural productivity negatively, and that women's lack of independent access to and control over land and water threatens household food security (Bhawana Upadhyay, 2003). Furthermore, Upadhyay (2003) argues, "there has been increasing recognition that equitable access to water helps reduce poverty. Bestowing poor women with water for their productive purpose is an effective way to reduce poverty.

Women's involvement and participation in groundwater management in all its facets are critical from empowerment, development and equity perspectives. A study of the Dakiri irrigation system in Burkina Faso proved that the productivity of land and labour were higher in systems where both men and women owned plots (Zawarteveen, 1996). There is some evidence that poor people and vulnerable

groups experience decreased access to groundwater, and, in some cases, groundwater access patterns may exacerbate inequalities (Baguma et al., 2017), in Guppy, Uyttendaele, Villholth and Smakhtin, 2018).

Vulnerability is another critical element for consideration in groundwater, outside of the gender imperative. WHO and The International Federation of Red Cross (IFRC) define vulnerability as the diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or manmade hazard. Poverty – and its common consequences such as malnutrition, homelessness, poor housing and destitution – is a major contributor to vulnerability.

Another group that should be included in Integrated Water Resource Management (IWRM) planning is people living with disability. The specific needs of people with disabilities to access water, sanitation and healthcare should be considered. People with disabilities should be appropriately consulted when WASH interventions are being designing for households, as well as for institutions, schools, hospitals, and livelihood projects.

From a governance and policy perspective, Hawkins et al. (2018) have highlighted the omission of gender considerations from global governance (law and policy) instruments over transboundary surface and groundwater resources (Earle and Bazilli, 2013).

The relevant international and regional instruments (1997 UN Watercourses Convention, 1992 UNECE Water Convention, 2000 SADC Revised Water Protocol), reveal six key governance approaches to consider gender in the transboundary governance of water resources. The first three approaches include the issue of equitability:

- Equitable access to water resources;
- Equitable use of water resources and benefit sharing; and
- Equitable control over water resources.

Care should be taken while addressing issues of gender, food security and poverty eradication as part of a plan to achieve the SDGs. Specifically, in pursuing the target of ‘doubling agricultural productivity’, governments and SDG implementers may create unforeseen negative impacts for groundwater. This can be done through increasing the risks of groundwater depletion and decreasing groundwater quality through nutrient and pesticide leaching and salinization (Guppy, Uyttendaele, Villholth and Smakhtin, 2018). The integrated management of access to water for agriculture and groundwater quantity and quality management is therefore critical.

The SADC Gender Unit and the Water Division are working to mainstream gender across the water sector on all levels and in all SADC, Member States to ensure improvements are implemented (SADC, 2017). These efforts include the “Gender Mainstreaming in Transboundary Water Management Programme”, which emphasizes a basin-wide integrated approach for institutions.

SADC-GMI can play a role in ensuring local level gender concerns, challenges and outcomes regarding transboundary groundwater cooperation are addressed. Instruments such as the SADC Protocol on Gender and Development (2015) and the National Policy on Gender and Development (2015) should be used to strengthen local level Gender Units, which can ensure that local voices reach the transboundary levels.

2.5.5 Groundwater for public health and WASH initiatives

Water and access to water is fundamental to quality of life and impacts every aspect of our lives, from the quality of healthcare, hygiene and food security, to our sense of dignity, safety and protection. The importance of water, including groundwater, for public health and sanitation purposes have become even more critical as the world fights the effects of the COVID-19 pandemic. The latest Sustainable Development report (UN, 2020), preliminary findings suggest that the impact of the pandemic on SDG

6 (clean water and sanitation) has been “mixed or moderately negative, with limited access to clean water among disadvantaged groups limiting the possibility of adhering to strict hygiene guidelines”. There is a lack of access to basic water services, including boreholes, in many SADC Member States (refer to Figure 2-3 in Section 2.3).

WHO has initiated a “Hand Hygiene for All Global Initiative”, which aims to implement recommendations on hand hygiene to prevent and control the COVID-19 pandemic and work to ensure lasting infrastructure and behavior This WHO and UNICEF-led initiative calls for countries to lay out comprehensive roadmaps that bridge together national COVID-19 preparedness and response plans, with mid- and long-term national development plans that will ensure hand hygiene is a mainstay beyond the pandemic (WHO, 2020a).

From a health and hygiene perspective, much work is still needed, as the SDG (2020) estimate approximately 2.4 billion people globally still lack access to basic sanitation services, such as toilets or latrines. UNICEF confirms that about 946 million people defecate in the open (UNICEF, 2020a). United Nations experts argue that “availability and access to water, sanitation and hygiene (WASH) services is fundamental to fighting the virus and preserving the health and well-being of millions, and COVID-19 will not be stopped without access to safe water for people living in vulnerability” (SDG, 2020).

Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks. This often results from people having to drink from unprotected wells and springs and the SDG data shows that 144 million people collect untreated surface water from lakes, ponds, rivers and streams. WHO found that “contaminated water can transmit diseases such diarrhea, cholera, dysentery, typhoid, and polio, and contaminated drinking water is estimated to cause 485 000 diarrheal deaths each year with more than 800 children dying every day from diarrheal diseases linked to poor hygiene” (WHO, 2020b).

International human rights law obliges states to work towards achieving universal access to water and sanitation for all, and to prioritize those most in need, The United Nations have called upon civil society organizations to keep their governments accountable. UNICEF has also pointed to the specific needs and negative impacts that a lack of access to clean water and basic toilets hold for women and girls. This includes issues of safety (i.e. when having to walk far from the household or defecate in the field) and missing school due to menstrual hygiene.

Furthermore, research shows that in 45 developing countries, in 7 out of 10 households, the burden of collecting water falls to women and girls, which negatively impact schooling for girls (UNICEF, 2020a). In an article in preparation for the “Sanitation and Hygiene Conference in 2002”, WaterAid Uganda and Uganda Water and Sanitation NGO Network (UWASNET) described the sanitation situation in Uganda as low in coverage. The responsibility for sanitation is the household with women at the center of the process. This is true for many Sub-Saharan African countries, and therefore necessitates women to be part of interventions to improve conditions of sanitation.

Solutions to sanitation often include poorly constructed and managed pit latrines, which leads to contamination of groundwater. Countries where pit latrine use is prevalent also tend to have high rates of groundwater use (Tillett, 2013, in Lisa Guppy, Paula Uyttendaele, Karen G. Villholth and Vladimir Smakhtin, 2018). The need for water and sanitation technologies is critical, as well as waste handling and recycling of waste with risk to groundwater in mind. Research is required to understand the characteristics and vulnerability of local groundwater resources in all member states.

The dual topics of WASH and gender equality and social inclusion in a period of time where COVID-19 has brought inequalities in access to water into stark focus, provide SADC-GMI with a unique opportunity. SADC-GMI can demonstrate thought leadership in advocating an answer to the fundamental programme question '***groundwater for what?***', with programmes and interventions that promote the utilization of groundwater for equal access to WASH facilities, especially for women and vulnerable people.

3 Programme development objective (PDO)

3.1 Introduction

Within the context of groundwater management in the SADC region and emphasis on overarching issues, the proposed SADC-GMI PDOs form the heart of the proposed new SADC-GMI programme. Organisational, technical and thematic lessons learned during the implementation of the first programme were taken into account in the development of the PDO for the next ten years. Current issues such as groundwater for socio-economic development and climate change resilience receive particular attention in the proposed PDO. In addition, cumulative targets give attention to gender equality and social inclusion as well as livelihoods to assist SADC-GMI to track and measure relevant impact.

This chapter presents the proposed PDO that will form the basis of the new 10-year groundwater management programme, set against SADC-GMI's values. The chapter discusses the potential beneficiaries of the programme and concludes by presenting the approach to developing PDO level indicators.

3.2 Operational principles (values)

In March 2020, SADC-GMI commissioned an independent process to identify the lessons learned through the implementation of its SGM Project. These lessons were captured through review of project deliverables and consultation with various stakeholder groups and disclosed and verified during an interactive workshop. This process indicated the need for revisiting SADC-GMI's values which were published as part of its Strategic Plan (2019).

SADC-GMI participated in a value casting process which supported the organisation to re-evaluate its values based on the following three parameters:

- Internal functioning;
- External reputation; and
- Focus on impact.

The resulting values to steer the development of the new programme are indicated in Table 3-1. These values were carefully imbedded in SADC-GMI's proposed logical framework to ensure that value-based decision-making permeates all its organisational activities.

Table 3-1: SADC-GMI's revised values

Category	Proposed values	Definition
Internal functioning	Integrity	Operating with responsibility, transparency and a strong code of ethics
	Excellence	Operating at the highest professional and technical level and exceeding expectations
External reputation	Collaborative partnerships	Building partnership networks to grow capacity and work together on common goals
	Innovative	Seeking and introducing approaches and methods that are responsive to changing circumstances
Focus on impact	Sustainable outcomes	Pursuing appropriate and lasting outcomes that will be of benefit across generations
	Empowerment through knowledge	Generate and disseminate knowledge to grow capacity and foster autonomy

3.3 PDO and Key Result Areas

The lessons learned process provided the impetus for SADC-GMI to revisit and reformulate its PDO. In particular SADC-GMI used the opportunity to identify key success factors in the development and implementation of a new programme. These key success factors were identified by experts in the field of programme development, organisational capacity and financial management and are summarized in: Figure 3-1.

Taking cognisance of the key success factors, the proposed SADC-GMI PDO for programme development in the next ten years was formulated with the assumption that an evaluation process will be conducted after the first five years to ensure that the PDO remains suitably calibrated. The PDO for the second 5-year period will be adjusted based on the lessons and recommendations arising from the first 5-year period. SADC-GMI's proposed PDO and associated Key Result Areas (KRAs) for the next 10 years are indicated in Table 3-2 and presented in Sections 3.3.1 to 3.3.2. A full description of the KRAs is provided in Section 4.3.

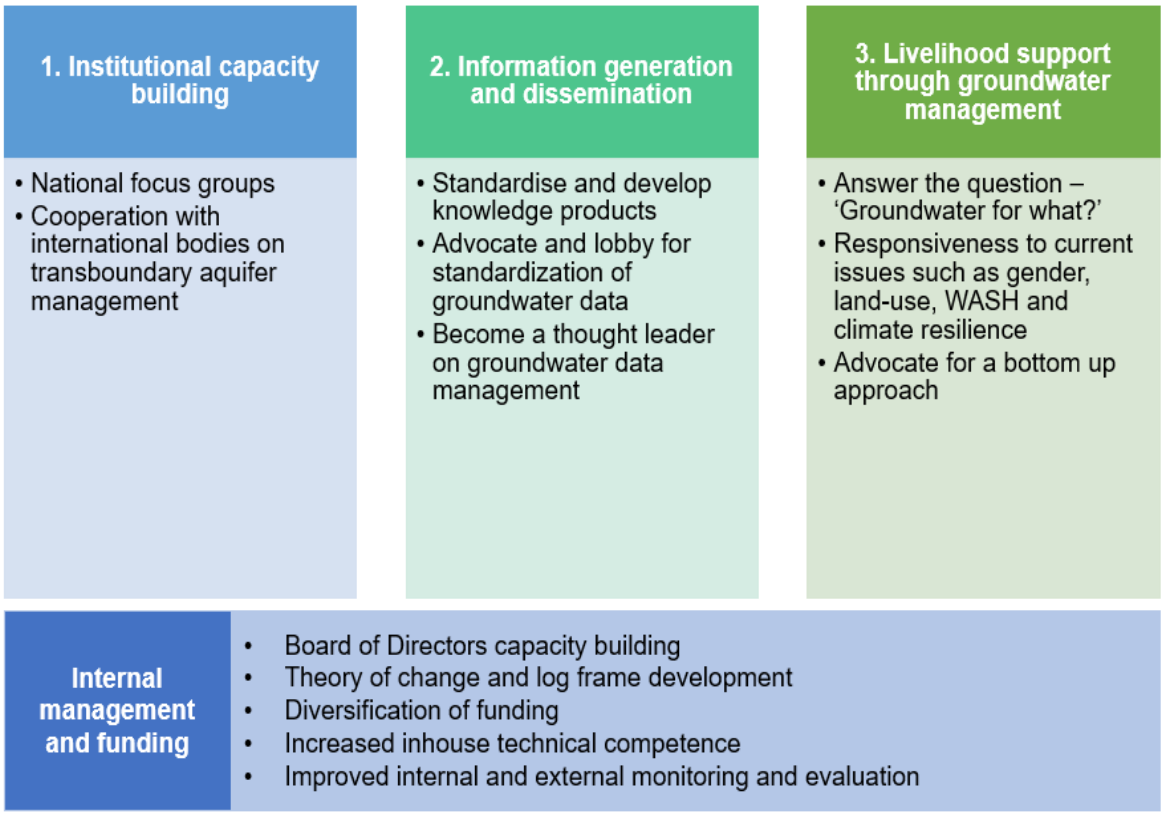


Figure 3-1: Key success factors

As is evident from Table 3-2 SADC-GMI proposes structuring its key result areas around three main themes – institutions, information and infrastructure.

Table 3-2: Concept plan framework

PROGRAMME TITLE: Sustainable groundwater management for resilience and socio-economic development in the SADC region	
Project development objective:	To strengthen capacity for sustainable management of groundwater to build resilience in the SADC region.

Key result area 1	Build capacity of national and regional **institutions** and develop skills for groundwater management to improve resilience and support socio-economic development.
Key result area 2	Generate knowledge through analytics and through data and **information** sharing.
Key result area 3	Support resilient livelihoods through groundwater management and innovative **infrastructure** for socio-economic development

Figure 3-2 provides a high-level overview of SADC-GMI's key result areas, beneficiaries and the central role information sharing plays in the integration of the three key result areas.

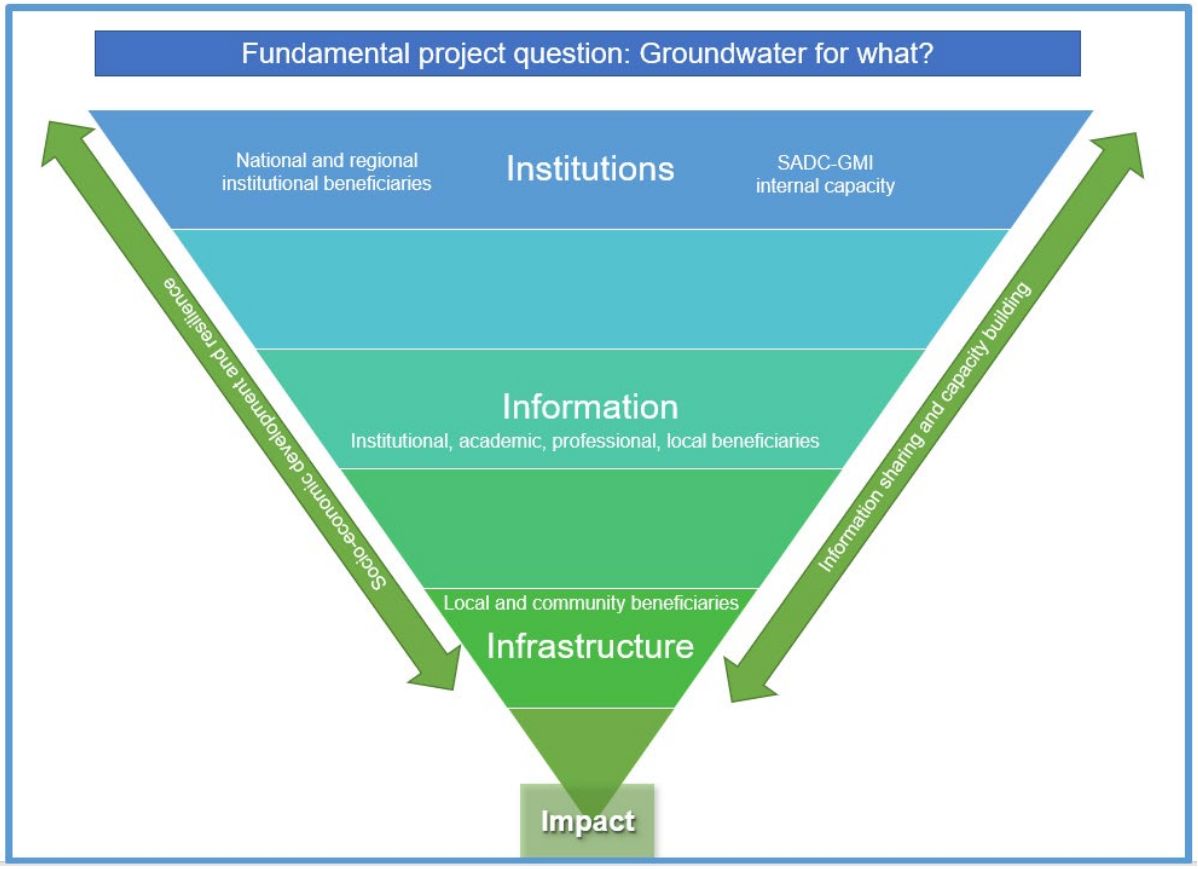


Figure 3-2: Overview of SADC-GMI's fundamental project question, key result areas and beneficiaries

3.3.1 Key result area 1 - Institutions

SADC-GMI aims to build the capacity of national and regional institutions and develop skills for groundwater management to improve resilience and support socio-economic development. The organisation plans to achieve the following to deliver on key result area 1:

- Enhance the internal capacity of SADC-GMI;
- Improve the capacity of institutional stakeholders; and
- Develop technical and vocational skills among stakeholders.

3.3.2 Key result area 2 – Information

SADC-GMI aims to generate and disseminate knowledge through analytics, data and information sharing. The organisation plans to achieve the following to deliver on key result area 2:

- Expansion of the existing SADC-GMI online portals and archives;

- Development of sector-specific knowledge products;
- Research to advance the role of groundwater in promoting sustainable socio-economic development; and
- Facilitate knowledge management through data/information sharing events, platforms and networks.

3.3.3 Key result area 3 - Infrastructure

SADC-GMI aims to support resilient livelihoods through sustainable groundwater management and innovative infrastructure for socio-economic development. The organisation plans to achieve the following to deliver on key result area 3.

- Implementation of groundwater infrastructure projects;
- Capacity building of communities in the Member States; and
- Design and installation of groundwater monitoring networks.

3.4 Programme beneficiaries

3.4.1 Proposed benefits

The programme has a SADC-wide regional footprint, but it is designed to contribute to the sustainable management of groundwater at multiple levels, ranging from regional to local. In this context there are many beneficiaries, some deriving direct benefit from the project and its activities and others enjoying indirect benefits.

This section outlines the spread of benefits expected to flow from the programme, and it identifies the beneficiaries. Donors and funders may be argued to benefit by virtue of extending their development agendas through involvement with the programme. Donors and funders are discussed elsewhere, however, and are not included here.

The benefits of the programme are broadly the following:

- Skills development. Development and consolidation of groundwater management skills, though customised skills enhancement interventions (training, internship) and hands-on implementation and management experience through groundwater infrastructure pilot projects;
- Knowledge transfer. Interactive transfer of groundwater management knowledge, through networking engagements, conferences and workshops;
- Capacity building. Support to the technical and operational capacity of groundwater management structures and institutions, through targeted capacity building initiatives (for example capacity building with national focal groups and persons) and the provision of technical and operational guidance in the form of customised case study work (for example in the context of transboundary aquifer management) and management guidelines;
- Policy and strategy support. Support to groundwater management policies, strategies and frameworks through appropriate research, benchmarking, analysis and the development of implementation tools and roadmaps; and
- Knowledge and information. Provision of and access to a broad spectrum of groundwater management information, knowledge and guidance made available through the SADC Groundwater Portal and the Groundwater Literature Archive.
- Regional integration. Regional integration of groundwater management policies, strategies, knowledge, operational practices and monitoring networks and approaches.
- Project beneficiaries are discussed in more detail in Sections 3.4.2 to 3.4.4 below. Table 3-3 presents a classification of beneficiaries, which informs the discussion.

Table 3-3: Classification of beneficiaries

	Directly Impacted	Indirectly Impacted
Local	• Sub-grant project and community level capacity building beneficiaries • SADC-GMI host institution	• Groundwater-using communities in Member States • Groundwater professionals working at community level
National	• Focal persons, focal groups members, trainees and interns	• National institutions responsible for water management • National academic institutions and water research agencies • Groundwater professionals working at national level
Transboundary and Regional	• SADC Secretariat and Secretariat structures addressing water resource management such as the Directorates for Food, Agriculture and Natural Recourses and Gender	• River Basin Organisations • Regional water resource management agencies • Groundwater professionals working at regional level

3.4.2 Local level beneficiaries

Direct beneficiaries

Sub-grant project and community-level capacity building beneficiaries

Following the implementation of twelve infrastructure pilot projects in selected Member States under the SADC GMP, this programme will continue with the implementation of innovative infrastructure projects compliant with environmental and social safeguards (ESS), with the purpose of promoting sustainable groundwater management practices. Whilst relatively few in number, these infrastructure projects will be of direct benefit to the planners, managers, implementors and community members, illustrating the potential of innovative approaches. It will also demonstrate the optimal design, operation and management requirements of such projects.

Another local-level project initiative is the development of technical and vocational skills among groundwater stakeholders. The modalities will include training and the provision of guidance materials on groundwater stewardship, and the beneficiaries will be the local stakeholders selected and involved.

SADC-GMI host institution

SADC-GMI was hosted by the University of the Free State. Alternative hosting arrangements have been investigated for this project and the results are discussed in Section 5.5.

The host institution will benefit from the project in several ways, including the partnership with a regional body such as SADC, association with a funded regional project, promotion and extension of the host's own development and water management agenda, and the opportunity for local professionals, researchers and students to work in a regional network and to contribute regionally.

Indirect beneficiaries

Communities in Member States

Groundwater is the primary source of water for over 70% of the SADC population. Most rural communities are served from groundwater resources, with high dependence in Botswana, Malawi, Namibia, South Africa, eSwatini, Tanzania and Zimbabwe (SADC-GMI, 2019). Many towns and cities

also depend substantially on groundwater, including Tshwane in South Africa, Lusaka in Zambia, Bulawayo in Zimbabwe and Dodoma in Tanzania (Pietersen and Beekman, 2016).

To the extent that programme's technical and institutional capacity support at national level improves groundwater management and the sustainability of groundwater resources. Hence, groundwater-dependent communities will be indirect beneficiaries.

Groundwater professionals working at community level

Public and private sector groundwater professionals working at community level will be indirect programme beneficiaries, through access to knowledge, tools and network connections facilitated by the programme, and in the case of specialist consultants, through providing services to local infrastructure development and to local skills development and training.

3.4.3 National level beneficiaries

Direct beneficiaries

Focal Persons, Focal Group members, trainees and interns

Under the SGM Project, SADC-GMI has identified and supported National Focal Persons to act as an interface between the Institute and the SADC Member States. Five National Focal Groups were also established. The Focal Group initiative will continue as an activity in the proposed programme and will include further capacity building and support inputs. As the focal persons and focal group initiatives unfold, growing numbers of participants will be direct project beneficiaries.

Further national-level direct beneficiaries will include country participants in conferences, workshops and training, and young professionals selected and or seconded to join the regional internship programme.

Indirect beneficiaries

National institutions responsible for water management

Institutional arrangements for water resource management are similar across most SADC Member States. Typically, they include a nationally responsible ministry and localised institutions such as water user associations. Some have water resource management agencies and most water management policies provide for catchment-based management structures (SADC-GMI, 2019). There is considerable variation among member state institutions, however, in terms of policy stability, institutional development, dedicated groundwater responsibilities, groundwater management capacity and the capacity of local management structures (SADC-GMI, 2019).

Subject to country-by-country differences in participation, national water management institutions will be indirect beneficiaries of multi-facetted programme efforts to build capacity, especially around the growth and institutional consolidation of groundwater management in the broader water resource management domain.

National academic institutions and water research agencies

National academic institutions and with an interest in the following research areas may be beneficiaries:

- Regional water management,
- Cross boundary water resource and aquifer management,
- Groundwater management,
- Climate change and climate resilience; and
- The role of water in poverty reduction and socio-economic development.

They could use programme information and knowledge resources, participate in research initiatives and use opportunities for student internships and networking. Similarly, research agencies (such as the Water Research Commission in South Africa) will be beneficiaries if they draw on information resources, provide research services to the programme, participate in regional networks and collaborate in specific research initiatives.

Examples of university collaboration under the SADC SGM Project include the University of the Free State, which currently hosts SADC-GMI, and which has an agreement with SADC-GMI to include UFS students in the Institute's internship programme, and the University of the Western Cape which has undertaken research on behalf of SADC-GMI.

Groundwater professionals working at national level

Groundwater professionals working at national level will be indirect programme beneficiaries, through access to project-generated knowledge, project groundwater management tools and project networks and connections. Specialist consultants will benefit through providing services to national initiatives linked to the programme, including research, support to national capacity development and support to national-level monitoring.

3.4.4 Cross boundary and regional - level beneficiaries

Direct beneficiaries

SADC Secretariat

The SADC Secretariat is the body that facilitates SADC projects and activities. The Secretariat is guided by the SADC mandate on regional integration and sustainable development. The Water Division and associated structures are located within the Secretariat's Directorate of Infrastructure and Services. The latter includes the Water Resources Technical Committee and the Hydrogeology Sub-Committee. The goal of the Water Division is to improve quality of life through the promotion of regional cooperation in water matters for sustainable and equitable development, proper usage, and management of water resources.

The SADC Secretariat in general and Water Division in particular, will benefit from the new programme in that it advances the SADC agenda and the goal of the Water Division, through a focus on groundwater management. The SADC Secretariat will benefit further through building on the achievements of the SADC-GMI and the SGM Project. These have built significant momentum over the project duration, with the support of the World Bank and other development partners.

Indirect beneficiaries

River Basin Organisations

The programme will work actively with River Basin Organisations (RBOs) in the SADC Region. The established RBOs are Limpopo Watercourse Commission (LIMCOM), the Permanent Okavango River Basin Water Commission (OKACOM), the Orange-Senqu River Commission (ORASECOM), the Cuvelai Watercourse Commission (CUVECOM) and the Zambezi Watercourse Commission (ZAMCOM). Under the SGM Project, SADC-GMI established formal relationships with the RBOs. They will continue to benefit from collaboration under these arrangements, including support with analytic tools, knowledge products, forecasting and climate risk management.

Regional and extra-regional water resource management agencies and sector partners

SADC-GMI has established mutually beneficial collaborative partnerships with several regional and extra-regional groundwater water resource management programmes. These include the UNESCO Intergovernmental Hydrological Programme (UNESCO-IHP) and the International Groundwater Resources Assessment Centre (IGRAC). Similar cooperation will continue under the new programme.

Groundwater professionals working at regional level

As with groundwater professionals working national, professionals active at regional level benefit from the project, through access to information, tools and network connections. Consultants may benefit through the provision of services to regional research, information management, network facilitation and other SADC-wide initiatives. The new programme also proposes establishing a Regional Association of Groundwater Professionals where standards of practice and matters of mutual interest to groundwater professionals in the region can be coordinated.

3.5 PDO Level Results Indicators

PDO level results indicators are used to map out operational plans to achieve the overall PDO. The PDO for the new SADC-GMI programme is:

"To Strengthen Capacity for Sustainable Management of Groundwater to Build Resilience in the SADC Region"

Appendix C presents indicators and cumulative targets for the three KRA's underpinning the PDO, together with indicators for KRA Sub-Areas (ten in all). The indicators provide a practical and replicable framework for assessing KRA and KRA Sub-Area progress and results, initially over a five-year period from 2021 to 2025.

Cumulative targets are set for KRAs and KRA Sub-Areas over this period, capturing year-on-year progress commitments. Refinements of the Results Framework may be required as initial KRA implementation tests and validates the applicability and viability of the indicators and goals. The results framework for the second implementation period, 2026 to 2030, will be developed based on a midterm evaluation process.

4 Programme description

4.1 Introduction

The SADC Secretariat, through the Water Division in the Directorate of Infrastructure and Services, received a grant from the World Bank to implement the five-year (2016 to 2021) regional project for SGM in the SADC Member States (SADC-GMI Financial Sustainability Report, 2018). The project was implemented from 30 June 2015 until 31 December 2020 (after 18 months no-cost extension from 30 June 2019). However, the recent COVID-19 pandemic has negatively impacted on progress and hence there are negotiations to extend the project implementation deadline to 30 June 2021.

This chapter provides an overview of the historical evolution of SADC-GMI as well as a short description of the programme components by discussing each of the proposed KRAs. It further explores project planning and financing and concludes with a description of proposed management and organisational structures that will support programme implementation.

4.2 Historical evolution of SADC-GMI

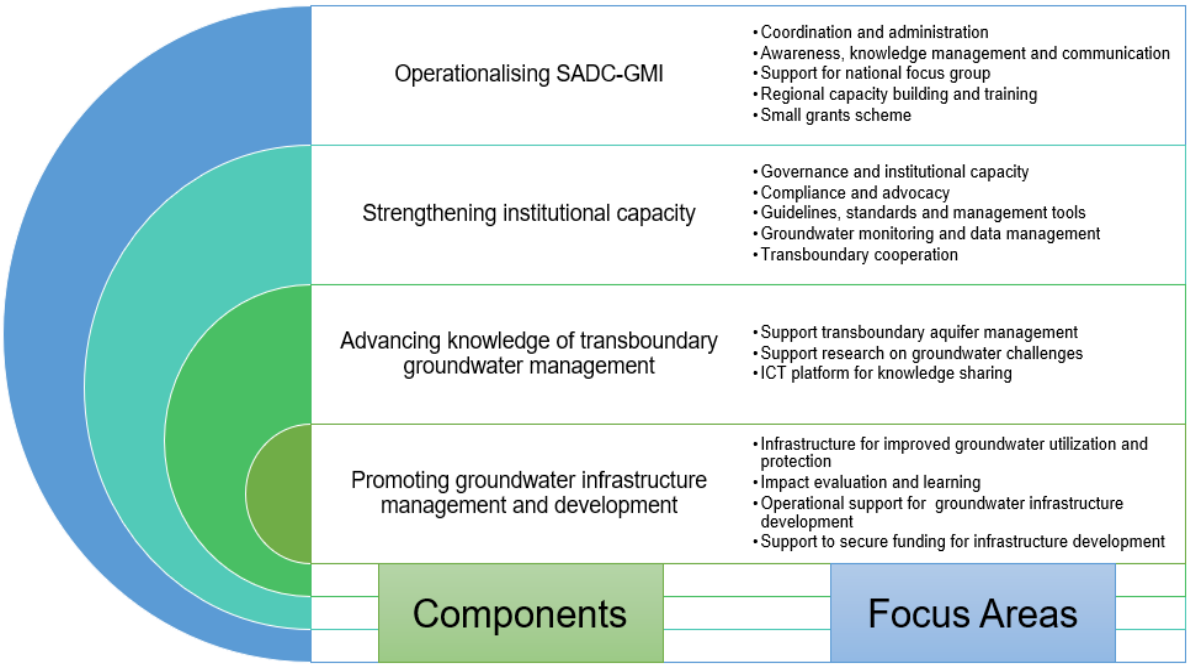
In June 2008, the SADC Council approved a recommendation of the SADC Sub-Committee on Hydrogeology to host the SADC-GMI at the Institute for Groundwater Studies (IGS) at the University of the Free State (UFS). After a competitive procurement process, this was run across the SADC region and involved approximately 13 potential hosting institutions culminating in the IGS winning the said bid. The first Strategic Business Plan for the SADC-GMI for the period 2010 – 2012 was drafted in 2009 by Pegasus Strategy and Development and focussed entirely on the establishment of SADC-GMI. On 6 May 2011, SADC-GMI was legally registered as a section 21 not-for-profit company with the Companies and Intellectual Properties Commission (CIPC) under the South African Companies' Act to serve as a Centre of Excellence in promoting equitable and sustainable groundwater management in the SADC region. Articles and a Memorandum of Association were notarially registered in South Africa. By February 2014, the SADC Secretariat and the UFS had a final draft Memorandum of Understanding for hosting of the SADC-GMI.

Once established, SADC-GMI had a strong internal focus and embarked on a process of setting up its governance structure, looking at initial staff appointments and simplistic systems and processes to function. Over the years, SADC-GMI also built capacity internally with the appointment of technical staff and initiation of a number of projects (SADC-GMI Strategic Business Plan 2018-2023).

SADC-GMI's core mandate is to promote sustainable groundwater management and provide solutions to groundwater challenges across the SADC region.

To achieve these objectives, the project consists of the following components, with specific focus areas illustrated in Figure 4-1:

- **Component A:** Operationalising the SADC Groundwater Management Institute (SADC-GMI) as a regional centre of excellence;
- **Component B:** Strengthening institutional capacity for the sustainable management of groundwater in SADC;
- **Component C:** Advancing knowledge on transboundary and national groundwater; and
- **Component D:** Promoting groundwater infrastructure management and development



Source: SADC-GMI Physical Activities and Progress Report, February 2020 and WBG Appraisal Document, April 2014

Figure 4-1: SADC-GMI current programme's strategic objectives and focus areas

Through Component A, SADC- GMI was operationalised with the remaining three components (B, C and D) having a greater impact in the areas of institutional strengthening, information and infrastructural aspects of groundwater management among SADC Member States from local to regional levels.

From 2010 to 2013 the Institute focused on internal capacity building and organisational development (Figure 4-2) however this was limited to the company registration. In 2014, the commencement of the World Bank-funded SGM Project initiated a period during which SADC-GMI refined its vision and strategic objectives and began strengthening its operational effectiveness through initiatives such as regional capacity building and knowledge management. The Institute also developed guidelines, standards and management tools to strengthen institutional capacity in the region.

The visioning and conceptualisation of the future evolution of SADC-GMI has been articulated by the Executive Director of SADC-GMI to potential funders through various means. The direction of the proposed future programme is supported by the lessons SADC-GMI learned from implementing its SGM in SADC Member States Project from 2014 to 2020.

Not only does past lessons learned informs the future evolution of SADC-GMI but the organisation is also acutely aware of several current socio-political factors which could potentially influence donor priorities and programme implementation. To date, SADC-GMI had four well-articulated strategic objectives to achieve in becoming a recognised centre of excellence in groundwater management. These four components form the basis of the current programme and provide a foundation for formulating subsequent strategic objectives for the planning of the next phase in SADC-GMI's strategic business plan.

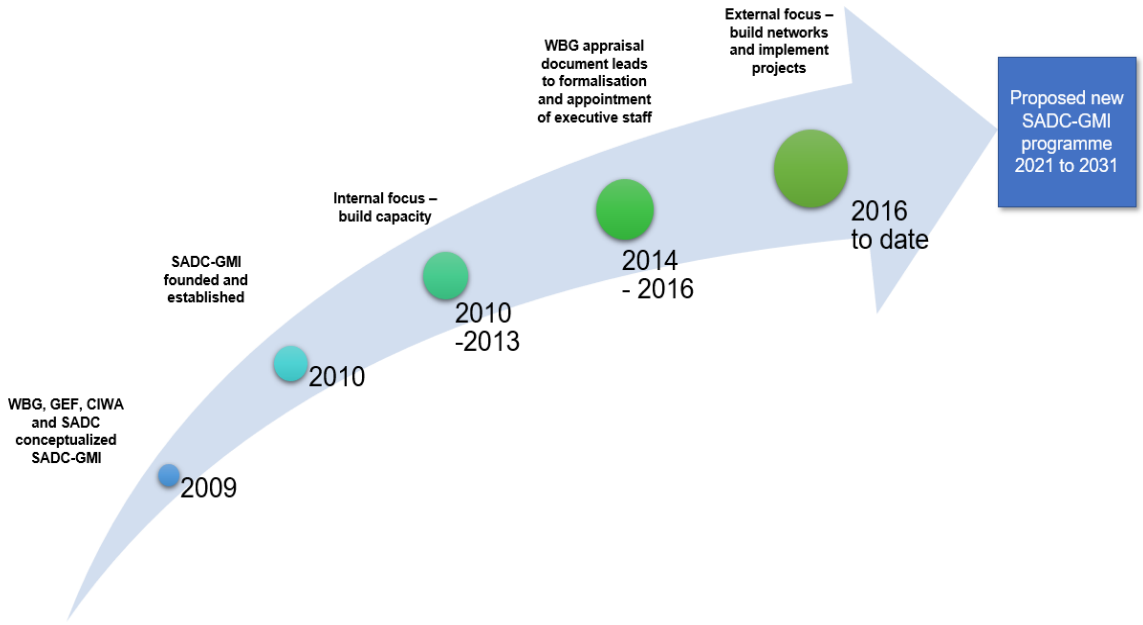


Figure 4-2: Timeline evolution of SADC-GMI

Figure 4-3 provides an overview of how SADC-GMI's original strategic objectives which were focused on sustainable groundwater management are evolving to answer the key question: 'Sustainable groundwater management for what?' This subtle change in focus enables SADC-GMI to be responsive to current socio-political factors and increase its ability to measure impact on beneficiaries. SADC-GMI proposes to answer this key question through:

- Capacity building of national and regional institutional organisations in groundwater management to promote climate resilience and socio-economic development;
- Generation and dissemination of groundwater knowledge to strengthen resilience and promote socio-economic development; and
- Promoting groundwater infrastructure innovation for resilience and livelihoods.

Figure 4-3 presents a schematic of the SADC-GMI's likely future evolution in terms of strategic focus from 2021 to 2031.

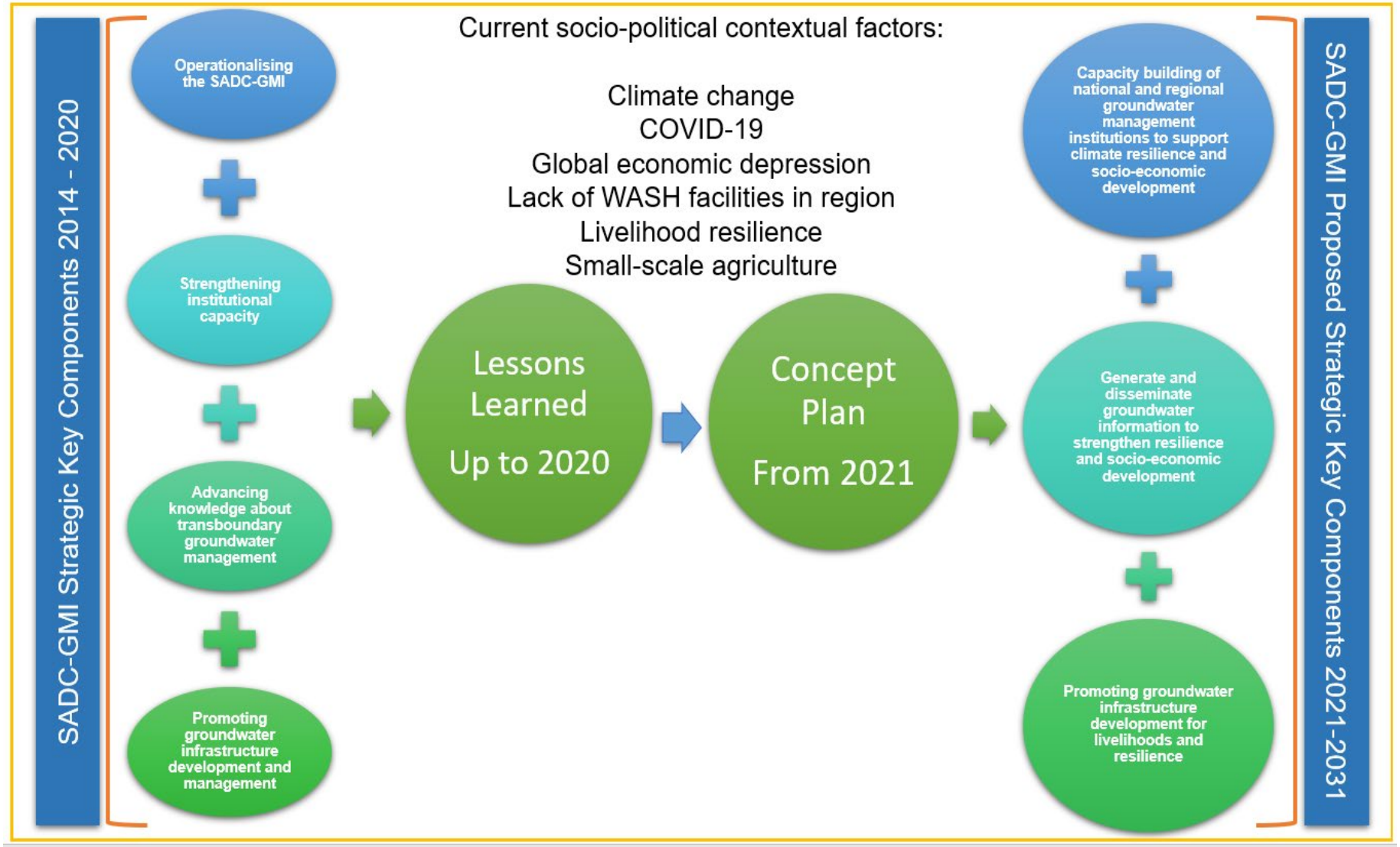


Figure 4-3: Future evolution of SADC-GMI

4.3 Programme components

Based on a strong track record of delivering on targets and objectives and informed by lessons learned from the previous SGM Project implementation, SADC-GMI proposes a new programme that focuses on institutions, information and infrastructure in groundwater management. Each of these KRAs has proposed intervention areas and priority projects, but the final evolution of the future programme will depend on securing the appropriate funding and aligning with donor priorities. SADC-GMI envisions the new programme to expand and deepen efforts of SADC Member States in addressing some of the intractable development challenges in the SADC region. For most Member States, groundwater is a vital resource that contributes to water security, resilience to the impact of climate change and that supports socio-economic development. To this end, SADC-GMI proposes the following name for the future programme:

Groundwater for resilience and socio-economic development in the SADC region 2021-2031

As mentioned in Section 3.3, the proposed programme consists of three KRAs and approximately 10 KRA subareas.

4.3.1 Key result area 1: Institutions

Build capacity of national and regional institutions and develop skills for groundwater management to improve resilience and support socio-economic development

To deliver results in this KRA, SADC-GMI proposes aiming interventions at the capacity of three broad stakeholder groups:

- **SADC-GMI internal capacity**

  The scale of the proposed programme is approximately triple the scale of the previous programme. To deliver on the objectives of the new programme, SADC-GMI will need to strengthen its internal capacity in terms of skill sets and number of employees;
- **Regional and national institutions**

  Regional and national institutions such as the SADC Secretariat and associate structures, RBOs and National Departments of Member States are critical partners in terms of programme influence and implementation. To harness the collective power of these institutions, SADC-GMI aims to strengthen capacity and understanding for groundwater management for socio-economic development; and
- **Local, national and transboundary groups and individuals working in technical groundwater fields**

  A key recommendation from the technical section of the LLP is strengthening capacity of technical employees, professionals and academics in groundwater management for resilience and socio-economic development. To support this intervention area, SADC-GMI aims to establish national focus groups through which standards of practice and other information can be disseminated.

4.3.2 Key result area 2: Information

Generate groundwater knowledge through analytics and through data and information sharing

To deliver results in this KRA, SADC-GMI proposes aiming interventions in four broad categories:

- **Expansion of online information system**

  The SADC Groundwater Information Portal (SADC-GIP) and the SADC Groundwater Literature Archive (SADC-GLA) are evolving as a regional knowledge hub on groundwater. To support its growth SADC-GMI aims to expand it with new information, linkages and data

services to support sustainable groundwater management at transboundary, national and local perspectives;

- **Develop sector-specific knowledge products**

  SADC-GMI delivered several well-received knowledge products as part of the current programme implementation. The scope to expand these knowledge products are discussed in detail in Section 4.6;

- **Support and conduct research to advance the role of groundwater**

  SADC-GMI is well placed to collaborate with academic- and other institutions to advance research about the role of groundwater in promoting sustainable socio-economic development. A list of proposed research areas is presented in Section 4.6; and

- **Facilitate regional groundwater knowledge management**

  SADC-GMI's strengthening position as a regional knowledge hub for groundwater puts it in a strong position to become the single authoritative source of information in the region. This objective will be strengthened by proactively hosting knowledge sharing events, creating platforms and building networks.

From a stakeholder perspective, SADC-GMI plans to generate and provide timely access to knowledge to the following stakeholder groups:

- **Local stakeholders and water users**

  SADC-GMI plans to upgrade the SADC-GIP with a suite of near real time monitoring data through a citizen's/expanded in-country monitoring programme. This information will be integrated with existing global data sets to aid prediction ability and decision making. One of the proposed outcomes of this project is to be able to establish a feedback loop to local farmers and participants with regards to possible climate-related threats. This will help reduce vulnerability and exposure to disasters; and

- **Planners and decision makers**

  SADC-GMI plans to integrate groundwater data with the aim to provide timely, targeted and sector specific groundwater information to planners and decision makers. One of the proposed outcomes of this project is to inform decision making through integrated information about resource potential, development, vulnerability and uses. This could aid Member States in disaster preparedness and response measures.

4.3.3 Key result area 3: Infrastructure

Support resilient livelihoods through sustainable groundwater management capacity building and innovative infrastructure for socio-economic development

To deliver results in this KRA, SADC-GMI proposes aiming interventions in four broad categories:

- **Implement innovative groundwater infrastructure projects**

  The LLP results indicated that most of 12 pilot infrastructure projects implemented in Member States during the current programme period, can be scaled up with little or no modification. SADC-GMI plans to use this momentum to expand the groundwater infrastructure for resilient livelihoods project to identify new successful projects, implement new project and upscale existing successful projects;

- **Build capacity of communities in Member States**

  Lessons learned from the implementation of the infrastructure projects in the current programme, indicate a need for building community capacity in groundwater stewardship and management. SADC-GMI aims to integrate a capacity building component into the infrastructure project implementation; and

- **Build groundwater monitoring networks**

  SADC-GMI has been advocating for increased and aligned groundwater monitoring networks across national and transboundary aquifers to inform decision making on community level. This component of KRA 3, is essential to plan groundwater infrastructure and plan and develop sustainable usage strategies.

4.4 Programme planning

4.4.1 Stakeholder consultation process during planning

Throughout its evolution, SADC-GMI has recognised the importance of stakeholder consultation. Stakeholder engagement is deemed essential when preparing programmes and plans. The organisation actively sought out the opinions, views and inputs of key stakeholders and strengthened collaborative partnerships in the process.

In order to ensure that this inclusive decision-making ethos is reflected in the lessons learned and concept plan framework process, SADC-GMI included several stakeholder groups in the lessons learned project and elicited responses through various means of interaction. The broad types of stakeholder groups and data collection methods are depicted in Figure 4-4.

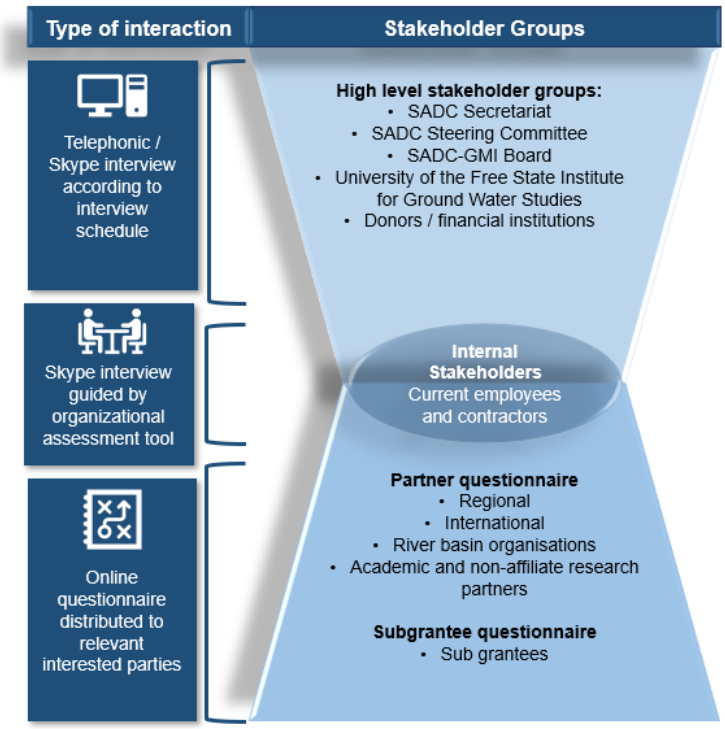


Figure 4-4: Stakeholder consultation process during bankable project plan development

After the compilation of the lessons learned report (SADC-GMI, 2020), SADC-GMI hosted an online Lessons Learned Disclosure workshop on the 19th of June 2020. The workshop was facilitated by SRK and attended by over 50 participants from stakeholder groups across the SADC region and globally. These groups included representatives from research institutions, focal persons in Member States (prime partners), sub-grantees and various partners such as research institutions, NGOs and donor agencies. The workshop proceedings have been issued as a standalone report.

Topical breakaway sessions were included in the workshop programme to facilitate stakeholder participation and engagement. The sessions were facilitated by SADC-GMI staff members and the topics were aligned with SADC-GMI's three proposed Key Results Area's as indicated in Table 3-2: Concept plan framework. At the start of each session the SADC-GMI representative proposed interventions for the relevant Key Result Area, after which participants were given the opportunity to engage and provide recommendations for the proposed concept plan. A summary of the key recommendations from the workshop is presented in Appendix D and included in the conceptualisation of the proposed SADC-GMI programme.

4.4.2 Theory of change

Theory of Change (ToC) methodology is a creative and strategic tool and is often used in development project design, especially where a defined developmental change (or changes) is desired in a complex and multi-dimensional environment. A ToC analysis provides a comprehensive causal description and illustration of how and why the desired change will happen. ToC is not an implementation instrument; it captures the "big picture" whilst frameworks for implementation are presented through Logical Framework Analysis (LFA) and Results Frameworks (see Sections 4.4.3 and 3.5 respectively). A summary of the definitions used in the development of SADC-GMI's ToC is provided in Table 4-1.

Figure 4-5 presents a ToC "map" developed for the Sustainable groundwater management for resilience and socio-economic development in the SADC region programme (2021-2025). It shows anticipated outcomes and impacts of the KRAs, and how these are supported and driven by linked interventions and outputs. The map also demonstrates that whilst SADC-GMI as the project enabler has a key role in advancing the project's change process, implementers (Focal Groups, River Basin Organisations and sub-grant recipients) and influencers (SADC Secretariat, donors and Member State partners) also play a significant part. In essence, the project would not succeed without the collective contribution of all of these parties.

Table 4-1: SADC-GMI's ToC definitions

Concept	Definition	Application to SADC-GMI	Assumptions
Enabler	An enabler is an organisation and/or person who drives the implementation of a programme.	SADC-GMI's employees, contractors and consultants enable the development of the programme.	SADC-GMI has adequate funds, capacity and skills to enable the programme
Implementer	An organisation and/or person who takes responsibility for undertaking the practical execution of a project.	SADC-GMI's subgrantees, regional focus groups, river basin organisations and non-profit organisations. Member States (National Focal Groups).	SADC-GMI has the ability to support implementation through funding, capacity building and good practice standards
Influencer	An organisation and/or person that has the power to encourage and facilitate action	SADC-GMI's governance structures, Board, SADC Secretariat, donors, partners and Member States (Sub-Committee on Hydrogeology) and WRTC.	SADC-GMI is able to develop and maintain the necessary networks, contractual agreements and relationships
Interventions	Action taken to improve a specific condition	SADC-GMI's specific actions to achieve its goals in each key result area	
Outputs	A programme-specific deliverable resulting from an intervention	SADC-GMI's records of interventions completed	
Outcomes	The consequence of an intervention	SADC-GMI's measurable and documented results	
Impact	A marked effect or influence on a specific area of intervention	SADC-GMI's positive effect on potential beneficiaries	

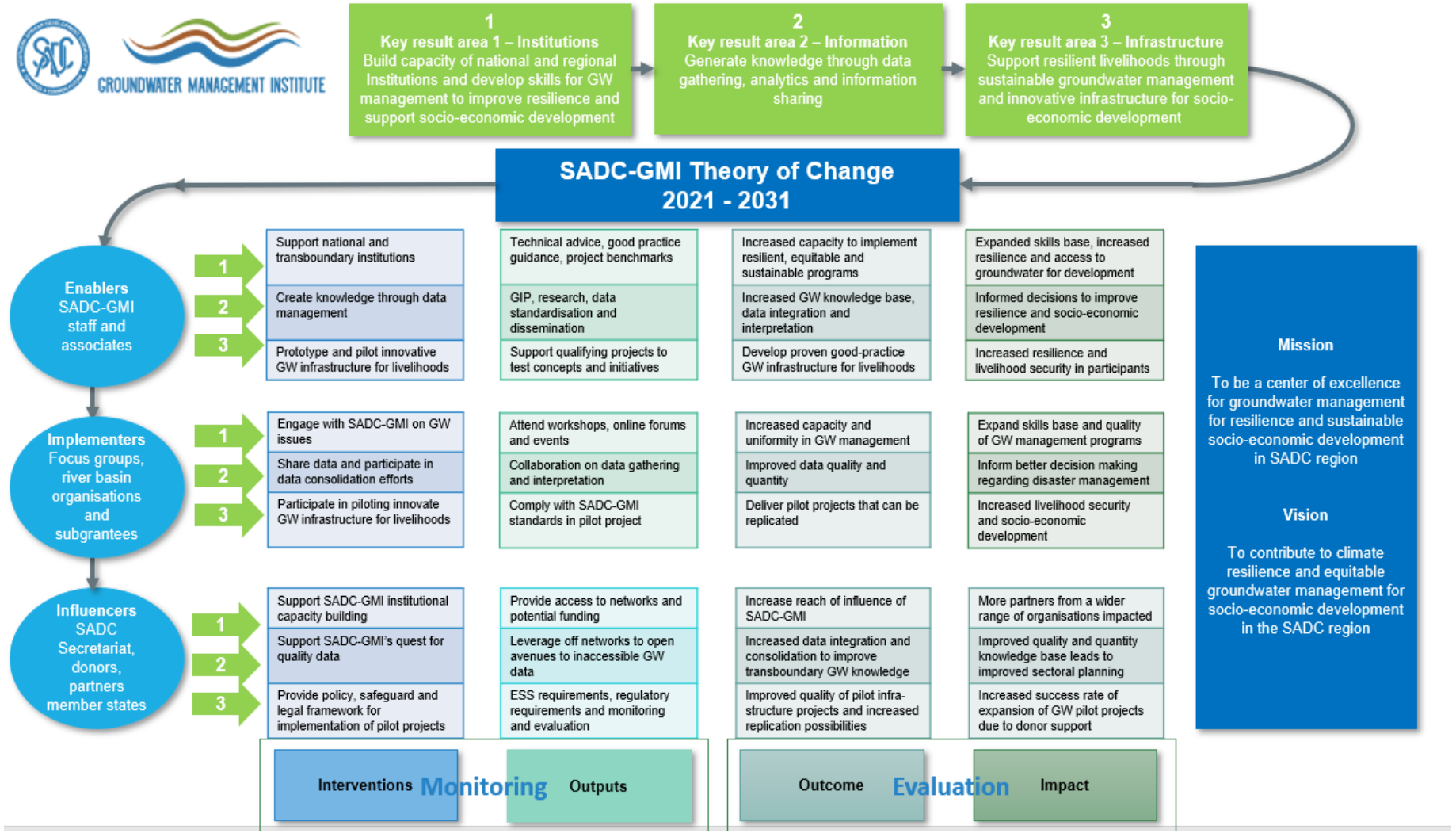


Figure 4-5: SADC-GMI's proposed theory of change

4.4.3 Logical framework development

A logical framework is a systematic process and analytical set of tools used to support project planning, management, monitoring and evaluation. It is often used in development work and helps the project team to communicate essential elements of a multifaceted and multi-stakeholder programme clearly and succinctly from project inception right through the project cycle. SADC-GMI's logical framework is underpinned by definitions relevant to its programme objectives and ToC. Even though SADC-GMI's future programme is still in proposal phase, the organisation has already clarified its key result areas and the themes of the interventions is under development.

Specific, measurable interventions for each key result area is under development and a preliminary Logical Framework for the project is depicted in Appendix E. Like ToC, LFA shows the project elements required to realise an overall programme or project goal. Where ToC is typically a broad brush and inclusive view of a programme or project, LFA provides a concise and robust description of the project. A project Logical Framework is an important management tool in that it facilitates and guides monitoring and evaluation across project elements. A commonly used LFA-based monitoring and evaluation approach looks at the *efficiency* with which project inputs produce outputs, the *effectiveness* of outputs in supporting the project purpose, and the *impact* of the fulfilled purpose on the project or programme goal.

The preliminary programme Logical Framework presented in Appendix E is a sample completed with information currently available. The inputs, activities and resources required to produce the desired outputs remain to be fully identified and described. Once SADC-GMI has completed its detailed future programme planning, the LFA should be revisited and updated. The Programme Results Framework presented in Section 3.5 is a higher-level planning tool whereas the LFA is a dynamic operational tool. The two tools should be read and used in conjunction.

4.4.4 Impact and paradigm shift potential

Private investors, funders, donors and other stakeholders are increasingly motivated by demonstrated excellence in environmental, social and governance (ESG) performance when considering support to non-profit initiatives. Most recently, the 'S' in ESG has received increased attention as COVID-19 and its public health and economic consequences exposed deep inequality globally. Donors increasingly demand that programmes demonstrate positive social impact in a quantifiable manner and that programmes are implemented in a way that uphold ESS standards.

Whilst SADC-GMI's proposed future programme remains true to the original mandate of being a centre of excellence for groundwater management in the SADC-region, a subtle shift in focus to socio-economic development and resilience increases its impact potential. Key to this shift in focus is the fundamental question: "Groundwater for what?" which guides intervention decision making and monitoring and evaluation.

The implementation of some of the key recommendations for the success of the future programme, will also assist in deepening SADC-GMI's impact potential on a variety of stakeholder groups. These include:

- A theory of change in which the pathway to impact is clearly indicated;
- A logical framework to guide implementation and support monitoring and evaluation; and
- Advocating for a bottom-up approach to groundwater infrastructure development to build climate change resilience and facilitate socio-economic development.

SADC-GMI's organisational track record and lessons learned during the implementation of the SGM Project also places SADC-GMI in a position to start its future programme from a foundation of knowledge and expertise. This positioning will assist in fast tracking especially infrastructure

related projects. A subgrantee survey undertaken as part of the LLP, indicated that of the current infrastructure projects, most can be scaled up with little or no modifications. This aligns well with SADC-GMI's original intention to allow the initial sub-grantee infrastructure projects to serve as pilot projects and provides a knowledge base from which additional projects can be launched.

While the impact of capacity building interventions might be difficult to track, it is worth noting that the exponential effect of multiplied knowledge can lead to individual and institutional paradigm shifts. This type of change is challenging to effect and takes years to demonstrate and is also the most lasting and sustainable type of impact as skill sets are improved and new ways of managing groundwater are imbedded in institutional DNA.

4.4.5 Indicative time frames

The concept framework of SADC-GMI's future programme is discussed in section 3.13.3. Table 4-2 provides an overview of the indicative timeframes of SADC-GMI's new programme implementation schedule. As is evident from Table 4-2, the activities in some intervention areas will be ongoing throughout the programme lifecycle. These include SADC-GMI's internal functioning, knowledge sharing and research as well as focused groundwater monitoring. Other intervention areas will go through the typical project lifecycle – planning, staffing (ramp up), implementation (peak activity) and close out. The exact time frames of these intervention areas will be finalized upon project initiation and are dependent on a number of factors, such as:

- Funding agreement timing;
- Specified priority projects in funding agreement;
- Contribution of diversified income generation activities to key result areas;
- Expansion in SADC-GMI internal capacity; and
- External factors such as socio-political circumstances.

Table 4-2: SADC-GMI indicative timeframes 2021 to 2030

Key result areas	2021	2022	2023	2024	2025	Mid-programme evaluation	2026	2027	2028	2029	2030
1. Institutions											
Intervention area 1: Internal											
Intervention area 2: Influencers											
Intervention area 3: Local											
2. Information											
Intervention area 1: Expand											
Intervention area 2: Knowledge products											
Intervention area 3: Research											
Intervention area 4: Sharing											
3. Infrastructure											
Intervention area 1: Projects											
Intervention area 2: Capacity											
Intervention are 3: Monitoring											
Timeline keys		Ongoing			Project peak			Ramp up / Close out			

4.5 Project financing

4.5.1 Description of financial elements of the programme

SADC-GMI is dedicated to becoming a centre of excellence to strengthen capacity of sustainable management of groundwater to build resilience in the SADC region. In terms of project financing, SADC-GMI will likely face growing challenges in covering core costs due to the global economic downturn and limited donor funding and support and might experience financial constraints. Another financial risk that SADC-GMI might face is the possibility of needing to bridge a finance gap, when funding does not come through as committed. The organisation might find themselves having to bridge cash flow gaps when funding tranches are delayed, due to no fault of their own.

To mitigate these impacts, an integrated financial and funding strategy is proposed, which involves a resilient financing approach based on four pillars, as indicated in Figure 4-6:

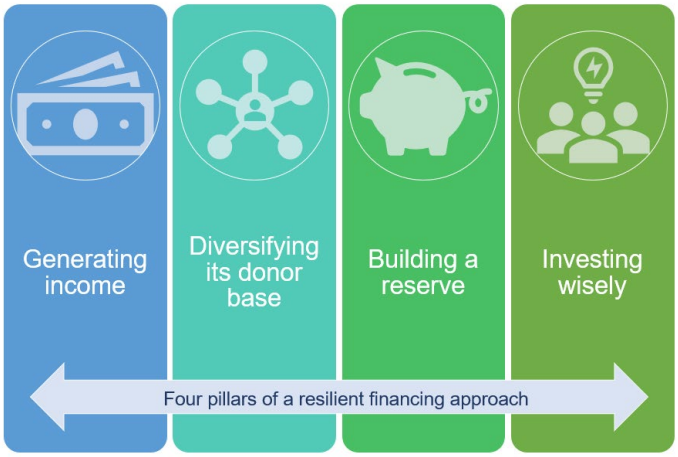


Figure 4-6: Proposed resilient financing approach

4.5.2 Diversified income planning

A deliberate strategy of diversified income generation will enable SADC GMI to move towards a degree of self-sustainability and decrease the reliance on exclusive donor funding. To improve SADC-GMI's ability to apply and qualify for donor funding and generate earned income it is essential to establish and define a value proposition that distinguishes it from other service providers or contenders in the groundwater management sphere. A funding model (business model in a for-profit context) must be developed to clearly identify SADC-GMI's value. A list of considerations in the development of a funding model is presented in Appendix F1.

A preliminary funding model drawn up during the SADC-GMI LLP, resulted in a proposed forecast of healthy, realistic mixed source income planning and potential weighting. This preliminary SADC-GMI general funding model is presented in Table 4-3 and the proposed diversification of donor funding is presented in Table 4-4:

Table 4-3: Preliminary funding model

Income Source	Description	First 5 Year period	Second 5 Year period
Earned Income	Management fees Membership fees Interest Conference hosting Data/Knowledge base	5%	8%
Donor Funding	Grants Corporate Sponsorships Allowances/Bequests/In-Kind payments Financial Aid	95%	92%

Table 4-4: Proposed diversification of donor funding

Donor	First 5 Year period	Second 5 Year period
World Bank (GEF/CIWA)	96.5%	90%
Other donors	3.5%	10%

To achieve these funding goals, the following additional sources of income are proposed:

- Consultancy fees (technical and project management);
- Expanded workshops and conferences;

- Management fees;
- Membership fees;
- Interest;
- Conference hosting; and
- Income from data and/or knowledge base.

Passive interest income derived from reserve investment and mindfully investing cash for maximum safe returns can provide leverage to allow flexibility to pilot or invest in activities and programmes that are core to organisational mission and vision. It can also assist with funding cashflow gaps and improve viability and resilience. SADC GMI commits to meeting financial sustainability goals by starting to diversify income and initiate cost savings. It has developed a high-level strategy to put away any savings and profits towards generating passive income in the form of interest and thereby improve flexibility and sources of bridging finance when needed.

Diverse sources of funding have been identified and detailed planning and the design of a funding plan will be undertaken. The first 5 years of the new programme will focus on diversification of funding types as well as the sources of funding, which are discussed further below.

Donor funding

SADC-GMI is continuously applying for and seeking non-refundable funds or products from government departments, corporations, individuals and foundations or trusts in the form of grants; corporate sponsorships; donations; allowances/bequests/in-kind payments and financial aid.

Loan funding

As SADC-GMI grows as an organisation and builds internal capacity the Board might consider approval of loan funding. After successful diversification of funding and a satisfactory level of organisational maturity and financial sustainability has been reached, attention can shift to loan funding in support of bridging finance and SADC-GMI can initiate and fund some of its own initiatives.

Various financial instruments such as an overdraft facility or bridging finance are available for medium- and short-term funding requirements and could be investigated as the need arises.

Crowd funding

Crowdfunding is a way to raise money from a large number of people. Large groups of people pool together small individual investments to provide the capital needed to get a project off the ground. Individuals, charities or companies can create campaigns for specific causes, and anyone can contribute. SADC Member States have been experiencing an exodus of skilled and qualified citizens to other international destinations. Engaging diasporas as development partners for home country and community development through crowdfunding and other initiatives could support the funding of SADC-GMI initiated programmes and projects as the Institute builds its knowledge base and has the technical expertise to promote high-potential localised projects.

These funding sources should be considered by SADC-GMI when it investigates diversified income sources as part of the next programme phase.

4.5.3 Expenditure planning

SADC-GMI has aligned its current budget planning with its revised values and PDO. It recognises that to demonstrate and measure impact in building climate change resilience and socio-economic development, the programme and its activities will have to be implemented over a medium to long term period. To account for the incremental and gradual change in KRAs, SADC-GMI proposes a

10-year programme, divided into two five-year periods. A robust monitoring and evaluation system will keep track of key result areas (Section 5.6).

Based on current planning scenarios, SADC-GMI will require a minimum of US$30 million over the next 5 years (2021-2025) and an additional US$34 million for the subsequent 5 years (2026-2031) calculated at an average global inflation rate of 2.5%[1] per annum. A multi donor and income source model is proposed with the incremental annual flow estimated as indicated in Table 4-5. It is recommended that SADC-GMI undertakes a lessons learned process similar to the one recently conducted after the first five years to recalibrate the PDO and budget from 2026 to 2030.

SADC-GMI is cognisant of the fact that they have been entrusted with a mission to deliver on the needs of civil society. Its resources, both financial and others, belong to civil society and the SADC-GMI team will strive to build financial systems that guide planning, fundraising and implementation to deliver both efficiently and effectively, but also with value and care.

Table 4-5: Incremental annual budget over a 10-year period

2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
$ 5 707’	$ 5 850’	$ 5 996’	$ 6 146	$ 6 300	$ 6 468	$ 6 630’	$ 6 796”	$ 6 966	$ 7 140
Total first 5-year tranche: US$30 million					**Total second 5-year trance: US$34 million**				

4.5.4 Budgeting

A common theme around non-profit financial management practitioners is the method of integrating the core of the organisation into budgeting practice and making sure that each programme pays its way. However, this practice has not materialised for many non-profit organisations (NPOs) and the sector finds it increasingly difficult having to contribute their own reserves to ‘pay their way’. Within this context, it is proposed that SADC-GMI revise its budgeting approach as it enters its new funding cycle.

Budgeting approach

The new budgeting approach contrasts with the traditional way of viewing NPO budgeting as depicted in Figure 4-7. The proposed new approach involves an integrated view of NPO budgeting that pinpoints the organisation’s mission as its nucleus in harnessing a comprehensive, financially sustainable approach, with a variety of funding partners. As SADC-GMI develops and implements several projects simultaneously, it will find particular benefit in an integrated approach. Figure 4-8 depicts the proposed integrated approach to NPO budgeting applied to SADC-GMI.

1 Source: Projected inflation as estimated by PWC Global with caveat on the data taken Covid-19 and the impact on global economy into account.

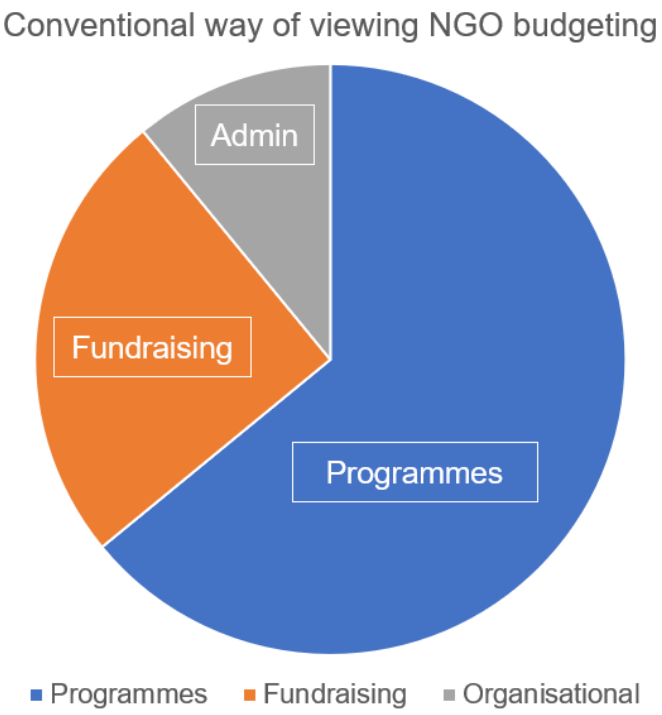


Figure 4-7: Conventional way of viewing NGO budgeting

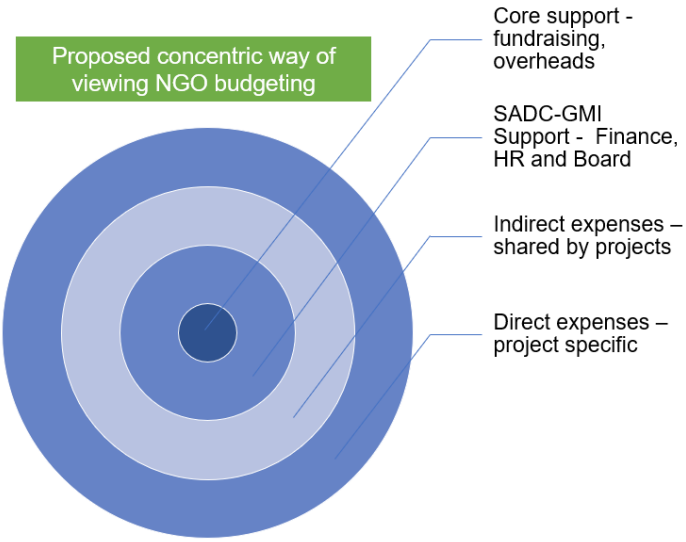


Figure 4-8: New integrated way of viewing SADC-GMI budgeting

Budget expense considerations

Figure 4-8 indicates all the financial and other resources an organisation needs to reach its programme objectives. It includes four types of expenses:

- Direct expenses – project specific;
- Indirect expenses – shared by projects;
- Core support – finance, human resources and Board; and
- Core support – fundraising and overheads.

Bridging funding gaps

In SADC-GMI's case, underfunded KRAs and associated projects, will cause a gap in core expenses which will have to be mitigated through other financial measures. This general shortfall is depicted graphically in Figure 4-9.

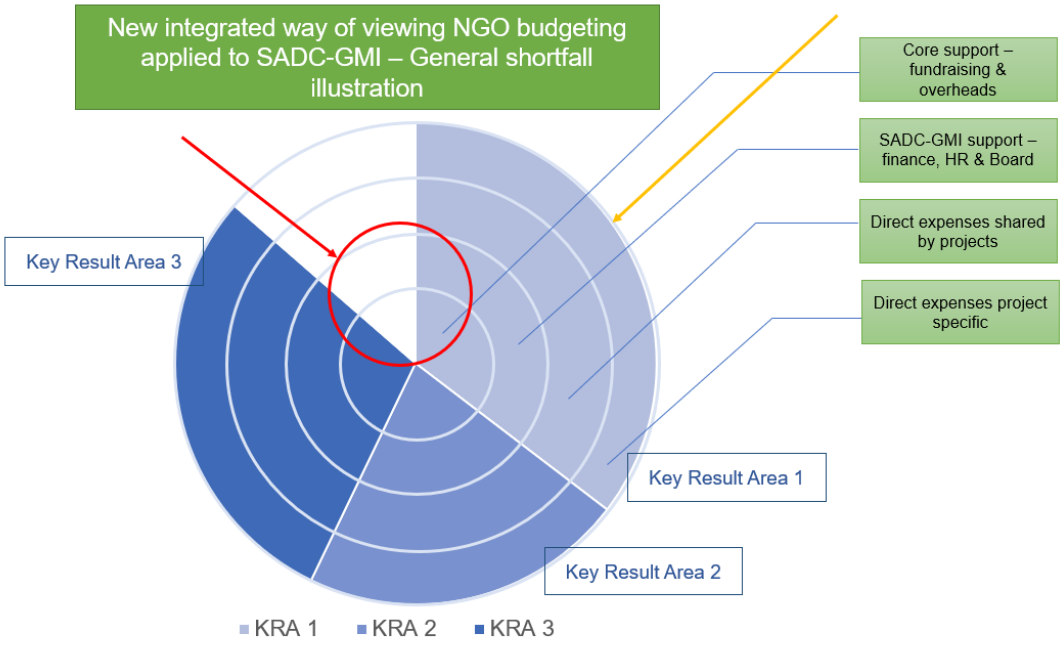


Figure 4-9: General shortfall illustrated by integrated budgeting

Correct project funding applications, expenses budgeting and planning can prevent possible project funding gaps. Alternatively, other sources of income and funding can be used to bridge gaps without impacting the sustainability of the organisation. In another integrated budgeting scenario, some funders limit their support to only the direct expenses of one KRA (or project) and this leads to line-item gaps in core funding, as illustrated in Figure 4-10.Figure 4-10

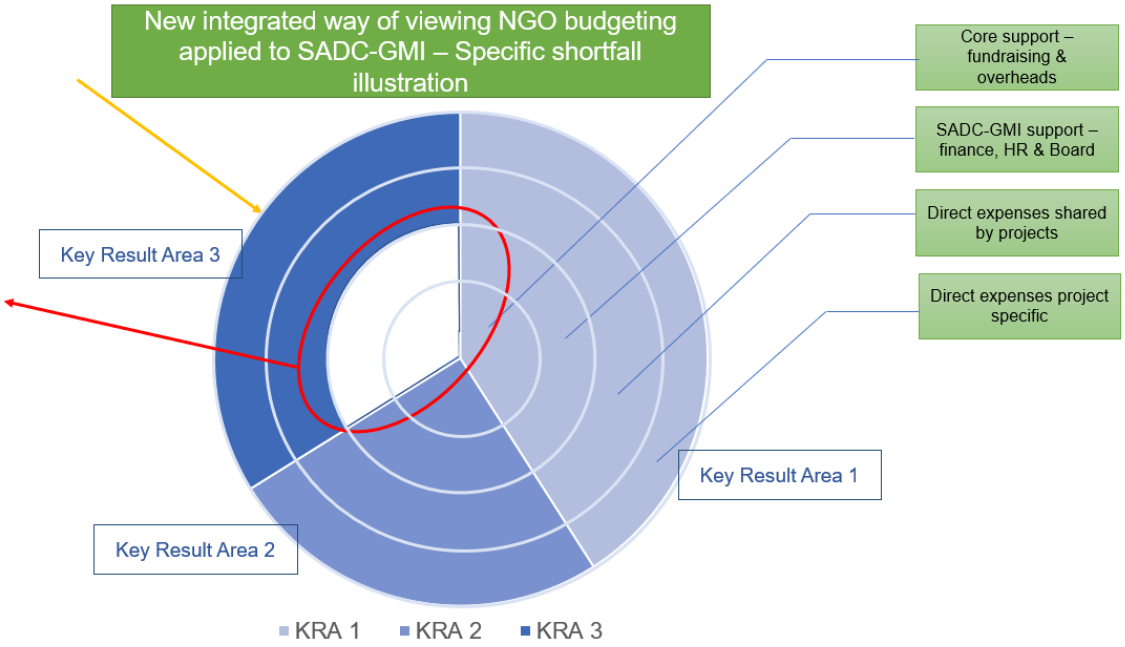


Figure 4-10: Specific shortfall integrated budgeting illustration

Preliminary programme

The proposed budgeting and planning process will make provision for those funders who support direct expenses only, to limit the impact on sustainability and the health of the organisation. Table 4-6 indicates SADC-GMI's preliminary budget from 2021 to 2031.

Table 4-6: SADC-GMI preliminary budget

Preliminary Budget Spending Estimate and Funding Contribution for 10-year Project						
Key result area	First 5-Year period			Second 5-year period		
	Total proposed budget (Million US$')	Donors (Million US$')	SADC-GMI other income (Million US$')	Total proposed budget (Million US$')	Donors (Million US$')	SADC-GMI other income (Million US$')
Key Result Area 1 (KRA 1): Institutions	8 400	7800	600	9 520	8872	648
Key Result Area 2 (KRA 2): Information	8 000	7 500	500	9 067	8531	536
Key Result Area 3 KRA 3): infrastructure	13 600	12 200	1 400	15 413	13877	1536
Total proposed Budget	30 000	27 500	2 500	34 000	31 280	2 720

Tiered programme financial reporting

SADC-GMI's proposed programme will implement a 3-tiered budgeting and reporting system that will integrate and balance all income and spending. The reporting will be used for planning and performance management processes. Table 4-7 indicates SADC-GMI's proposed reporting and budgeting tiers. To guide the SADC-GMI in budget and planning preparation according to the new integrated method, a ten-step project budget and planning process is recommended and available in Appendix F2.

Table 4-7: SADC-GMI's proposed reporting and budgeting tiers

Tier	Budget/Report	Goal
1	Project	Design to report on each individual project to reflect project related directed and indirect spending against allocated funds as per funder requirements
2	Key result areas	Combines all project reports as well as other core funding and spending to report on performance against 3 key result areas
3	Financial Performance	Combine all financial information: - Earned income - Donor income - Project direct spend - Project indirect spend - Core spend True reflection of financial position, performance and sustainability Used for the compilation of all regulatory and statutory financial reporting

4.5.5 Financial management

The financial management assessment conducted as part of the SADC-GMI LLP process found that SADC-GMI lacks ***full*** capacity to manage the full statutory financial function as required South African legislation. A location-based cost benefit analysis (CBA) was conducted as part of the LLP

process to assist management with the decision-making process by estimating the possible cost savings as well as better service to SADC Member States and beneficiaries through being based in alternative locations (than at the UFS).

The results of the CBA support SADC-GMI's relocation to Gauteng (specifically Pretoria) in broad terms and indicate the possibility of a substantial cost saving. It also indicated that a combination of a hosted and/or outsourced financial management and procurement support function should continue. Different options for relocation, hosting and outsourced financial management are discussed in Section 5.5.

Regardless of hosting options, SADC-GMI plans to enlist the services of a professional financial management consultant to support inhouse capacity regarding financial management, procurement and reporting. The following services will be performed inhouse:

- Fulfil current financial and administrative function;
- Build capacity to gain and improve skills;
- Reconciliations;
- Statutory filing and reporting; and
- Project reporting and budgeting.

The following services will be performed by an outsourced professional service provider:

- Training and capacity building;
- Ad hoc specialised services; and
- Internal auditing function.

A full list of duties of the outsourced professional service provider is provided in Appendix F3.

Budgeting and financial reporting

The LLP process proposed a new integrated reporting, core- and project budgeting approach, which should be developed in collaboration with the professional service provider. This budget can then be uploaded in the financial system with automated controls to indicate when reallocations are required. The financial system can also be used to produce necessary reports required to manage and monitor the financial operations.

Integrated performance reports, project reports and Interim Financial Reports (IFRs) will be produced on a quarterly basis and project specific annual financial statements will be prepared according to donor requirements.

Grant funding disbursement arrangements

The pooled grants funds will flow from the donors/funders to the Designated Account (DA) opened and managed jointly by SADC GMI and the Board of Directors. 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 DA at the inception of the donor project and at the request of the recipient. The option of disbursing the funds for large payments through direct payments from the donor to beneficiaries should also be available.

Financial audits

All financial reporting and auditing activity will proceed as required and regulated by Companies Act No.71 of 2008 and Non-profit Organisations act 71 of 1997.

The audit report for the project specific activities will be submitted to donors/funders within six months after the financial year-end. As SADC-GMI envisions implementing projects from multiple

donors/funders, a project and grant specific reporting mechanism as well as monitoring and control system will be developed and put in place for each grant.

SADC-GMI also commits to implementing and testing newly developed financial management and procurement policies for robustness and corrective actions will be taken and steps implemented as necessary.

4.5.6 Procurement

The SADC-GMI LLP process included an assessment of current procurement processes and in-house capacity. SADC-GMI's Board recently approved the adoption of a robust Procurement Manual (SADC-GMI, 2020). This document reflects SADC-GMI's value of professional integrity in its stewardship of donor funding that is meant for public good. The manual augments the previously published Project Management Manual (SADC-GMI, 2007) and provides detailed requirements for procurement under SADC-GMI. It aims to serve as a reference document for all consultants, sub-grantees, contractors and service providers regarding procurement standards at SADC-GMI. It also provides detailed descriptions of specific procedures to demonstrate its' alignment with internationally accepted procurement good practice as required by development partners.

In particular, the SADC-GMI Procurement Manual details standards and step by step procedures to be followed in the procurement of goods, works and services under SADC-GMI. These standards and procedures are designed to:

- Guide the procurement processes;
- Provide uniform procedures for the procurement of goods, works and services;
- Ensure transparency and accountability in all procurement operations;
- Improve the efficiency and effectiveness of procurement operations; and
- Promote consistent application of good international procurement practices.

SADC-GMI's procurement processes are underpinned by sound economic principles, which include – striving for the best value for money and the most efficient delivery of goods and services, fairness to all potential suppliers (including timely payments), transparency to all stakeholders and accountability on all levels of the organisation.

During the LLP process, the financial management expert assessed SADC-GMI's current procurement processes and recently published Procurement Manual. The results indicated several practical recommendations to mature SADC-GMI's procurement systems to prepare for upscaling programme deliverables. These recommendations included:

- Operationalising and testing the new Procurement Manual and making adjustments based on feedback from staff and suppliers;
- Continuous alignment of procurement procedures and requirements as stipulated by SADC-GMI donors;
- Implementation of a new approval threshold protocol matrix;
- SADC-GMI staff capacity training to fill gaps in knowledge and procedures;
- Continued implementation of competitive bidding practices;
- Develop additional checklists and controls specific to the country in which a project is based to improve turnaround times and prevent project delays;
- Requests for quotations should involve inviting and comparing not less than 3 quotations from suitably qualified contractors;
- Implementation of a clause that allows for direct contracting when competition is not advantageous with the applicable donor's prior review and approval;
- Implementation of pre-qualification of contractors and utilisation of the procurement databases of hosting and/or other partners with experience in the area;
- Development of a more pro-active regional procurement approach;

- Implementation of additional mitigation and control measures against fraudulent behaviour and corruption;
- An annual post-procurement review process should be conducted; and
- The procurement plan should be updated annually or as required to reflect actual project implementation needs.

In support of its sustainable development mandate, SADC-GMI will promote and implement beneficiation and preferential procurement practises to promote community participation in procurement where possible.

4.5.7 Governance, regulatory framework and taxation

The SADC Protocol, regional water policy, regional strategy, and strategic development plan provide a sound framework for SADC-GMI to operate as a regional advocate for sustainable groundwater management and development, in alignment with its vision and mission. SADC-GMI's work within the SADC regional objectives is framed through the SADC Regional Strategic Action Plans (RSAP) currently in its the fourth phase (2016-2020). SADC-GMI's alignment with the fifth RSAP should be considered as soon as the next version of the RSAP becomes available. Without these instruments and their associated institutional arrangements, the SADC-GMI vision and mission would have been difficult to realise. SADC-GMI operates in a nested hierarchy of legal frameworks. The legal frameworks and contractual arrangements are presented in Table 4-8 and fall into the following broad categories:

- Treaties, policies and cross-national planning frameworks that position the SADC Water Division and SADC-GMI in the Southern African region; and
- Contracts and agreements that frame the role and operation of SADC-GMI itself.

Table 4-8: SADC-GMI Legal frameworks and contractual agreements

Title	Role	Brief Outline
Regional		
SADC Revised Protocol on Shared Watercourses in the Southern African Development Community (2000)	The legal framework governing transboundary water in SADC. SADC Member States are signatories	The Protocol seeks to foster closer cooperation around the management of shared water courses in the SADC region. Among other things, the Protocol describes the SADC institutional mechanisms responsible for Protocol implementation. The SADC Water Division is responsible for coordinating regional initiatives under the guidance of the Protocol
SADC Regional Water Policy (2005)	The policy framework for management and development of water resources across SADC Member States	The Policy seeks to provide a framework for the sustainable, integrated, and coordinated management and development of national and transboundary water resources in the SADC region
SADC Regional Water Strategy (2006)	Strategy for achieving development and poverty reduction in SADC, through integrated planning, development and management of water	The Regional Water Strategy gives effect to the Policy. The Policy addresses the "what" on regional water issues, and the Strategy the "how". The document addresses strategy for important regional issues (including for example water and poverty alleviation) and clarifies implementation processes
SADC Revised Regional Indicative Strategic Development Plan 2015-2020 (2015)	Plans to realise the potential for water to play a role as an engine and catalyst for socio-economic development	The revised RISDP updates the original plan of 2003. It seeks to deepen the integration agenda of SADC, with a view to accelerating poverty eradication and other development goals. Among other things, it presents strategies to resource the revised RISDP

Title	Role	Brief Outline
SADC-GMI		
Memorandum of Incorporation for SADC-GMI (2011)	Official document setting out the requirements for SADC-GMI registration and operation under the Companies Act (2008)	South African company legislation was amended in 2011. Under the new legislation, NPOs formerly registered under Section 21 of the Companies Act became Non-Profit Companies (NPCs). Memoranda of Incorporation (MoI) replaced Articles of Association, but general requirements under the Articles remain unchanged. Among other things the SADC-GMI MoI includes rules for the board and the powers and duties of board members
Project Agreement between agent for GEF and CIWA and the University of the Orange Free State	Grant agreement between the World Bank (acting as agent for GEF and CIWA) and the University of the Free State	The grant agreement lays out the general articles underpinning the agreement, together with arrangements for the implementation of the SADC-GMI project. These arrangements include the role of the SADC Directorate for Infrastructure and Services (and by implication the SADC Water Division) and the establishment of a management unit to host SADC-GMI. The agreement also addresses anti-corruption, environmental and social safeguards, and project monitoring, reporting and evaluation
Service Level Agreement between SADC-GMI and University of the Free State	Agreement in terms of which the UFS provides hosting services to SADC-GMI	In terms of the agreement, UFS must provide services that align with Good Industry Practice, prioritise the sustainability and preservation of the environment (especially groundwater), and comply with GMI policies, procedures and practices. UFS must provide a sufficiently capacitated and skilled management team

SADC-GMI is registered as a Non-Profit Company (NPC) and an NPO in terms of South African law. It is arranged in broad alignment with the provisions of the following South African regulatory requirements:

- The Companies Act (Act No. 71 of 2008);
- The Income Tax Act (Act No. 36 of 1996); and
- The Non-profit Organisations Act (Act No. 71 of 1997).

In order to operate effectively in other SADC Member States, additional specialist services and legal counsel may have to be sourced to assist with registration with member state governments and other organisations. This will assist SADC-GMI with compliance to all Member State and regional statuary requirements and regulations and support eligibility for all governments and other organisational grants, funding and support.

4.6 Lessons learned and reflected in the programme design

The results of the LLP process and online disclosure workshop are captured in the SADC-GMI lessons learned and emerging issues report (SADC-GMI, 2020) and the SADC-GMI online disclosure and lessons learned workshop proceedings (SADC-GMI, 2020a).

Table 4-8 indicates the most significant lessons highlighted by the LLP process and shows how recommendations from the process are being incorporated into the new project design:

Table 4-9: Lessons learned and reflected in the project design

Category	Lesson learned	Reflection in new programme	Report section
Technical	Importance of partnerships in TBA projects	Plan for more lead time and stakeholders in TBA projects	Section 5.4
Technical	Need for improved data collection management and sharing practices.	Plan for expansion of the SADC GIP and the SADC GLA	Section 4.3.2
Technical	Deepen impact through a more focused approach	Explicit focus on socio-economic development and resilience	Section 3 and Section 4.4.4
Technical	Expand monitoring practices by focusing on priority areas	Focus on monitoring in KRA 3 to provide a link to informed decisions to equitable distribution of groundwater for livelihoods	Section 4.3.3
Technical/ organisational	Build capacity regarding groundwater management on regional, national and local	Capacity building is incorporated in all three KRAs	Section 4.3
Organisational	Consider permanent positions for core team	A proposed new organogram indicates which positions should be made permanent	Section 4.6.2
Organisational	Review organisational structure to consider revenue generating activities	Revision of organisational structure complete and recommendations presented	Section 5.2
Organisational/Technical	Expand partnership networks	Partnership strategic planning commenced	Section 5.4
Organisational	Include government relations in the job description of senior staff member	Included in proposed new organogram	Section 4.6.2
Organisational / Financial	External support will be needed should the hosting agreement with UFS be terminated	Scope of work for outsourced financial specialist to be reviewed	Section 4.5.4
Organisational	Investigate SADC-GMI's brand position	In process as part of partnership strategic planning	Section 5.4
Governance	Board capacity building initiatives a priority	Recommended as part of institutional capacity building	Section 5.3
Governance	Strengthen monitoring and evaluation through ToC and LFA	Incorporated into the report development	Section 4.4.2 and 4.4.3
Governance / Finance	Income diversification should be an urgent priority	Income diversification strategy presented in this report	Section 4.5.2
Finance	Implement annual integrated reporting	Three-tiered reporting strategy designed	Section 4.5.5
Finance	Recently developed policies should be operationalised	Policy and procedure changes proposed in this report	Section 4.5.5
Finance	CBA indicates Pretoria as the preferred location	Formal presentation of the CBA to the Steering Committee for adoption	-

Category	Lesson learned	Reflection in new programme	Report section
Finance	Outsourced financial service provider and internal capacity building needed	Outsourced services scope of work completed, and capacity building incorporated in planning	Section 4.5.3 Section 5.3

4.7 Management and organisational development

The LLP process indicated that SADC-GMI as an organisation has areas of inherent strengths and is on the right track considering it is a young organization, but there are also a number of organisational aspects that need to be given attention as the organisation moves into its next funding cycle. The organisation's senior management is considered to be one of its strengths and strong leadership has propelled SADC-GMI forward in a relatively short time. The organisational structure and capacity assessment conducted during the LLP highlighted the need for SADC-GMI to consider key improvement in areas such as Board of Director capacity building, monitoring and evaluation, generating revenue from knowledge products, systematic knowledge management, strengthening brand awareness and instituting measures to improve staff retention and performance management.

4.7.1 SADC-GMI Board of Directors

The organization increased its Board members to ten in 2020, by adding two Non-Executive Board Members. Through these appointments, improvements have been made through the establishment of two sub-committees, an audit sub-committee to provide guidance regarding governance and financial matters and a business development sub-committee to guide the SADC-GMI team in diversifying its income base. During the LLP process, SADC-GMI noted experiencing the following challenges with its Board:

- Lack of groundwater-related skills as Member State representation is based on the SADC Troika system and not skills based; and
- Non-attendance of meetings by Member State representatives.

Recommendations were made in the LLP Report to improve Board performance through:

- More objective selection of Board Members so as to give better oversight to SADC-GMI programmes;
- Continuous Board capacity building and self-assessment; and
- More focused and specialised operational involvement by Board Members.

Appendix G1 provides an overview of the current Board structures.

4.7.2 SADC-GMI staff structure

SADC-GMI's organizational structure is lean with a staff complement of eight roles in place and the organization intends to make these positions permanent once sufficient funding is sourced (Appendix G2 provides an overview of the current staff structure). The senior management and Board recognize the risk of temporary or contract-based positions for the sustainability and strategic delivery of the organizations, since a lack of job security and continuous on-boarding of new staff creates internal instability. This instability is problematic while the organization is still strengthening its brand position in the region.

The proposed strategy is to increase the staff component in a phased approach, as the organization grows. This is anticipated to be over two 5-year periods, spanning 2021 to 2031. The technical stream will be strengthened by appointing a second technical expert in hydrogeology and an intern during the short-term, and though appointing consultants on a project-by-project basis.

A Gender Equity and Social Inclusion (GESI) specialist will be appointed to head up KRA 3, focusing on resilient livelihoods and supporting the Monitoring and Evaluation Specialist. A new pillar for Governance, Government Relations and Business Development will be created, with the current Governance Specialist and the Communications and Knowledge Management Expert falling into this business unit.

SADC-GMI recognizes they need strong relationships with Member States, and understand protocols of engagement, specific needs in the various government departments, in order to influence and advocate for policy reforms, access to data, funding support and project delivery. The new business function will assume this responsibility, as well as support the Executive Director with business development and governance activities.

Contract based consultants will be used to support core positions during peak times. A financial administrator will be appointed in the short term and accounting, statutory and taxation will be outsourced or may form part of the Service Level Agreement with the host site.

Marketing and brand positioning will be outsourced to smaller companies specializing in social media and brand management. This will enable the Communication and Knowledge Management Specialist to focus on critical internal tasks such as creating a comprehensive document control system and creating Knowledge Products.

In order to deliver on its mandate, SADC-GMI will need to gradually grow its staff capacity in terms of number of positions and skill sets. The proposed future organogram is presented in Figure 4-11. The scope of work for the next ten years has been packaged under three Key Result Areas (KRAs). The organization must ensure its staff component has the capacity (in terms of time) and competency (in terms of skills) to deliver the work plan. The structure of the organization from a staff, management and governance perspective as described above, is designed to meet the scope of work as outlined in Appendix G3.

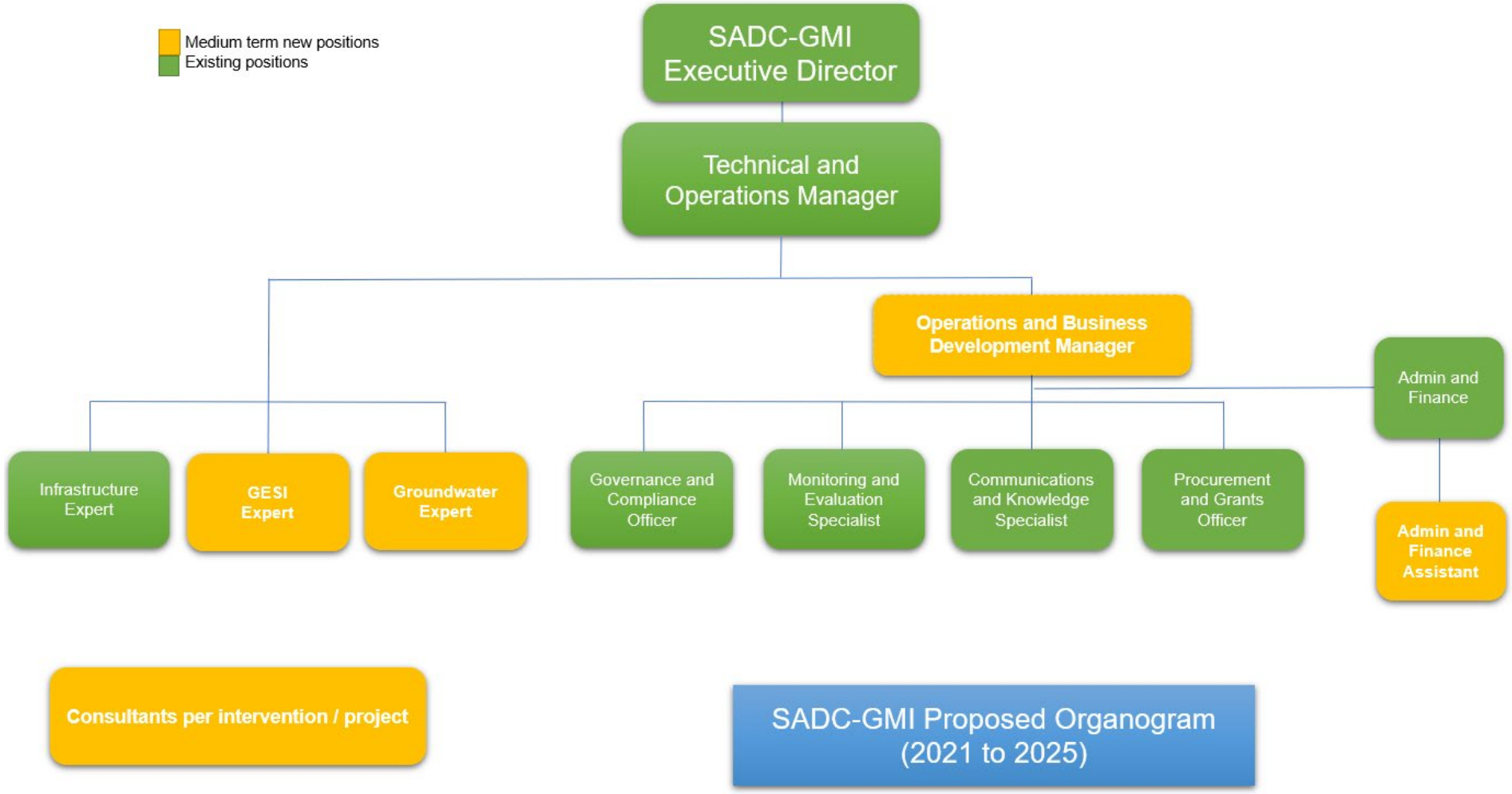


Figure 4-11 Proposed new organogram

4.7.3 Learning and knowledge management

SADC-GMI is well positioned to fulfil the role of 'centre of excellence in promoting equitable and sustainable groundwater management in the SADC region'. The organization has developed into a learning organization over the past three years, by internally strengthening institution building, and externally, by initiating research in groundwater management. The organization is open to new ideas and new skills and continue to evolve in line with new trends and developments within the groundwater management field.

This is important for a network organization that strives to create new knowledge and become a centre of excellence. As a learning organization, SADC-GMI will stay at the forefront of new information and guide the Member States in using data, technology and information and knowledge products that will support their efforts in managing groundwater sustainably and equitably.

Peter M. Senge (1990) defines the concept of a 'learning organization' as an effort of a group of people to learn and to improve their capabilities to create that which they want to create. During the LLP process it was evident that SADC-GMI's staff are committed to advancing their common vision, and it was recommended that SADC-GMI builds internal capacity as a learning organisation through developing the following:

- A shared vision: an important characteristic of a learning organization is to provides a common goal to the members of the organization. As a result, they feel motivated to learn to achieve a common goal;
- Systems thinking: a learning organization adopts systems thinking method when assessing the performance of the company and rather than focusing on the mistakes made by one employee, it focuses on the actions of the whole team;
- Learning as a team: the organization focuses on the learning of the whole team rather than the learning of an individual. Learning organization adopt strategies such as openness and boundary crossing, which allows employees to work creatively across job descriptions;
- Personal mastery: individual staff members are willing to learn new skills and bridge the gap between their current skills and the skills and knowledge required by the tasks; and
- A mental model – staff shares the values and norms of the organization as their mental model (i.e. way of seeing the world).

Understanding the need

During the last three years SADC-GMI has delivered a range of products to Member States as indicated in Section 2.1.3. The results from the sub-grantee online questionnaires survey conducted as part of the LLP process indicate that the following could assist in the implementation and scaling up of the infrastructure pilot project:

- The need for the dissemination conclusive guidelines for technical guidelines like borehole siting and drilling standards;
- Specific guidance on project development and management;
- More structured technical oversight through mentoring to build capacity in the Member States;
- Creation of an integrated database of projects and impacts to illustrate the value to policy and decision-makers;
- More flexibility in adapting infrastructure programmes in reaction to evolving conditions on the ground;
- Continued data management and collection is an essential component to facilitate effective groundwater management; and
- Capacity building of groundwater management for regional and national institutions.

Knowledge products

SADC-GMI will develop knowledge products based on existing information, research and knowledge generated over the last three years, as well as ongoing efforts. Table 4-9 lists knowledge products under consideration for development.

Table 4-10: Knowledge products under consideration

KNOWLEDGE PRODUCT	FURTHER DEVELOPMENTS
Annual conferences based on KRAs	This will include technical areas as well as non-technical such as socio-economic needs for groundwater.
Capacity building initiatives based on KRA and Recording of Learning	Existing training manuals, and ESS toolkits provides a good starting point.
Research papers – technical and non-technical	To be stored on the SADC Groundwater Grey Literature Archive.
SADC Journal on Groundwater based on new research	Call for papers for Conference (all universities and institutions).
Groundwater association	National Chapters; Accreditation as "professional".
Consultancy – commissioned work from private sector	Research needs that SADC-GMI can deliver or supervise University students to deliver at a fee.
Post graduate research – funded by private sector	Knowledge to be shared between the funder and the Member States.
Manuals and toolkits	Internationally compliant environmental and social safeguard (ESS) toolkits, groundwater operation and maintenance manual, manual for groundwater projects financing, guidelines for groundwater data collection and management.
Re-package knowledge from the manuals to make accessible to different audiences, i.e. Learning material, brochures, frameworks, infographics, country-level factsheets for different purposes, etc.	Linked to partner needs.

4.7.4 Relevant research and development areas and topics

SADC-GMI has already identified critical areas that need research to generate new knowledge for the region. These include:

Expansion of SADC groundwater information portal

Launched in May 2017, the SADC-Groundwater Information Portal (SADC-GIP) is a web portal for storing and sharing groundwater related information in the SADC region: http://gip.sadc-gmi.org. The SADC-GIP consists of a map viewer. It was established to make maps and documents easily available for SADC member states, research institutions and other international organisations. It is managed by SADC-GMI, with the technical support of IGRAC (hosting and technical maintenance). The SADC-GMI endeavours to keep the SADC-GIP up to date and relevant to stakeholders through; enhanced content i.e. addition of new maps and documents, linking to other groundwater data sharing platforms, addition of new functionalities to improve users' experience e.g. user ability to visualise real-time to near real-time groundwater data and capacity-building: The success of the SADC-GIP (and data sharing initiatives in general) depends on the participation of groundwater data collecting and managing organisations in the SADC region. These organisations will be supported to store and share groundwater data efficiently, in relation with the SADC-GIP.

SADC groundwater literature archive

In the quest to make groundwater literature more accessible across the SADC region, the SADC Secretariat, with support from the **British Geological Survey**, established a Grey Literature Archive (GLA) a repository of groundwater literature such as research theses, conference papers, government reports, consulting reports and any other hydrogeological reports that are not in major scientific journals or commercially available literature. The Department of Water and Sanitation in South Africa contributed to the Grey Literature Archive project by making their hydrogeological reports available in pdf format on the GLA. The SADC-GMI intends to build upon this effort and expand the content of the GLA. The SADC- GMI has sought to make improvements to the SADC Groundwater archive through a number of measures including; increasing the number of documents accessible through the portal; populating the GLA with most up to date and relevant resources from all regional stakeholders, improving the visual appeal of the portal, have the portal fully hosted by the SADC-GMI and owned by SADC-stakeholders.

Groundwater monitoring at regional and national levels

The forecasting and provision of early warning of naturally occurring changes, drought and anthropogenic changes depends on a regional scale ability to comprehensively and consistently monitor an agreed set of 'adverse impact indicators. Evaluation and presentation of these data and information for use by Member State governments will enable timely implementation of mitigation and coping strategies. The next challenge is to start to develop a nucleus regional groundwater monitoring network which member states will develop to their own requirements, but which will collectively report to a regional platform. The ultimate vision is a network of water level and water quality measuring points transmitting real time data to a regional data centre. The centre will be responsible for Quality Assurance (QA) of the data, preparing it within a database format and disseminating the assimilated and interpreted data back to Member States. This vision is regarded as a critical step towards regional drought mitigation.

Aquifer characterization across SADC region and exploration of deep aquifers

Whereas there is a general understanding of the broad classification of aquifers at the regional level, the detailed understanding of the aquifer's characteristics of the strategic aquifers at regional level or national level is hardly known. Quantitative information on the characteristics of aquifers (recharge, flow regimes, quality etc.) is still meagre and available information is not always as easily accessible. Research efforts are therefore required to understand the different groundwater provinces of the region (*Basement, Sedimentary Basin, Volcanic, High-Relief Folded Mountain Provinces, Local alluvial aquifers).* Deep aquifers offer a potential source of water in the in the region, however the location and hydrogeological characteristics of these aquifers is hardly known across the SADC region. The BGR has initiated work on exploring the Ohangwena II Aquifer, located at several hundred meters depth as a transboundary resource between Namibia and Angola. Such studies have the potential of being replicated across the region, thereby unlocking significant resource for the region.

Vulnerability mapping – hotspots/vulnerable zones

Groundwater vulnerability to both pollution and drought is often overlooked. To guard against this vulnerability assessments needs to be performed. A regional groundwater drought risk mapping was performed in 2011 by Villholth et al. Efforts should be made to build upon and use the drought risk map to inform groundwater related interventions. The quality of a groundwater system might be endangered or destroyed by inappropriate or no protection. There are numerous examples world-wide, where precious groundwater resources that are invaluable assets for the water supply to both the environment and future generations, have been damaged or made useless by pollution resulting from inappropriate agricultural and industrial land-use activities above or upstream of

important groundwater systems. Groundwater Vulnerability mapping for strategic national and transboundary aquifers should be prioritised and used to inform decisions on developments over the aquifer.

Transboundary aquifers

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 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. There is an enormous amount of work to be done in this area given that out of the 30 identified transboundary aquifers in the region extensive studies have been conducted in only 5 TBAs.

Island and coastal aquifers

Coastal cities/urban centres are also increasingly becoming reliant on groundwater. Such reliance results in intensive abstraction which often triggers saltwater intrusion and significant declining of water levels, thereby compromising the water security in these settlements in addition to threatening the integrity of the coastal ecosystems. Instances of saltwater intrusion due to intensive groundwater abstraction are a feature of most coastal urban settlements relying on groundwater The SADC-GMI therefore wishes to make further research inputs in this field.

Knowledge generation on the value of groundwater for the WEFE-Nexus (Water-Energy-Food- Ecology)

Enhancing the contribution of groundwater in the WEFE-Nexus requires that the understanding of hydrogeological systems is enhanced. This lack of knowledge on groundwater systems in part explains the lack of inclusion of groundwater in WEFE initiatives. The SADC region led by Water Division of the SADC- secretariat, is currently undergoing a paradigm shift towards the WEFE-Nexus approach. There is therefore an urgent need for the SADC-GMI to actively undertake research to demonstrate the central role of groundwater in the WEFE-Nexus approach.

Urban centres

The increasing dependence of urban settlements on groundwater considering the dwindling surface water resources and failure of centralised water reticulation infrastructure calls for a paradigm shift in understanding the hydrogeology, city planning, institutional and legal interactions around bulk urban water supply. Kinshasa (Democratic Republic of Congo – DRC) is already classified as a megacity with a population exceeding the 10 million mark. Johannesburg (South Africa), Dar es Salaam (Tanzania), and Luanda (Angola) are emerging as megacities by 2030. The high rate of urbanisation which often exceeds 4% per year is already putting strain on water infrastructure; poses problems for human and environmental health; and disparate socioeconomic development and access to water.

Conjunctive surface- and groundwater numerical models

Conjunctive management of surface water and groundwater offers a potential solution to water challenges of the region and is acknowledged by the SADC-GMI. Conjunctive management/use needs to be informed by rigorous scientific investigations. Integrated Hydrological Models (IHM) are being increasingly used to inform conjunctive use. The SADC-GMI will work promote the use of IHMs at both national and transboundary levels.

4.7.5 Benchmarking of existing knowledge products and integrated water resource management

The LLP process recommended that SADC-GMI undertakes a brand positioning study to benchmark its contribution to the sector against other, similar organisations. To this end, material exists for SADC-GMI to benchmark their existing 'knowledge products' for the region based on the identified needs and their scope of work and to investigate partnerships. Examples of organisations with similar products include:

- ORASECOM offers a good example of a Water Information System. ORASECOM was established by the governments of Botswana, Lesotho, Namibia and South Africa to promote equitable and sustainable development of the resources of the Orange–Senqu River. ORASECOM provides a forum for consultation and coordination between the basin states to promote integrated water resources management (IWRM). This Water Information System – WIS – provides the tool for sharing and managing data and information on the Orange–Senqu River basin;
- Cap-net, UNDP and GWA produced a self-learning tutorial titled, "Why Gender Matters in IWRM: A tutorial for water managers", aimed at water professionals that would demonstrate the benefits of including gender considerations in water management planning and practice. The tutorial consists of five chapters, including general IWRM and gender concepts, different sectors of water management and water interventions, domestic and drinking water, sanitation, agriculture, environment, climate change and waste management. The tutorials provide guidance for developing Strategies for Mainstreaming Gender in IWRM, and is a good reference for design of similar products;
- The GWA provides a resource guide in "Mainstreaming Gender in Water Management", updated in November 2006. Various case studies from India and Africa are provided as learning material;
- The Gender, Agriculture and Rural Development in the Information Society (GenARDIS) implemented a small grants fund in 2002, to support work on gender related issues in information and communications technologies. The experience of the GenARDIS grantees and projects illustrates that there is critical work that still needs to take place at the policy and planning levels to ensure that ICTs provide equal opportunities and benefits to women and men in rural areas. This work provides great learning on how the use of ICT can support agriculture projects in rural areas; and
- WaterNet is a good institution to benchmark learning material and how to build an alumni that will add value to the region. WaterNet is a regional network of university departments and research and training institutes specialising in water. They have an impressive retention of their alumni, with 95% who are reported to currently work in Southern or East Africa.

5 Implementation

5.1 Introduction

SADC-GMI evolved as an organisation over the last 4 years and has grown in maturity and ability to implement large scale projects related to its mandate across the SADC region. The LLP process highlighted several important matters which can be adjusted to lead to more efficient implementation practices. These matters are discussed in this chapter and include:

- Improved institutional and implementation arrangements;
- Enhanced institutional capacity building initiatives to assist with the implementation of the new key result areas;
- Strengthening strategic partnerships with actors committed to common goals; and
- Developing symbiotic hosting agreements and location.

This chapter also proposes SADC-GMI's results monitoring and evaluation practices and sustainability criteria.

5.2 Institutional and implementation arrangements

As an NPC, SADC-GMI is governed by Schedule 1 of the Companies Act and is registered with the Companies and Intellectual Property Commission (CIPC). NPCs are suitable for a variety of organisational structures. They are regarded as the most complex of the available options to run a non-profit institution and are often preferred by donors because of the high standard of monitoring and reporting required of their directors.

SADC-GMI, therefore automatically have a separate legal identity. There are several benefits of having a separate legal identity:

- The organisation continues to exist even if its membership changes;
- It can own property in its own name; and
- The organisation can sue and be sued independently, separate from its members.

SADC-GMI is also a registered NPO. Registration as an NPO is a funding requirement for many prospective donors because it increases the accountability and transparency of the organisation and creates the expectation that the organisation has complied with the NPO Act. Globally, NPOs are granted some degree of preferential tax treatment. In South Africa, NPOs can qualify for tax exemption. Individuals and corporations that donate towards SADC-GMI can benefit from becoming eligible for tax deductions. SADC-GMI, as an NPC, registered NPO and recognised public benefit organisation (PBO) does have tax exemption status and qualifies for tax deduction for its donors.

Only NPOs recognised by the South African Revenue Service (SARS) as PBOs can qualify for tax benefits. The term "Public Benefit Organisation" is defined in Section 30(1) of the Income Tax Act. It must be set up to carry on one or more public benefit activities where:

- All such activities are carried on in a non-profit manner with an altruistic or philanthropic intent (i.e. with the intention of helping others and with no intention of profiting);
- No such activity is intended to promote the economic self-interest of any employee or fiduciary other than by way of reasonable remuneration; and
- Each such activity is for the benefit of, or is widely accessible to, the general public at large, including any sector (other than small and exclusive groups).

Through SADC GMI's strategic goals, corporate governance and strict financial management it should be in a position to keep its current PBO (and subsequent taxation exception) status which is deemed beneficial by donor organisations.

SADC GMI is currently liable for taxation on income earned through conference fees. As SADC-GMI is planning to increase earned income, tax liability might need to receive additional attention. Through the assistance of a professional financial service provider, SADC-GMI can ensure that all expenses incurred to generate earned income is allocated correctly to ensure tax deductibility.

If these financial and taxation management processes are found unsatisfactory or the PBO status of SADC GMI is challenged, a taxation specialist could be consulted, and a hybrid organisational model considered. A summary of the differences between a NPC such as SADC-GMI and a commercial or profit driven organisation is presented in Appendix H.

5.3 Institutional capacity building initiatives to strengthen partners and interventions

SADC-GMI will work on capacitating its own organization as well as partners in order to deliver on the new scope of work. The KRAs will guide the specific capacity needs as the team works towards meeting the intermediate indicators and overall PDO.

The key result areas include work that the SADC-GMI team has not done before, specifically the KRA 3, which has a stronger focus on socio-economic development (i.e. resilient livelihoods). This KRA is an outcome from the LLP process, which found that new trends on the ground related to climate change, food insecurity and capacity needs at grassroots level, necessitating that the programme provide more focus on socio-economic development to foster resilient livelihoods. The following institutional capacity building initiatives are proposed to strengthen the implementation of the proposed KRAs:

- SADC-GMI may have to appoint a combination of skillsets to guide the work for KRA 3, or work through strategic partners and associates. The organization has existing relationships with institutions including non-profit organizations in the Member States and may have to undertake Service Level Agreements with implementing parties to deliver projects when the time is right;
- Capacity of the SADC Secretariat, RBOs and Member State national departments improved to include groundwater management for socio-economic development in their programmes;
- Technical and vocational skills developed among stakeholders at local, national and transboundary levels in the SADC region for effective groundwater-based resilience and socio-economic development;
- Internal capacity for the Communications and Knowledge Specialist to design sector-specific knowledge products and information to promote equitable and sustainable socio-economic development. (refer to information on knowledge products presented in Section 4.7.3);
- Internal capacity for the Communications and Knowledge Specialist to deliver the indicator "innovative and environmental and social safeguard compliant infrastructure projects piloted and up scaled in SADC Member States to promote sustainable groundwater management practices for socio-economic development", towards meeting KRA 3. The existing toolkits will provide a good foundation for this work;
- Capacity building for the Technical and Infrastructure Specialists to oversee and manage research that advances the role of groundwater in promoting sustainable socio-economic development;
- Capacity building for the Infrastructure Specialists to support delivering on the indicator "communities in SADC Member States enhanced to improve resilience and to promote socio-economic development", and the appointment of a GESI Specialist to support the current Monitoring and Evaluation Expert; and

- Capacity building for the Technical Groundwater Specialist to deliver the indicator on "monitoring networks in national and transboundary aquifers designed and installed to support sustainable use of groundwater for socio-economic development".

The appointment of a GESI Expert will support SADC-GMI in building internal capacity on gender mainstreaming and undertake work to build a stronger gender-sensitive organization. This may include changes to the Procurement Policy to promote women-led businesses as service providers; increasing women in research and benefit projects such as training and a hiring policy that promotes gender equity.

5.4 Strategic partnerships with actors committed to common goals

SADC-GMI works with strategic partners to deliver its strategy and will continue this approach, with partnerships being developed and strengthened across all three KRAs.

Partners fall under the following categories:

- **Overarching:** these partnerships are critical to achieving SADC-GMI's vision since they enable the delivery of projects. They include host and Member States and other SADC entities;
- **Knowledge sharing and generation:** the objective here is to work towards similar goals and measure collective impact. SADC-GMI currently has such partnerships with the University of Strathclyde, USAID's Resilient Waters Programme, UNESCO, River Basin Organizations and Africa Groundwater Network. University partners fall in this category to support new research and as a training partner;
- **Similar organisations / partnerships:** the goal is to gain understanding who else do similar work, enable new partnerships as well as keeping the contribution of SADC-GMI as distinct in certain regards to fill a unique gap;
- **Regional programmes:** these partners are often service providers to GMI or support knowledge sharing;
- **Service providers / implementers:** these partners are mostly locally based organizations, i.e. civil society organizations who implement projects as sub-grantees; and
- **Donors:** partners who provide the financial means to deliver the projects and direction to achieve impact.

New partnerships will be developed during the new 10-year programme cycle, with an emphasis on the new monitoring and evaluation framework for measuring collective indicators, as well as SADC-GMIs specific contribution to the determined indicators and the overall PDO.

Partners will be used for capacity building project delivery to support the work of service providers who may be appointed for specific projects. These will include post-graduate students and universities seeking platforms to share new research. SADC-GMI will continue to host conferences, building on a good foundation and lessons learned from past work, and will seek partners as sponsors and contributors to the conferences.

SADC-GMI plans to develop a revised strategic partnership plan and started to identify partners who could support the three programme KRAs. Table 5-1 provides a preliminary summary of potential partners who could support the implementation of each KRA.

New partnerships will be investigated and developed with private sector companies, particularly industries that rely on water and contribute to new research. The objective here is to share knowledge and knowledge platforms, find common ground on new research and indicate where SADC-GMI can undertake research on behalf of companies as an income stream and collaborate on community-based projects to strengthen livelihoods.

Table 5-1: Potential partners for support of each KRA

KRA 1: Institutions	KRA 2: Information	KRA 3 : Infrastructure
Africa Groundwater Network	British Geological Society	Regional NGO's
Climate Resilient Infrastructure Development Facility (CRIDF), SADC-WaterNet	Institute for Geosciences and Natural Resources (BGR)	Climate Resilient Infrastructure Development Facility (CRIDF)
Gender and Water Alliance	IGRAC (GIP)	Subgrantees (Water Mission, KCS, Water Aid, World Vision)
Research institutions and Universities in Member States	International Water Management Institute (IWMI)	River Basin Organizations (e.g. ORASECOM)
Resilient Waters Programme	Cap-Net	
		UK PACT (renewable energy for groundwater), International Union for Conservation of Nature (IUCN)
African Ministers' Council of Water (AMCOW)	African Ministers' Council of Water (AMCOW)	African Ministers' Council of Water (AMCOW)

5.5 Symbiotic hosting agreements and location

SADC-GMI takes cognisance of the increased capacity that strategic partnerships can add to its organisation. As part of the LLP process, SADC-GMI undertook a location-based CBA. This analysis critically evaluated the cost and benefits to be hosted by the University of Bloemfontein viz a viz the costs and benefits of being hosted elsewhere.

The CBA investigated two main options with several variations, where option one involved staying in Bloemfontein and option two analysed moving to a Gauteng-based location with and without hosting options.

5.5.1 Option one – Remain in current hosting scenario in Bloemfontein

SADC-GMI's current hosting relationship with the IGS at the UFS was established as part of the initial World Bank Group project requirements. The relationship served SADC-GMI well in its formative years through providing support and facilities which would have been difficult to obtain as an independent new organisation. SADC-GMI has since matured and is critically evaluating its current hosting relationship. Figure 5-1 depicts SADC-GMI's current hosting scenario with the UFS in Bloemfontein.

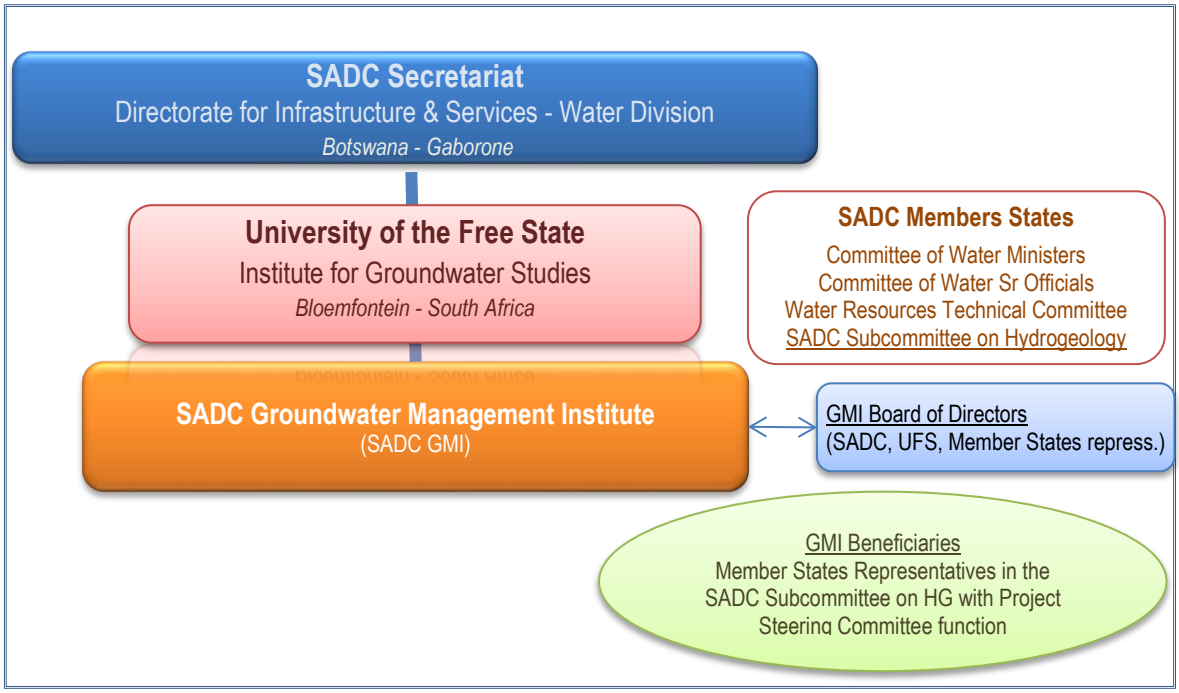


Figure 5-1: SADC-GMI's current hosting arrangements in Bloemfontein

Should the current hosting arrangement with the UFS continue, some adjustments to the support and financial management services are recommended:

- Appointment of an outsourced independent financial service provider to fulfil the functions currently being provided by UFS (a significant cost saving); and
- Build the capacity of current financial/administrative/procurement staff member to become fully compliant in basic statutory reporting and requirements.

5.5.2 Option two – Move to Gauteng-based location

The CBA conducted as part of the LLP process, investigated the costs and benefits of 8 other hosting scenarios, among which the University of Pretoria (UP), IWMI or the Council for Scientific Research (CSIR). The full methodology and results are published in the SADC-GMI Location-based Cost Benefit Analysis Report (SADC-GMI, 2020). The findings of the CBA indicate that it would be beneficial for SADC-GMI to move from Bloemfontein to Gauteng. It also showed that a hosted option in Gauteng such as the UP, IUCN, IWMI or CSIR would be the most cost-efficient option. The relative cost of establishing itself independently in a commercial property location is approximately R100 000 per year more expensive, but the benefits of associating with reputable organisations should be taken into account when making the final decision. Figure 5-2 indicates the possible hosting scenarios in Gauteng, all with support from a professional service provider. It is evident that several water-related organisations are based in Gauteng and that proximity to these organisations will be of benefit to SADC-GMI. Association other partners (such as UFS and other SADC bodies), can be maintained remotely.

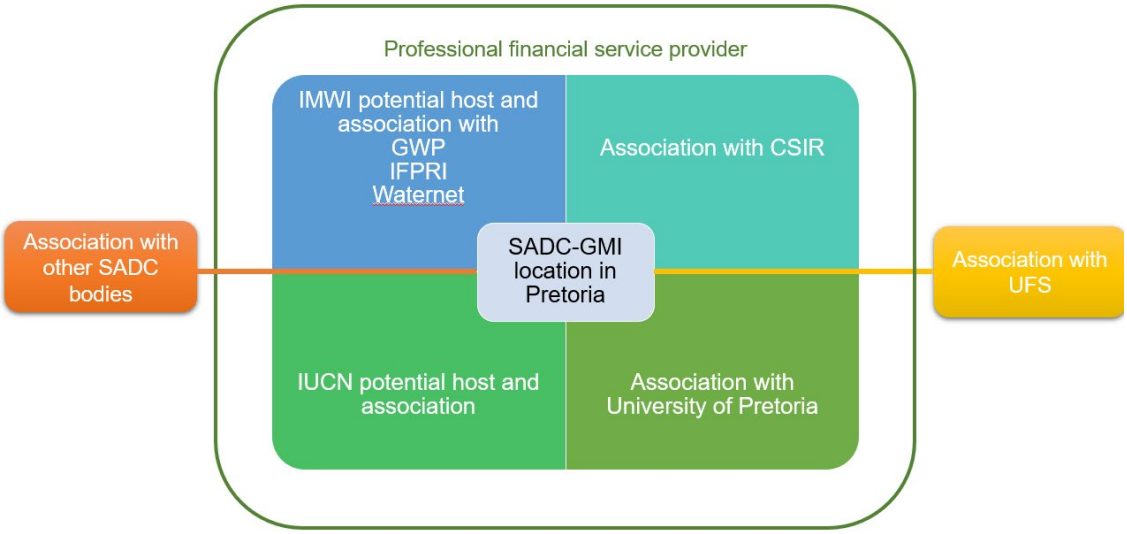


Figure 5-2: SADC-GMI proposed hosting and association options in Gauteng

The advantages of being in a hosting relationship with a related organisation, are numerous. Apart from building capacity and credibility and extending the possible scope of work, shared costs can lead to significant savings. Some of the hosting arrangements under discussion include services such as:

- Joint funding and project proposal and applications;
- Supplier, staff and consultant due diligence service;
- Application to share in diplomatic status with all the benefits associated with the status; and
- Visa and work/travel permit applications.

Several institutions in Gauteng have expressed an interest in entering into a hosting agreement with SADC-GMI. The ones with the highest potential as hosts are discussed further below:

The International Union for Conservation of Nature (IUCN)

IUCN is a membership union composed of both government and civil society organisations. It harnesses the experience, resources and reach of its more than 1,400 Member organisations and the input of more than 15,000 experts. This diversity and vast expertise make IUCN the global authority on the status of the natural world and the measures needed to safeguard it.

IUCN is a democratic union that brings together the world's most influential organisations and top experts in a combined effort to conserve nature and accelerate the transition to sustainable development.

University of Pretoria (UP)

The University of Pretoria (UP) is one of Africa's top universities and the largest contact university in South Africa. They produce socially impactful research to find solutions for the world's most pressing issues. They have a high quality of teaching and learning in the classroom, online, or in communities. They have support in place for our students to graduate on time as well-rounded, responsible citizens fully prepared for the world beyond university.

CSIR

The Council for Scientific and Industrial Research (CSIR) is a leading scientific and technology research organisation that researches, develops, localises and diffuses technologies to accelerate

socioeconomic prosperity. The organisation's work contributes to industrial development and supports a capable state.

The CSIR was established through an Act of Parliament in 1945 and the organisation's executive authority is the Minister of Higher Education, Science and Technology.

The organisation plays a key role in supporting public and private sectors through directed research that is aligned with the country's priorities, the organisation's mandate and its science, engineering and technology competences.

IWMI

IWMI is a research-for-development (R4D) organization, with offices in 13 countries and a global network of scientists operating in more than 30 countries. For over three decades, IWMI's research results have led to changes in water management that have contributed to social and economic development. Associates of IWMI, being hosted by IWMI in Pretoria South Africa include: Global Water Partnership (GWP); International Food Policy Institute (IFPRI) and WaterNet (a regional network of university departments and research and training institutes specialising in water).

The final decision about where SADC-GMI should be located during the implementation of its new programme lies with the SADC regional governance structures.

5.6 Results monitoring and evaluation

5.6.1 Introduction

Monitoring and evaluation (M&E) are increasingly important aspects of programme implementation. Donors, investors and lenders are requiring more informed and accurate M&E systems to ensure that funds are allocated and spent in a responsible manner. Monitoring is defined as routine and systematic collection of data relating to project performance and is focused on project development objective-related interventions and outputs. Evaluation is a periodic and objective assessment and/or appraisal of a project and is often performed by an independent party at a programme's mid-point or end. Evaluation takes a broader view to assess if the interventions and outputs led to the desired outcomes and impacts.

Apart from being good practice and a hallmark of an efficient governance system, a robust M&E system can also contribute to ensuring that an organisation's practices are aligned with its values and current overarching issues. An efficient M&E system should be developed based on the logical framework for key interventions and outputs (monitoring) as well as outcomes and impacts (evaluation). If done in a systematic and impact-focused manner, M&E should lead to continual improvement in programme deliverables through a well-established feedback loop. Figure 5-3 indicates the main elements in SADC-GMI's proposed M&E framework.

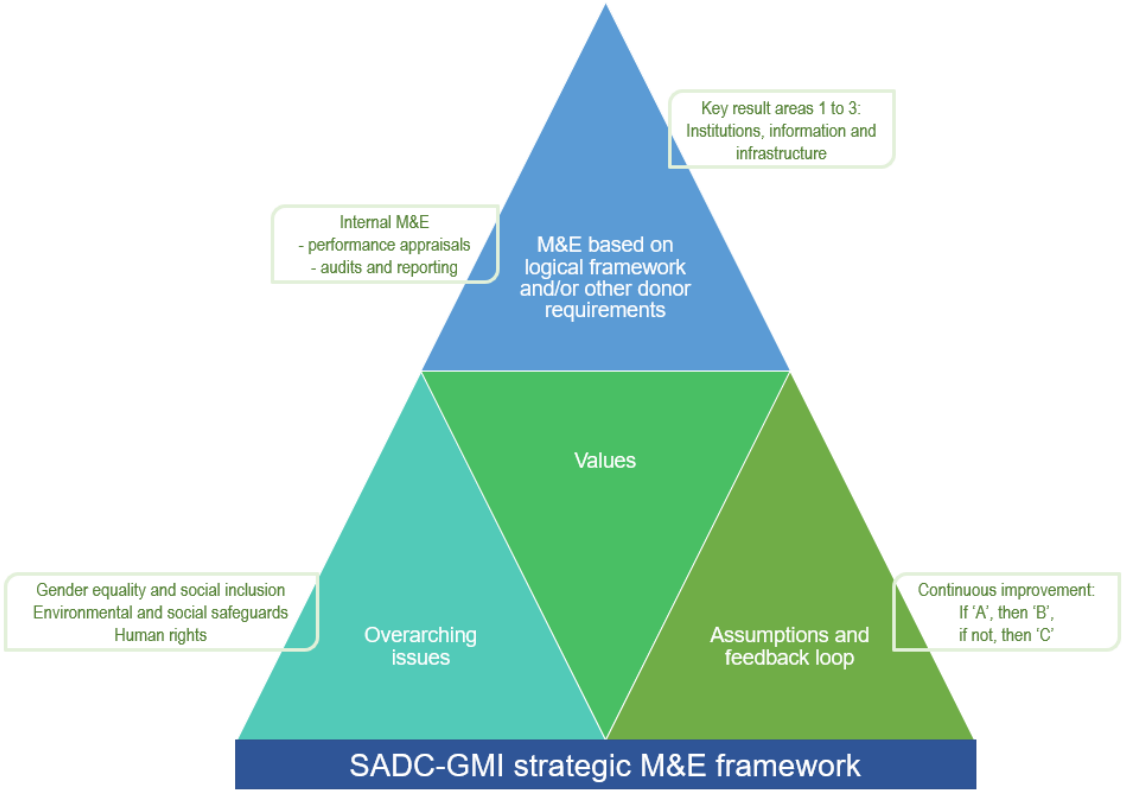


Figure 5-3: SADC-GMI monitoring and evaluation framework

Several overarching issues influence the proposed strategic M&E framework. In the current global socio-political context, SADC-GMI foresees that certain elements in programme M&E will be prioritised. These include environmental and social safeguards, gender equality and social inclusion as well as human rights. The next section discusses each of these elements in detail and Appendix I provides a thematic analysis of the topical areas in each of the three overarching issues that selected donors include in their M&E frameworks.

5.6.2 Overarching issues in M&E

Environmental and social safeguards

Environmental and social safeguards (ESS) policies are essential tools to prevent and mitigate undue harm to people and their environment. When identifying and designing a programme or project, safeguards will help the team assess the possible environmental and social risks and impacts (positive or negative). During programme implementation, safeguards should help define measures and processes to effectively manage risks and enhance positive impacts.

The objective of these policies is to avoid or, when avoidance is not possible, to minimize and mitigate adverse programme impacts on the environment and affected people, and to help borrowers (and grant recipients) strengthen their own safeguard systems and develop the capacity to manage environmental risks. Key environmental safeguard considerations include biodiversity conservation, sustainable natural resource management, pollution prevention and abatement, pesticide use and greenhouse gas emissions. The key issues addressed by social safeguards relate to involuntary resettlement, participation and inclusion of indigenous peoples, forest-dependent people, retrenched workers and affordability of public services. To obtain funding support, national governments must have adequate safeguard systems in place (including institutions and implementation capacities) to be able to manage social risks during the implementation of agriculture and rural development (ARD) investment programmes and projects.

Safeguard policies provide guidelines for borrower/country staffs in identifying, preparing, and implementing programmes and projects. They also provide a mechanism for integrating environmental concerns into development decision-making and help to prevent reputational harm from inappropriate project implementation.

All programmes and projects requiring funding must ensure that the relevant ESS requirements, regional protocols and national legislation are considered and applied to all aspects of the programme/project. SADC-GMI gave significant attention to ESS requirements in the implementation of its current subgrantee projects and built up a significant knowledge base in applying ESS good practice standards to small-scale infrastructure development projects.

Gender equality and social inclusion

SADC-GMI's proposed programme will incorporate a strong theme of gender inclusion and equality, to fit into a world that increasingly recognizes the importance of a gender balance in order to achieve sustainability.

Gender mainstreaming was established as a global strategy for the promotion of gender equality in the Platform for Action from the fourth World Conference on Women held in Beijing in 1995. It is defined as "the incorporation of gender issues in development programs so that at all levels gender is automatically addressed" (DANIDA, 2001).

The differences in tasks and relative status of men and women, lead to a difference in access to and control over resources, including water. Most frequently, this implies that women and men do not have the same level of access to water or the same level of control over how (often scarce) water is used (Cap-net, 2014).

The Food and Agriculture Organization of the United Nations (FAO) argues that if women had the same access to productive resources as men, they could increase yields on their farms by 20 to 30 percent, which in turn could raise total agricultural output in developing countries by 2.5% to 4% and reduce the number of hungry people in the world by 12% to 17% (USAID, 2020).

The implementation of any programme will therefore have to include not just a gender lens, but should "bring the experiences, knowledge and interests of women and men to bear on the water development agenda" (CA, 2020). Women should be seen as water actors and their concerns and contributions should be included in any program design.

The Comprehensive Assessment of Water management in Agriculture (CA) and GWA sets out the minimum requirements for demonstrating gender mainstreaming in programs, and will be considered in the design of future SADC-GMI projects:

- A comprehensive social analysis – which should include a water use analysis (this entails analysing users and uses, the amount of water and how it is accessed, the type and quality of water resources, spheres of influence);
- Collect and make use of gender-and diversity-disaggregated data in design, implementation, and monitoring of water and agricultural projects;
- Involve all stakeholder groups- men and women of different age groups and classes, through a facilitated dialogue process from the start;
- Involve social/gender experts in projects and programmes from the design stage;
- Share expertise and knowledge among practitioners and give feedback to academics and policymakers; and
- Lobby at higher political levels to stimulate the right environment for social changes enabling equity.

SADC-GMI can do this through partnerships and linkages with other like-minded institutions, where a sharing of information and knowledge can enhance and scale the work of all role-players.

One example is the existing link that SADC-GMI has with the SADC Gender Unit and the Water Division, and where a sharing of information will support the work of all parties. Since these entities are working on mainstreaming gender in transboundary water management programmes, SADC-GMI can support their work through the inclusion of women in their programme delivery, i.e. researchers, hydrologists and sub-grantees.

In project development and implementation, SADC-GMI can play a role in ensuring local level gender concerns, challenges and outcomes regarding transboundary groundwater cooperation are addressed through the National Nodal Points and Gender Units. The experiences of women in the sub-grantee projects can be recorded as learning and to influence policy decisions. The appointment of women headed SMMEs as service providers when SADC-GMI procure in the future can also go a long way in establishing the organization's contribution.

Through its M&E practices, SADC-GMI plans to be accountable to donors and its governance structures for ensuring that its new programme is responsive to gender equality and social inclusion matters.

Human rights

Water is a basic human right for all people under the Universal Declaration of Human Rights, and the UN General Assembly recognizes access to safe drinking water and sanitation as a human right. (UN, 2010). The access to clean water and basic sanitation is a right also guaranteed under the UN Convention on the Rights of Persons with Disabilities (UNICEF, 2020b). All children have the right to clean water and basic sanitation, as stated in the Convention on the Rights of a Child (UNICEF, 2020b).

Groundwater and access to it can ensure this right is realized, particularly during times of disasters. Villholth (2009), states that groundwater is a key resource for vulnerable populations who may experience surface water shortages and/or quality degradation during and in the aftermath of disasters. Aquifer-based solutions to water scarcity can also increase resilience to water related disasters such as floods and droughts and the progressive impacts of climate change. In this manner they can improve overall water security and agricultural productivity on a local or river basin scale (UN- WWAP, 2018; Pavelic et al., 2012).

Guppy, Uyttendaele, Villholth and Smakhtin, 2018, highlights that groundwater is not sufficiently featured in the current SDGs of the 2030 Development Agenda as it does not explicitly account for the significant role that groundwater plays and will continue to play in sustainable development. Their assessment of the role of groundwater, found that a total of 53 SDG core targets (42% of all core targets) have a link to the theme of groundwater. They recommend that those working on the SDGs should recognize the linkages with groundwater to build synergies that may accelerate positive opportunities.

The research and information that SADC-GMI generates for all Member States will add value to all role-players working on the SDGs and platforms should be created for a wider spread of knowledge. Conferences previously targeting those who work actively in the groundwater sector can be opened to a wider audience to optimize knowledge sharing.

Through its M&E practices, SADC-GMI plans to be accountable to donors and its governance structures for ensuring that its proposed programme is responsive to matters pertaining to human rights and access to water.

5.6.3 Implementation of M&E framework

Various tools and methods already exist within SADC-GMI's organisational structure to contribute to the efficient implementation of SADC-GMI's M&E framework. The organisation has also built

internal and external M&E capacity through various means during the implementation of the current SGM project. A contract-based M&E consultant was appointed to take responsibility for the M&E of the SGM and SRK was appointed as an independent consultancy to ensure that the ESS requirements in the current subgrantee projects were compliant. Through the ESS support process participating Member States received training in ESS requirements, stakeholder engagement and record keeping during a workshop in November 2019. These interventions provide a good foundation for the implementation of a more robust M&S. Table 5-2 provides an overview of the proposed M&E tools, roles and responsibilities an feedback loops.

Table 5-2: Proposed M&E tools, roles and responsibilities and feedback loops

	Proposed tools	Responsible people	Feedback loop
Monitoring	Logical framework - interventions and outputs Data analytics Periodic site visits Progress meetings Scheduled reporting	Project implementation agency SADC-GMI project manager SADC-GMI social and diversity expert Managing director	Regular lessons learned capturing Risk indicator monitoring Continuous improvement
Evaluation	Objective appraisal of outcomes and impacts in logical framework Impact measurement (for example social return on investment) Information from various stakeholders	Medium term internal periodic evaluation – SADC-GMI project manager Long term internal evaluation – M&E consultant Independent evaluation at key points – external consultant	Capture lessons learned and emerging issues Apply risk mitigation measures Adapt programme based on evaluation

5.7 Sustainability criteria

SADC-GMI is keenly aware that in order to achieve its PDO and related KRAs, it must plan and implement its programme with long term sustainability in mind. To help SADC-GMI imbed sustainability criteria into all of its institutional and programme activities, it is proposed that the six-capital framework of sustainable development is adapted to serve as a strategic framework to guide SADC-GMI in sustainability matters.

The six-capital framework is used by the International Integrated Reporting Framework (IIRF) (2013) to view the value created by programme activities based on all aspects that contributes to a sustainable programme, not only on social value. The model recognises that in order to be sustainable and create present and future value, each of the foundational capitals must be considered and be in balance throughout the life of the organisation.

Within this value creation framework, careful consideration is given to how programme activities strengthen (creates value) in each capital area. This framework provides a standardized and internationally recognized manner in which to view the sustainability of organisations. The six capitals and a short definition of each are provided below:

- **Financial capital** – refers to the pool of funds available to an organization either through making profits or through debt financing, equity, grants or investments;
- **Manufactured capital** – refers to the physical assets that are available to an organisation for conducting business. These include both physical objects like buildings and equipment and infrastructure such as roads, ports, bridges, water services and electricity;
- **Intellectual capital** – refers to knowledge-based intangibles such as intellectual property and organizational capital imbedded in systems, procedures and protocol;

- **Human capital** – refers to people's competencies, capabilities and experience and the organisation's ability to create a healthy, safe and growth-oriented work environment;
- **Social and relational capital** – refers to organizations' focus on building strong relationships with various stakeholder groups to obtain and maintain social licence to operate as well as to create shared value with host communities; and
- **Natural capital** - refers to all renewable and non-renewable environmental resources that supports the current and future viability of the programme. These include air, water, land, minerals, biodiversity.

Within this framework, SADC-GMI proposes to use the sustainability criteria presented in Table 5-3 to monitor and evaluate its own sustainability (internal) as well as the sustainability of its programme (external). The criteria list is not exhaustive, and an expansion of criteria per capital area is advised once programme planning starts.

Table 5-3: SADC-GMI sustainability criteria based on the six-capital framework

Category	Examples of internal criteria	Examples of external criteria
Financial capital	SADC-GMI has a diversified income-base SADC-GMI has financial control measures in place	Sub-grantees comply to financial governance requirements Procurement procedures enable efficient project implementation
Manufactured capital	SADC-GMI is located in an area where it has access to roads, electricity and transport	Sub-grantees and partners are able to link to SADC-GMI through local ITC infrastructure
Human capital	SADC-GMI is able to acquire the necessary skills sets to implement its KRAs SADC-GMI is able to retain institutional knowledge embedded in current staff members	Partners, stakeholders and sub-grantees are empowered with knowledge to improve the groundwater management in their own environments
Social and relation capital	SADC-GMI is able to obtain and maintain strong working relationships within the internal team	Partners, stakeholders and sub-grantees can utilise the goodwill in SADC-GMI's reputation to implement projects
Natural capital	SADC-GMI manages its own use of limited resources in such a way that sets an example to stakeholders	The SADC region at large is empowered to manage groundwater to enable future generations to utilise the resource
Intellectual capital	SADC-GMI is able to retain institutional knowledge through knowledge management systems	Stakeholders are able to leverage of knowledge generated and disseminated by SADC-GMI to create further value

5.7.1 Continuity and self-sustainability

During the LLP process, several of the experts involved reiterated the need for SADC-GMI to diversify its income base. Section 4.5.2 provides a concept level strategy for building a diversified income base over the next ten years with specific targets. Actioning this strategy should be one of SADC-GMI's highest priorities when starting the new programme, as it will help the organisation avoid funding gaps which are common in development organisations dependent on one income source.

SADC-GMI should not only look inward to promote self-sustainability but should actively promote self-sustainable practices in subgrantee projects. This will involve building the capacity of sub-grantees to engage early on with project beneficiaries to ensure buy-in and taking ownership of maintaining infrastructure when the funding cycle ended. This could be done through a systematic approach to infrastructure project management that views beneficiaries as true project partners.

5.7.2 Skills transfer

One of the keyways in which self-sustainability of groundwater infrastructure projects could be attained is through deliberate and pro-active skills transfer from the outset of the programme. One of the key observations from the technical expert involved in the LLP process, is that technical skills transfer during project implementation could determine the success or failure of a small-scale infrastructure project. It is recommended that SADC-GMI encourages skills transfer explicitly through the following means:

- The scope of work in its request for proposals;
- An active professional internship programme at SADC-GMI; and
- Community capacity building programmes regarding groundwater stewardship (KRA 3).

6 Key risks and mitigation measures

Risk management in international development programmes and projects is receiving increased attention as global uncertainty grows due to factors outside of donors and funders control. The current restriction in international travel brought about due to the COVID-19 pandemic necessitate the implementation of innovative ways of managing risk.

Risk is inherent in support to and implementation of development programmes. SADC-GMI has been able to mitigate several risk factors in the implementation of its first programme. This process was guided by the risk assessment that was undertaken by the World Bank as part of the assessment of the SGM Project (World Bank, 2014). A subsequent risk assessment was conducted as part of the development of a SADC-GMI Strategic Business Plan in 2018, which support SADC-GMI in mitigating continuous risk. The LLP process recommended regular risk assessments in the new programme and advised on the integration between M&E practices and risk assessment.

For the proposed new programme, SADC-GMI prepared a draft risk rating based on the risk assessment prepared by the World Bank team in 2014, as indicated in Table 6-1. In general, since the new programme builds on the goodwill, organisation and momentum of the preceding project, the residual risks are considered to be low. Since effective mobilization in 2016, SADC-GMI has effectively carried the SGM Project forward, mobilizing and consolidating regional relationships, building information resources and information networks, and supporting groundwater demonstration projects in Member States. Hence the new programme builds on a largely sound institutional, operational and procedural base. Lessons learned have been identified, and where gaps are evident, mitigation and improvement measures have been recommended (SADC-GMI, 2020).

Table 6-1: Project risk assessment

Project Stakeholder Risks				
Description: There is a risk that project implementation will be hampered by insufficient coordination and consultation with key regional and national structures. Further, there is a risk that stakeholders (RBOs and national departments) will continue to prioritise surface over groundwater.	Rating	Low		
	Risk Management: Several structures for consultation and coordination are already in place, including a Board of Directors with SADC Secretariat and Member State representation, National Focal Groups and Focal Persons and Memoranda of Understanding with River Basin Organisations. In addition, regional and national interaction has taken place in the contexts of research and information sharing, joint transboundary and national-level projects and training and capacity building initiatives. Surface water management remains more entrenched (policy and operationally) in RBOs and many national water resource management departments. SADC-GMI has facilitated a progressive shift in many contexts and will continue to do so under the project.			
	Responsible team: SADC-GMI	Stage: Implementation	Due Date: No date	Status: Ongoing
Implementing Agency Risks (including Fiduciary Risks)				
Capacity				
Description: There is a risk that SADC-GMI will be slow to operationalise the project, due in part to the possible change in hosting arrangements.	Rating:	Moderate		
	Risk Management: A final hosting decision is pending. With careful planning and management by SADC-GMI and the host, the hosting agreement and physical transfer should be completed with limited impact on operations.			
	Responsible team: SADC-GMI, host	Stage: Initiation	Due Date: No date	Status: Decision pending
Governance				
Description: There is a risk of weak governance of Sub-Grant projects under KRA 3	Rating	Moderate (Low for Sub-Grant governance)		
	Risk Management: A Sub-Grant manual is in place, and SADC-GMI has undertaken an Environmental and Social Safeguards (ESS) assessment of existing Sub-Grant projects. Taken forward these tools and procedures will consolidate Sub-Grant management			
	Responsible team: SADC-GMI, host	Stage: Initiation	Due Date: No date	Status: Planning pending
Project Risks				
Design				
Description:	Rating:	Low		

There is a risk that activities under this project do not meet the expectations of SADC Member States.	Risk Management: After several years of exposure to the SADC Groundwater Management Project, Member States will have built an appreciation of the project objectives and of its modes of collaboration with and support to the Member States. In addition, the project is aligned with SADC mandates, policies on water and shared watercourses, and agreed Regional Strategic Action Plans.			
	Responsible team: SADC-GMI	Stage: Implementation	Due Date: No date	Status: Ongoing
Social & Environmental				
Description: There is a risk that infrastructure and demonstration projects undertaken under KRA will have social and environmental impacts, including negative impacts.	Rating:	Low		
	Risk Management: Funded infrastructure projects are typically small and local, but they may prompt larger infrastructure interventions. In both cases impacts will be generated. The project will continue to apply the Environmental Management Framework developed under the previous groundwater management project, and should institutionalise the application of relevant ESS and regular ESS monitoring. All transboundary work will follow the provisions of the Revised SADC Protocol and relevant international (including World Bank) safeguards.			
	Responsible team: SADC-GMI	Stage: Implementation	Due Date: No date	Status: Ongoing
Program & Donor				
Description: There is a risk of incompatible donor support to implementing agencies hampering the achievement of the Project Development Objective.	Rating:	Low		
	Risk Management: Donor support to water management implementing agencies may leverage the capacity and impact of the project where objectives are compatible, or at least not mutually undermining. Most international Cooperating Partners have exposure to and interaction with elements of SADC's broader water agenda (including groundwater management in some cases) so there should be a level of understanding and alignment on both sides.			
	Responsible team: SADC Secretariat, SADC-GMI	Stage: Implementation	Due Date: No date	Status: Ongoing
Delivery Monitoring & Sustainability				
Description: There is a risk that project results are not monitored or evaluated satisfactorily. There is a risk that SADC-GMI will not be financially sustainable after the completion of the project.	Rating:	Low (Moderate in the case of sustainability)		
	Risk Management: A fairly robust monitoring and evaluation regime has been established under the previous project, with the necessary capacity. Preliminary results indicators have been developed for the project and are incorporated in a Results Framework. Reporting in the context of the Framework will continue (and perhaps improve) earlier practices. With potential reliance on a few funding sources, financial sustainability may be in jeopardy when the 2021 – 2025 funding cycle ends. This risk will be mitigated by ongoing efforts to diversify funding. Initial work on a diversification strategy has been undertaken, but this must be purposefully addressed and implemented before 2025.			

	Responsible team: SADC-GMI	Stage: Implementation	Due Date: No date	Status: Ongoing
Overall Risk Ratings:				
Implementation	Rating:	Low		
Comments: The risk rating for project implementation is low, considering the foundation laid by its predecessor and the incorporation of the lessons learned from the preceding project				

7 Conclusions

Groundwater plays a fundamental role in providing water security, resilience to droughts and supports social and economic development. Despite the high level of dependence on groundwater resources in SADC, its functioning in the hydrological environment is poorly understood compared to surface water due to its unseen value which contributes to its mismanagement. The region also faces a lack of equitable access to groundwater for women and vulnerable groups. The current COVID-19 pandemic has brought into stark relief the importance of groundwater for public health and initiatives supporting water, sanitation and hygiene (WASH). These challenges negatively affect the quality of life and livelihoods of a significant proportion of Southern African's population. The need to strengthen groundwater management and development in order to promote sustainable social and economic development within the region led to the establishment of SADC-GMI in 2011.

SADC-GMI is currently approaching the end of the implementation of the "Sustainable Groundwater Management (SGM) in SADC Member States Project", funded by GEF and CIWA through the World Bank. In response, SADC-GMI conducted a review of lessons learned from the SGM Project to inform the development of a new 10-year (2021-2031) regional groundwater programme. SADC-GMI envisions the new programme to expand and deepen efforts of SADC Member States in addressing some of the intractable development challenges in the region.

The review findings were disclosed during an online stakeholder workshop on 19 June 2020. The concept framework for this bankable programme proposal document was also presented to participating stakeholders and partners for their input. Informed by past project lessons and successes, emerging issues in groundwater management and stakeholder feedback, SADC-GMI is focussing its new sustainable groundwater programme on building resilience and socio-economic develop in the SADC region. In responding to the question "groundwater for what?", this development objective guides the design of the proposed programme which is structured around three key result areas that aim to further strengthen institutions, information and infrastructure. Each key result area will have specific intervention areas and priority projects. However, the final evolution of the future programme will depend on securing the appropriate funding and aligning with donor priorities.

SADC-GMI has built up significant momentum in becoming a centre of excellence in groundwater management in the region. The organization has moved from its 'establishment phase' (first Strategic Plan's outcome), and now sees itself as a full-fledged organization with most structures in place. At a strategic, funding and operational level, SADC-GMI is sound and ready to embark on a new strategic direction for the next ten years. SADC-GMI is registered as a Non-Profit Company and Non-Profit Organisation in terms of South African law, which makes it a suitable implementing agency for many donor organisations because of the high standard of monitoring and reporting required of its directors.

SADC-GMI has aligned its current budget planning with its PDO and strategic business objectives. It recognises that to demonstrate and measure impact in building climate change resilience and socio-economic development, the programme and its activities will have to be implemented over a medium to long-term period. A 10-year programme, divided into two five-year periods, will allow SADC-GMI to account for the incremental and gradual change in key result areas. Based on current planning scenarios, SADC-GMI will require a minimum of US$30 million over the next 5 years (2021-2025) and an additional US$34 million for the subsequent 5 years (2026-2031), calculated at an average global inflation rate of 2.5% per annum. The intention is to undertake a lessons learned process after the first 5-year implementation period to recalibrate the PDO and budget from 2026 to 2030.

Monitoring and evaluation (M&E) are important aspects of programme implementation. Donors, investors and lenders are requiring more informed and accurate M&E systems to ensure that funds are allocated and spent in a responsible manner. Various tools and methods already exist within

SADC-GMI's organisational structure to contribute to the efficient implementation of SADC-GMI's M&E framework. The organisation has also built internal and external M&E capacity through various means during the implementation of the current SGM Project.

Risk is inherent in support to and implementation of development programmes and hence needs to be proactively identified and mitigated. SADC-GMI has been able to continuously mitigate several risk factors in the implementation of its current SGM Project. Since effective mobilization in 2016, SADC-GMI has effectively carried the SGM Project forward, mobilizing and consolidating regional relationships, building information resources and information networks, and supporting groundwater demonstration projects in Member States. Risks to effective implementation of the new programme are likely to be manageable as it builds on a largely sound institutional, operational and procedural base.

SADC-GMI will work on capacitating its own organization as well as partners in order to deliver on the new scope of work. The key result areas will guide the specific capacity needs as the team works towards meeting the intermediate indicators and overall programme development objective.

8 References

African Development Bank. *Southern Africa Economic Outlook 2019 Macroeconomic performance and prospects. Regional integration and private sector development*. African Development Bank. (2019)

African Development Bank. *African Economic Outlook 2020. Developing Africa's Workforce for the Future*. African Development Bank. (2020)

African Development Bank. *African Economic Outlook 2020. Supplement. Amid COVID-19*. African Development Bank. (2020a)

African Studies Centre. Leiden University. https://www.ascleiden.nl/content/webdossiers/water africa#Water%20in%20Africa: %20introduction. (2020).

African Union Commission, 2015. *Agenda 2063 - The Africa We Want: a shared strategic framework for inclusive growth and sustainable development*, First ten-year Implementation Plan 2014 – 2023. (2015)

African Union. *African Governance Report. Promoting African Union Shared Values*. Prepared by The African Peer Review Mechanism in collaboration with the African Governance Architecture. (January 2019)

CapNet & Gender and Water Alliance. *Why Gender Matters in IWRM: A Tutorial for Water Managers.* Comprehensive Assessment, Making a difference in Water Management. Issue brief 3. (2014)

Companies and Intellectual Property Commission, Republic of South Africa. *Notice of Amendment of Memorandum of Incorporation – South African Development Community Ground Water Management Institute.* (2011)

Comprehensive Assessment. *Making a difference in Water Management*. Issue brief 3. (2020)

Croneborg, E.M. *Project Appraisal Document for the Sustainable Groundwater Management in SADC Member States Project (P127086).* World Bank Report No: PAD685 - AFTN1/2/3 Africa Region. (2014)

Döll, P. and Fiedler, K. *Global-scale modelling of groundwater recharge. Hydrology and Earth System Sciences Discussions*, 4: 4069-4124. (2007)

GEF and CIWA. *Project Agreement, Sustainable Groundwater Management in SADC Member States Project. Agreement between International Bank for Reconstruction and Development, International Development Association and the University of the Free State*. (2015)

Guppy, Uyttendaele, Villholth and Smakhtin. *Groundwater and Sustainable Development Goals: Analysis of Interlinkages*. UNU-INWEH Report Series 04. (2018)

Hawkins, Lefore, Sakuringwa and Thathana. *How important is Gender in Transboundary Groundwater Governance?* Journal of Gender and Water. Volume 6. (February 2019)

International Institute for Democracy and Electoral Assistance (IDEA). *The Global State of Democracy 2019*. Addressing the Ills, Reviving and Promise. International IDEA, www idea.int. (2019)

The International Integrated Reporting Council*. International Integrated Reporting Framework (IIRF).* (2013)

International Labour Organisation (ILO). *The impact of COVID 19 on the informal economy in Africa and the related policy responses*. ILO Brief- Informal Economy. (April 2020)

International Union for Conservation of Nature, 2015

Lapworth, D.J., Nkhuwa, D.C.W., Okotto-Okotto, J. *Urban groundwater quality in sub-Saharan Africa: current status and implications for water security and public health.* Hydrogeological Journal, 25: 1093–1116. https://doi.org/10.1007/s10040-016-1516-6 (2017)

Lautze, J., Holmatov, B., Saruchera, D., & Villholth, K. G.. *Conjunctive management of surface and groundwater in transboundary watercourses: a first assessment*. Water policy, 20(1), 1-20. https://doi.org/10.2166/wp.2018.033. (2018)

Macy, P. Geology. *Explanatory Brochure for the South African Development Community (SADC) Hydrogeological Map & Atlas*. In: Pietersen, K., Kellgren, N., Roos, M. and Chevallier, L. (eds.). (2010)

Mo Ibrahim Foundation (MIF). *Africa Governance Report: Agenda 2063, Agenda 2030 and public governance in Africa.* (2019)

Moya, S. Family farming in sub-Saharan Africa: its contribution to agriculture, food security and rural development. Working paper, Food and Agriculture Organisation of the United Nations and the International Policy Centre for Inclusive Growth, UNDP. (2016)

Mukasine, Randell and Mutumwinka. *Integrating Gender and Environment Aspects in Water. Sanitation and Hygiene for Rural Populations*. (2012)

National Institute of Communicable Diseases. First Case of COVID-19 Coronavirus reported in SA. https://www.nicd.ac.za/first-case-of-covid-19-coronavirus-reported-in-sa/. (2020)

Open Sustainable Development Goal (SDG) data hub. www.sdg.org. (2020)

Pavelic, P., Giordano, M., Keraita, B., Ramesh, V. and Rao, T. *Groundwater availability and use in sub-Saharan Africa: a review of 15 countries. Sri Lanka: International Water Management Institute*. (2012)

Pavelic, P.; Srisuk, K.; Saraphirom, P.; Nadee, S.; Pholkern, K.; Chusanathas, S.; Munyou, S.; Tangsutthinon, T.; Intarasut, T.; Smakhtin, Vladimir. *Balancing-out floods and droughts: opportunities to utilize floodwater harvesting and groundwater storage for agricultural development in Thailand*. Journal of Hydrology, 470-471:55-64. doi: http://dx.doi.org/10.1016/j.jhydrol.2012.08.007. (2012)

Pietersen, K and Beekman, H. *Groundwater Management in the Southern African Development Community*. SADC-GMI. (2016)

SADC-GMI. *Developing a new SADC Groundwater Management Programme 2021-2031: Lessons Learned and Emerging Issues*. Report (Report Number 557287). Report prepared for SADC-GMI by SRK. (July 2020)

SADC-GMI. *Financial Sustainability Report*. (May 2018)

SADC-GMI. Guidance Document: *Institutionalisation of Groundwater. Policy, Legal and Institutional Development for Groundwater Management in SADC Member States (GMI-PLI).* (2019)

SADC-GMI. *Procurement Manual.* (2020)

SADC-GMI. *Project Management Manual.* (2007)

SADC-GMI. *Regional Gap Analysis and Action Plan Report*. (2019)

SADC-GMI. *SADC-GMI online disclosure and lessons learned workshop proceedings*. (2020a).

SADC-GMI. Strategic Business Plan (2018-2023). (March 2019)

SADC-GMI and UFS. *Service Level Agreement.* (2018)

Southern African Development Community (SADC). *Southern Africa Environment Outlook Southern African Research and Documentation Centre, Gaborone, Harare, Nairobi* (2012)

SADC. *Regional Water Policy*. (2005)

SADC. *Regional Water Strategy*. (2006)

SADC. *Revised Protocol on Shared Watercourses in the Southern African Development Community*. (2000)

SADC. *Revised Regional Indicative Strategic Development Plan*. (2015)

SADC. *Southern African Development Community, Revised Protocol on Shared Watercourses* (signed at Windhoek 7 August 1995). SADC, Gaborone. (2000)

Senge, P. *The fifth Discipline*. (1990)

Southern African Development Community. *Southern Africa Environment Outlook Southern African Research and Documentation Centre, Gaborone, Harare, Nairobi*. (2012)

The World Bank in Africa, COVID-19 (Coronavirus) Response. https://www.worldbank.org/en/region/afr/coronavirus. (2020)

UNDP. Africa Human Development Report 2016: *Accelerating Gender Equality and Women's Empowerment in Africa*. http://hdr.undp.org/sites/default/files/afhdr_2016_lowres_en.pdf. (2016)

UNECA. Report on sustainable development goals for the Southern Africa subregion. https://www.uneca.org/sites/default/files/PublicationFiles/sdgs_southern_africa_main_eng.pdf. (2015)

UNESCO. *Water, a Shared Responsibility, Paris, France: United Nations Educational, Scientific and Cultural Organization*. World Water Assessment Programme. (2006)

UNESCO. *Facts and Figures from the World Water Development Report 4 – Managing Water under Uncertainty and Risk, United Nations Educational, Scientific and Cultural Organization*. World Water Assessment Programme. (2012)

UNESCO, UN-Water. *United Nations World Water Development Report 2020*. Water and Climate Change, Paris, UNESCO. (2020)

UNICEF. www.unicef.org/wash/3942_3953.html.(2020)

UNICEF, *Disabilities.* www.unicef.org/disabilities/index_65839.html. (2020)

United Nations. *The 2030 Agenda for Sustainable Development, Department of Economic and Social Affairs*. https://sdgs.un.org/2030agenda. (2015)

United Nations. *Policy Brief: Impact of COVID-19 in Africa.* (May 2020)

UN-WWAP. *The United Nations World Water Development Report 2018: Nature-based Solutions for Water.* United Nations Water Water Assessment Programmee (UN-WWAP), Paris, UNESCO. (2018)

Upadhyay, B. *Water, poverty and gender: Review of evidences from Nepal, India and South Africa. International Management Water Institute*. (2003)

World Bank Group. *Supporting Africa's Transformation: regional integration and cooperation assistance strategy for the period FY18-FY23*, Report no. 121912-afr. (December 2017)

World Bank. Africa Pulse. *Assessing the Economic Impact of Covid-19 and Policy Responses in Sub-Saharan Africa*. Volume 21. (2020)

World Health Organization (WHO). Drinking water. www.who.int/en/news-room/fact-sheets/detail/drinking-water. (June 2019)

World Health Organization (WHO). www.who.int/water_sanitation_health/sanitation-waste/sanitation/hand-hygiene-for-all/en/. (2020a)

World Health Origanization (WHO). www.who.int/en/news-room/fact-sheets/detail/drinking-water). (2020b)

WHO/UNICEF. *Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene (washdata.org).* (2017)

Villholth, K., Stendel, M., & Tøttrup, C.. *Integrated mapping of groundwater drought risk in the Southern African Development Community (SADC) region.* Hydrogeology Journal. (2013)

Zeufack, A. G., Gerard, C.C., Calvin, D Z.; Megumi, K; Vijdan., and Canales, K. C. 2020. *Africa's Pulse, No. 21, Spring 2020: An Analysis of Issues Shaping Africa's Economic Future. World Bank, Washington, DC*. World Bank. https://openknowledge.worldbank.org/handle/10986/33541 License: CC BY 3.0 IGO. (2020).

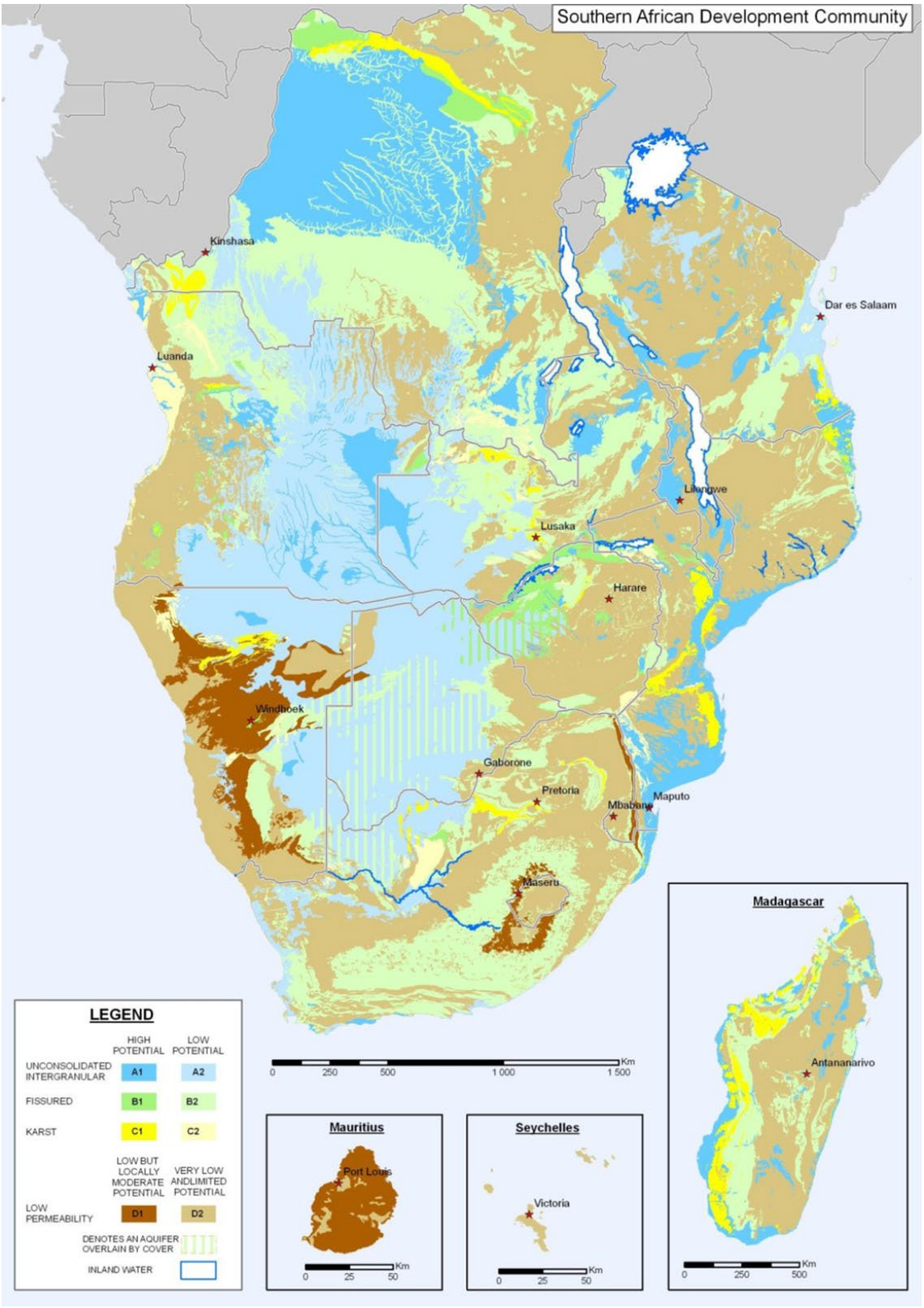
Zawarteween, M.Z. *A plot of one's own: Gender relations and irrigated land allocation policies in Burkina Faso.* Research Report 10. Colombo, Sri Lanka: International Irrigation Management Institute. (1996)

Appendices

Appendix A: SADC-Hydrogeological Map

Appendix A: SADC Hydrogeological Map and Atlas (represented at scale 1:30 000 000)

Source: MACY, P. 2010. Geology. In: PIETERSEN, K., KELLGREN, N., ROOS, M. & CHEVALLIER, L. (eds.) Explanatory Brochure for the South African Development Community (SADC) Hydrogeological Map & Atlas.



Appendix B: Gaps identified in groundwater management practices

Appendix B: Overview of past and current groundwater pressures in SADC

Member States	Pressures identified as part of the 2014 Appraisal Document	Subsequent gaps identified as part of the review of SADC-GMI's programmes
Angola	• Little readily available information	• Limited institutional capacity and cohesion • National water plan not well implemented
Botswana	• 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	• Outdated legislative framework does not address issues of development sectors in Botswana • Limited institutional capacity and groundwater leadership • Groundwater is the main resource for domestic use, but little attention to conservation
DRC	• Little readily available information	• No national water policy and no legislation relating to groundwater • Insufficient institutional and human capacity, and limited commitment to groundwater strategy implementation
Lesotho	• Contamination around urban areas (from landfills, septic tanks and pit latrines)	• Continued water insecurity due to inadequate legal and policy frameworks, limited resources and failing infrastructure • Land and environmental degradation limit retention capacity and aquifer recharge
Madagascar	• Little readily available information	• No groundwater policy in place • Groundwater management roles unclear
Malawi	• In urban and peri-urban (e.g. Blantyre, Lilongwe, Mzuzu an Zomba) groundwater threatened by contamination from faecal pollution from pit latrines, dumping of wastes and landfill sites • Agrochemicals • Alluvial shore aquifers face pollution • Mining (potential pressure)	• No body for registration and control of hydrogeologists. Inadequate enforcement of regulations • Inadequate human, financial and technical capacity
Mauritius	• Little readily available information	• Cooperation between land and water-use ministries needs to be reinforced • Inadequate abstraction monitoring
Mozambique	• Saltwater intrusion linked with tourist developments along coast • Biological contamination	• Limited groundwater legislation • No specific groundwater institution or section in the national water directorate • Lack of professional capacity for groundwater management

Namibia	• Karst Aquifer – (mining, agriculture) • Windhoek – pollution	• Limited and fragmented legislation and partial implementation. Low capacity to manage and monitor groundwater resources • Limited recording of groundwater data and licenses
Seychelles	• Ladite island water is polluted • Potential over extraction to meet water demand	• Lack of a national groundwater management policy and strategy. Insufficient guidelines and standards • Insufficient human capacity in government to implement provisions for groundwater management
South Africa	• Major aquifers exposed to land use pollution (DLMT) • All aquifers to some extent over-utilised during their lifetime which harms the aquifer's characteristics • Acid Mine Drainage (AMD) becoming a management challenge and polluting the surface water resources • 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	• National water policy, but no groundwater management policy. Policy not fully implemented • Weak intersectoral integration and collaboration • Slow devolution of water management functions and weak local groundwater management and monitoring • Limited compliance monitoring
Swaziland	• Maloma (in low veld) • Low veld – dropping levels and potential issues in future and move to surface water sources	• Lack of a specific groundwater management policy and support systems for groundwater management • Groundwater leadership but needs to be strengthened. Poor funding for groundwater exploitation
Tanzania	• Temeke in Dar es Saalm – use of shallow aquifers by community • Groundwater and mangrove swamps: Fisheries, livelihoods	• Inadequate policy guidance on aspects of groundwater management, including institutional arrangements, public awareness of pollution sources, private sector role in groundwater management and development and date collection and monitoring
Zambia	• Lusaka – unauthorised settlements, waste disposal practices and uncontrolled drilling of boreholes contributing to drop in water levels and an increase in contaminants • Kafue Valley – nitrates from fertilisers	• Groundwater recognised as an important source of water supply, and as a driver for poverty alleviation, food security and economic development. No specific policy approach for groundwater development in rural areas • No nationally managed groundwater programme and relatively uncoordinated groundwater management implementation • Inadequate financing for and investment in water resource development
Zimbabwe	• Harare – Peri urban development drilled bore holes • Excessive drawdown e.g. Lomagundi Dolomite aquifer	• Lack of explicit groundwater policy and legislation, including transboundary aquifers

	• Mining – arsenic contamination	• Weak and under capacitated institutions and weak institutional linkages • Lack of surface / groundwater integration • Lack of lower-level water management institutions

Appendix C: PDO level results indicators

SADC-GMI 2021 – 2025: PDO Level Results Indicators

PDO Results Indicators	Unit (s) of Measure	Baseline (2020)[1]	Cumulative Targets					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (Indicator Definition)
			2021	2022	2023	2024	2025				
Project Development Objective: To Strengthen Capacity for Sustainable Management of Groundwater to Build Resilience in the SADC Region											
PDO Indicator - Key Result Area 1 (KRA 1): Capacity of national and regional ***institutions*** built and skills developed for groundwater management to improve resilience and support socio-economic development	• Cumulative number of institutions with improved capacity to build resilience and socio-economic development • Cumulative number of people with improved technical and vocational skills to improve resilience and support socio-economic development	• SADC-GMI fully operational • MOUs fully operational with four RBOs • National Focal Groups established in five Member States	• Year-on-year improvement in the cumulative number of institutions with improved capacity • Year-on-year improvement in the number of people with improved skills	• Year-on-year improvement in the cumulative number of institutions with improved capacity • Year-on-year improvement in the number of people with improved skills	• Year-on-year improvement in the cumulative number of institutions with improved capacity • Year-on-year improvement in the number of people with improved skills	• Year-on-year improvement in the cumulative number of institutions with improved capacity • Year-on-year improvement in the number of people with improved skills	• Year-on-year improvement in the cumulative number of institutions with improved capacity • Year-on-year improvement in the number of people with improved skills	Annual	KRA sub-area results reporting (see below)	SADC-GMI	Demonstrated improvement in GW capacity and commitment, underpinning resilience and socio-economic development
PDO Indicator - Key Result Area 2 (KRA 2): Groundwater knowledge generated through analytics and through data and ***information*** sharing	• Cumulative number of thematic areas with better knowledge and information as a result of this programme • Increased operational effectiveness of knowledge management and information sharing platforms	• Conjunctive surface / groundwater knowledge generated in X[2] TBAs • GW Drought Risk Map updated and X hotspots identified • SADC GLA operational with X records • SADC-GIP operational with X maps and Y links	• Year-on-year improvement in the cumulative number of thematic areas with better knowledge and information • Year-on-year improvement in the operational effectiveness of knowledge management and information sharing platforms	• Year-on-year improvement in the cumulative number of thematic areas with better knowledge and information • Year-on-year improvement in the operational effectiveness of knowledge management and information sharing platforms	• Year-on-year improvement in the cumulative number of thematic areas with better knowledge and information • Year-on-year improvement in the operational effectiveness of knowledge management and information sharing platforms	• Year-on-year improvement in the cumulative number of thematic areas with better knowledge and information • Year-on-year improvement in the operational effectiveness of knowledge management and information sharing platforms	• Year-on-year improvement in the cumulative number of thematic areas with better knowledge and information • Year-on-year improvement in the operational effectiveness of knowledge management and information sharing platforms	Annual	KRA sub-area results reporting (see below)	SADC-GMI	Demonstrated Incremental uptake and use of knowledge products
PDO Indicator - Key Result Area 3 KRA 3): Resilient livelihoods supported through sustainable groundwater management and innovative ***infrastructure*** for socio-economic development	• Cumulative number of gender disaggregated direct beneficiaries with improved socio-economic conditions due to project activities	• X direct beneficiaries (Y male and Z female) benefited from project activities	• Year-on-year increase (gender disaggregated) in beneficiaries with improved socio-economic conditions due to project activities	• Year-on-year increase (gender disaggregated) in beneficiaries with improved socio-economic conditions due to project activities	• Year-on-year increase (gender disaggregated) in beneficiaries with improved socio-economic conditions due to project activities	• Year-on-year increase (gender disaggregated) in beneficiaries with improved socio-economic conditions due to project activities	• Year-on-year increase (gender disaggregated) in beneficiaries with improved socio-economic conditions due to project activities	Annual	Intermediate results reporting (see below)	Consolidation of indicators – SADC-GMI	Demonstrated contribution of infrastructure projects to resilience
Intermediate Results: KRA 1 – Building Institutions and Developing Skills (broadening definition of capacity)											
Intermediate Indicator – SADC-GMI Capacity:	• SADC-GMI's Strategic and	• SADC-GMI an established and	• Annual review and update of	• Annual review and update of	• Annual review and update of	• Annual review and update of	• Annual review and update of	Linked to Board	Internal human resources	SADC-GMI internal	Demonstrated maintenance

[1] Sources: World Bank Support Mission (2019); LLP Report (2020);
[2] X – referenced numbers to be updated as the details of the programme are developed

PDO Results Indicators	Unit (s) of Measure	Baseline (2020)[1]	Cumulative Targets					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (Indicator Definition)
			2021	2022	2023	2024	2025				
Capacity of SADC-GMI enhanced to support national and transboundary institutions to improve groundwater-based resilience and socio-economic development	Financial Sustainability Plan up-to-date and under implementation	functioning organization and implementing Strategic and Financial Sustainability Plan (2018-2023)	the Strategic Financial and Sustainability Plan • Review priorities implemented and optimum capacity sustained	the Strategic Financial and Sustainability Plan • Review priorities implemented and optimum capacity sustained	the Strategic Financial and Sustainability Plan • Review priorities implemented and optimum capacity sustained	the Strategic Financial and Sustainability Plan • Review priorities implemented and optimum capacity sustained	the Strategic Financial and Sustainability Plan • Review priorities implemented and optimum capacity sustained	reporting cycle	planning and management		and improvement of SADC-GMI capacity
Intermediate Indicator – Regional and National Structures: Capacity of the SADC Secretariat, River Basin Organisations and Member State National Departments improved to include groundwater management for socio-economic development in their programmes	• Number of National Focal Groups established and operational in the SADC Member States • Cumulative number of initiatives implemented with RBOs in SADC • Cumulative number of initiatives implemented jointly with other institutions in the Member States • Cumulative number of initiatives jointly implemented with international organisations including development partners • Meetings of the sub-committee on hydrogeology	• Five NFGs established and partially operational in eSwatini, Malawi, Mozambique, Namibia and Zimbabwe • X initiatives implemented jointly with RBOs • X initiatives implemented jointly with other institutions in the Member States (e.g. research institutions, universities, NGOs, CBOs) • X initiatives jointly implemented with international organisations including development partners • Sub-committee on Hydrogeology / Steering Committee fully constituted and operational.	• Year-on-year growth in the number of National Focal Groups established and operational • Year-on-ear increase in the number of initiatives implemented with RBOs • Year-on-year increase in the number of joint initiatives with institutions in the Member States • Year-on-year increase in the number of joint initiatives with international organisations including • Meetings of the sub-committee on hydrogeology held (with 90% attendance) as scheduled	• Year-on-year growth in the number of National Focal Groups established and operational • Year-on-ear increase in the number of initiatives implemented with RBOs • Year-on-year increase in the number of joint initiatives with institutions in the Member States • Year-on-year increase in the number of joint initiatives with international organisations including • Meetings of the sub-committee on hydrogeology held (with 90% attendance) as scheduled	• Year-on-year growth in the number of National Focal Groups established and operational • Year-on-ear increase in the number of initiatives implemented with RBOs • Year-on-year increase in the number of joint initiatives with institutions in the Member States • Year-on-year increase in the number of joint initiatives with international organisations including • Meetings of the sub-committee on hydrogeology held (with 90% attendance) as scheduled	• Year-on-year growth in the number of National Focal Groups established and operational • Year-on-ear increase in the number of initiatives implemented with RBOs • Year-on-year increase in the number of joint initiatives with institutions in the Member States • Year-on-year increase in the number of joint initiatives with international organisations including • Meetings of the sub-committee on hydrogeology held (with 90% attendance) as scheduled	Annual	Structured review of status / progress	SADC-GMI, external support if required	Incremental inclusion of GWM provisions national and regional structures
Intermediate Indicator – Technical and Vocational Skills: Technical and Vocational Skills developed among stakeholders at local, national and transboundary levels in the SADC region for effective groundwater-based resilience and socio-economic development	• Cumulative number of people undergoing technical and vocational training programmes organized by SADC-GMI (disaggregated by gender, skillset and level of operation) • Cumulative number of people trained by SADC-GMI still active in the region's GW field	• Capacity needs assessment developed • 65 young Professionals trained • X participants underwent SADC-GMI training workshops (Y male / Z female) • X people trained by SADC-GMI still active in the region's GW field (X male / Y female)	• Year-on-year increase in the cumulative number of people undergoing technical and vocational training (disaggregated by gender, skillset and level of operation). At least 30% of skills development	• Year-on-year increase in the cumulative number of people undergoing technical and vocational training (disaggregated by gender, skillset and level of operation). At least 30% of skills development	• Year-on-year increase in the cumulative number of people undergoing technical and vocational training (disaggregated by gender, skillset and level of operation). At least 30% of skills development	• Year-on-year increase in the cumulative number of people undergoing technical and vocational training (disaggregated by gender, skillset and level of operation). At least 30% of skills development	• Year-on-year increase in the cumulative number of people undergoing technical and vocational training (disaggregated by gender, skillset and level of operation). At least 30% of skills development	Annual	Structured review of capacity building progress	SADC-GMI, external support if required	Demonstrated GW skills development and skills mobilization at local, national and transboundary levels

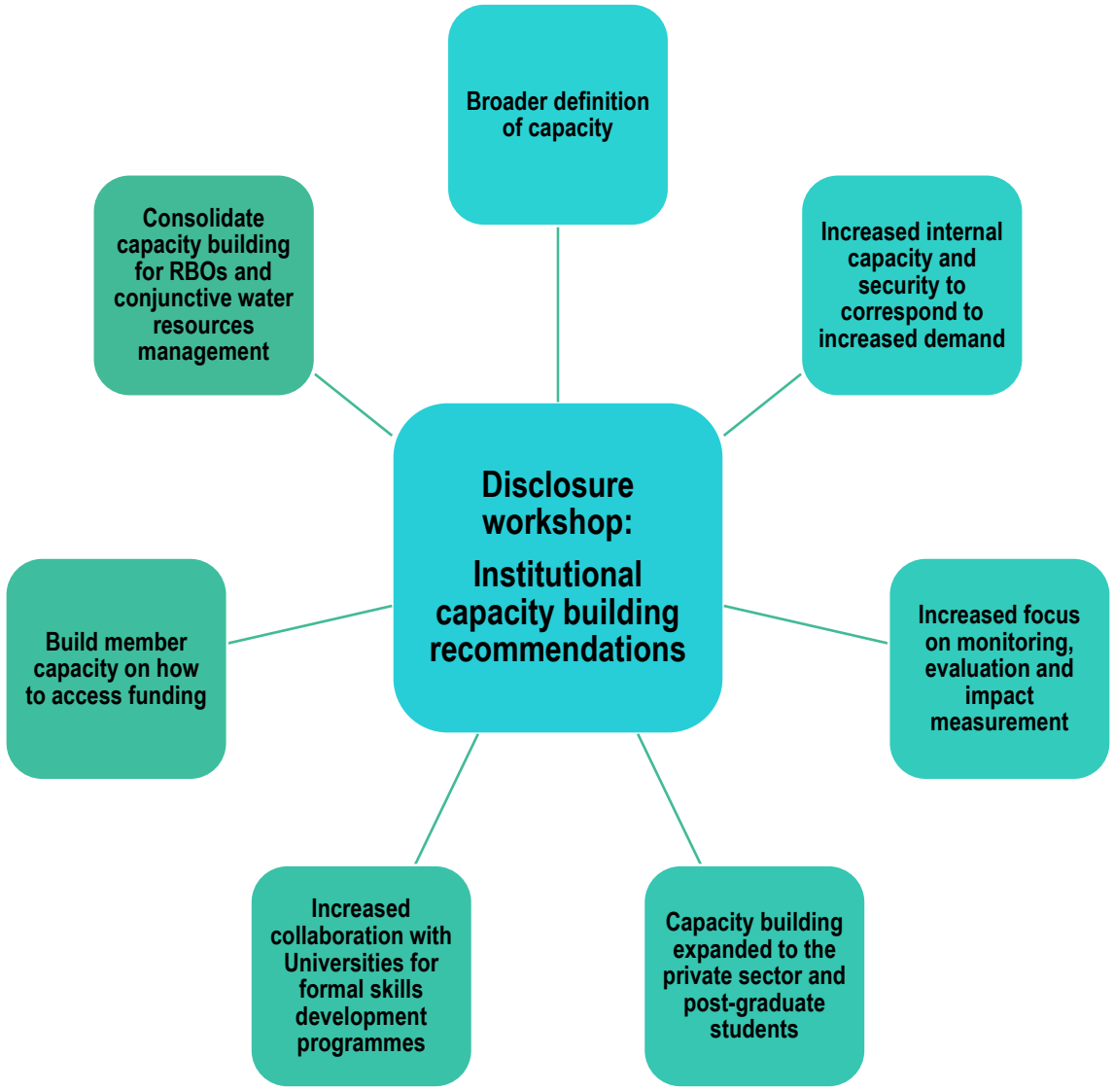
PDO Results Indicators	Unit (s) of Measure	Baseline (2020)[1]	Cumulative Targets					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (Indicator Definition)
			2021	2022	2023	2024	2025				
	(disaggregated by gender, skillset and level of operation)		beneficiaries female • Year-on-year increase in the number of SADC-GMI trainees active in the region's GW field (disaggregated by gender, skillset and level of operation). At least 5% yearly increase in local level practitioners	beneficiaries female • Year-on-year increase in the number of SADC-GMI trainees active in the region's GW field (disaggregated by gender, skillset and level of operation). At least 5% yearly increase in local level practitioners	beneficiaries female • Year-on-year increase in the number of SADC-GMI trainees active in the region's GW field (disaggregated by gender, skillset and level of operation). At least 5% yearly increase in local level practitioners	beneficiaries female • Year-on-year increase in the number of SADC-GMI trainees active in the region's GW field (disaggregated by gender, skillset and level of operation). At least 5% yearly increase in local level practitioners	beneficiaries female • Year-on-year increase in the number of SADC-GMI trainees active in the region's GW field (disaggregated by gender, skillset and level of operation). At least 5% yearly increase in local level practitioners				
Intermediate Results: KRA 2 – Generating and Disseminating Knowledge / Information											
Intermediate Indicator – Expansion of SADC GIP and GLA: SADC Groundwater Portal (SADC-GIP) and SADC Groundwater Literature Archive (SADC-GLA) expanded with new information and data services to support sustainable groundwater management and development at transboundary, national and local levels	• SADC-GIP fully operational to provide time-series data to inform decisions through groundwater related early warning systems • Incremental number of documents uploaded on the SADC-GLA • Incremental number of users visiting the SADC-GIP to access data • Incremental number of users visiting the SADC-GLA to access documents • Incremental number of stakeholder data sets linked to the SADC-GIP	• SADC-GIP established and functional with X maps and Y links but without time-series data • SADC-GLA in place with X documents • Metrics for visitors to both GIP and GLA not recorded • Roadmap for groundwater data management at National Level and River Basin Organisation developed based on Pilot in Malawi and ZAMCOM.	• Annual GIP and GLA improvement plan • SADC-GIP providing sound time-series data • Year-on-year increase in the cumulative number of documents uploaded on SADC-GLA • Year-on-year increase in the number of users visiting the SADC-GIP to access data • Year-on-year increase in the number of users visiting SADC-GLA • Year-on-year cumulative increase in the of stakeholder data sets linked to the SADC-GIP	• Annual GIP and GLA improvement plan • SADC-GIP providing sound time-series data • Year-on-year increase in the cumulative number of documents uploaded on SADC-GLA • Year-on-year increase in the number of users visiting the SADC-GIP to access data • Year-on-year increase in the number of users visiting SADC-GLA • Year-on-year cumulative increase in the of stakeholder data sets linked to the SADC-GIP	• Annual GIP and GLA improvement plan • SADC-GIP providing sound time-series data • Year-on-year increase in the cumulative number of documents uploaded on SADC-GLA • Year-on-year increase in the number of users visiting the SADC-GIP to access data • Year-on-year increase in the number of users visiting SADC-GLA • Year-on-year cumulative increase in the of stakeholder data sets linked to the SADC-GIP	• Annual GIP and GLA improvement plan • SADC-GIP providing sound time-series data • Year-on-year increase in the cumulative number of documents uploaded on SADC-GLA • Year-on-year increase in the number of users visiting the SADC-GIP to access data • Year-on-year increase in the number of users visiting SADC-GLA • Year-on-year cumulative increase in the of stakeholder data sets linked to the SADC-GIP	• Annual GIP and GLA improvement plan • SADC-GIP providing sound time-series data • Year-on-year increase in the cumulative number of documents uploaded on SADC-GLA • Year-on-year increase in the number of users visiting the SADC-GIP to access data • Year-on-year increase in the number of users visiting SADC-GLA • Year-on-year cumulative increase in the of stakeholder data sets linked to the SADC-GIP	Bi-annual	Internal GIP and GLA monitoring	SADC-GMI internal	Demonstrated improvement and expansion of GIP and GWA content, capability and impact
Intermediate Indicator – Sector Specific Knowledge Products: Sector-specific knowledge products and information developed to promote equitable and sustainable socio-economic development in the SADC region	• Cumulative number of Knowledge products produced and distributed / disseminated • Research publications and	• Seventeen knowledge products disseminated from the GMI-PLI project • Twelve national and one regional	• Annual sector needs review • Year-on-year Increase in the cumulative number of knowledge products	• Annual sector needs review • Year-on-year Increase in the cumulative number of knowledge products	• Annual sector needs review • Year-on-year Increase in the cumulative number of knowledge products	• Annual sector needs review • Year-on-year Increase in the cumulative number of knowledge products	• Annual sector needs review • Year-on-year Increase in the cumulative number of knowledge products	Bi-annual	Internal knowledge management monitoring	SADC-GMI internal	Demonstrated demand for and use of sector-specific knowledge products and information

PDO Results Indicators	Unit (s) of Measure	Baseline (2020)[1]	Cumulative Targets					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (Indicator Definition)
			2021	2022	2023	2024	2025				
	presentations emanating from SADC-GMI work	report on the State of Groundwater Collection and Data Management in SADC Member States. • One product from the SADC Data Collection & Management project (SADC-Framework for Groundwater Data Collection and Management)	produced and distributed / disseminated • Year-on-year maintenance of and improvement on baseline research publications and presentations • Publication citations and acknowledgements	produced and distributed / disseminated • Year-on-year maintenance of and improvement on baseline research publications and presentations • Publication citations and acknowledgements	produced and distributed / disseminated • Year-on-year maintenance of and improvement on baseline research publications and presentations • Publication citations and acknowledgements	produced and distributed / disseminated • Year-on-year maintenance of and improvement on baseline research publications and presentations • Publication citations and acknowledgements	produced and distributed / disseminated • Year-on-year maintenance of and improvement on baseline research publications and presentations • Publication citations and acknowledgements				
Intermediate Indicator – Groundwater Research: Research undertaken to advance the role of groundwater in promoting sustainable socio-economic development	• Number of research studies undertaken contributing to critical thematic areas (eg. climate change resilience; WEFE nexus, urban hydrogeology, salt water intrusion, island & coastal aquifers, deep aquifer exploration, economic value of GW, groundwater dependent ecosystems, and transboundary aquifer management)	• Research projects undertaken in TBA management (three), deep aquifer exploration (one), conjunctive surface/GW management (one), regional drought risk vulnerability mapping (one), big data analytics for TBA management (one)	• Annual research programme (including critical theme areas for the year) • Year-on-year increase in the number of research studies • At least 50% of supported research addressing critical theme areas • Year-on-year increase in constructive reviews and feedback	• Annual research programme (including critical theme areas for the year) • Year-on-year increase in the number of research studies • At least 50% of supported research addressing critical theme areas • Year-on-year increase in constructive reviews and feedback	• Annual research programme (including critical theme areas for the year) • Year-on-year increase in the number of research studies • At least 50% of supported research addressing critical theme areas • Year-on-year increase in constructive reviews and feedback	• Annual research programme (including critical theme areas for the year) • Year-on-year increase in the number of research studies • At least 50% of supported research addressing critical theme areas • Year-on-year increase in constructive reviews and feedback	• Annual research programme (including critical theme areas for the year) • Year-on-year increase in the number of research studies • At least 50% of supported research addressing critical theme areas • Year-on-year increase in constructive reviews and feedback	Bi-annual	Internal research mobilization monitoring	SADC-GMI internal	Demonstrated implementation of a focused GW research programme
Intermediate Indicator – Knowledge Management Facilitation: Knowledge management facilitated through data and information sharing events, platforms and networks	• Number of knowledge management events organised • Number of online / electronic information sharing platforms / initiatives • Number of participants attending SADC-GMI knowledge management events • Number of participants on SADC-GMI's online / electronic information sharing platforms/initiatives	• Annual SADC GW Conference (2018, 2019 & 2020) • X registered users on the Community of Practice in place for exchange of information and networking of groundwater professionals • Current average rating of level of satisfaction (excellent +) for SADC-GMI events is 76% • "The Well" Magazine	• Annual event and networking programme • Year-on-year maintenance or increase in the number of events • Year-on-year maintenance or increase in the number of online initiatives • Year-on-year increase in the number of SADC-GMI knowledge management	• Annual event and networking programme • Year-on-year maintenance or increase in the number of events • Year-on-year maintenance or increase in the number of online initiatives • Year-on-year increase in the number of SADC-GMI knowledge management	• Annual event and networking programme • Year-on-year maintenance or increase in the number of events • Year-on-year maintenance or increase in the number of online initiatives • Year-on-year increase in the number of SADC-GMI knowledge management	• Annual event and networking programme • Year-on-year maintenance or increase in the number of events • Year-on-year maintenance or increase in the number of online initiatives • Year-on-year increase in the number of SADC-GMI knowledge management	• Annual event and networking programme • Year-on-year maintenance or increase in the number of events • Year-on-year maintenance or increase in the number of online initiatives • Year-on-year increase in the number of SADC-GMI knowledge management	Bi-annual	Internal facilitation and events monitoring	SADC-GMI internal	Demonstrated implementation of a focused programme of information sharing events and platforms

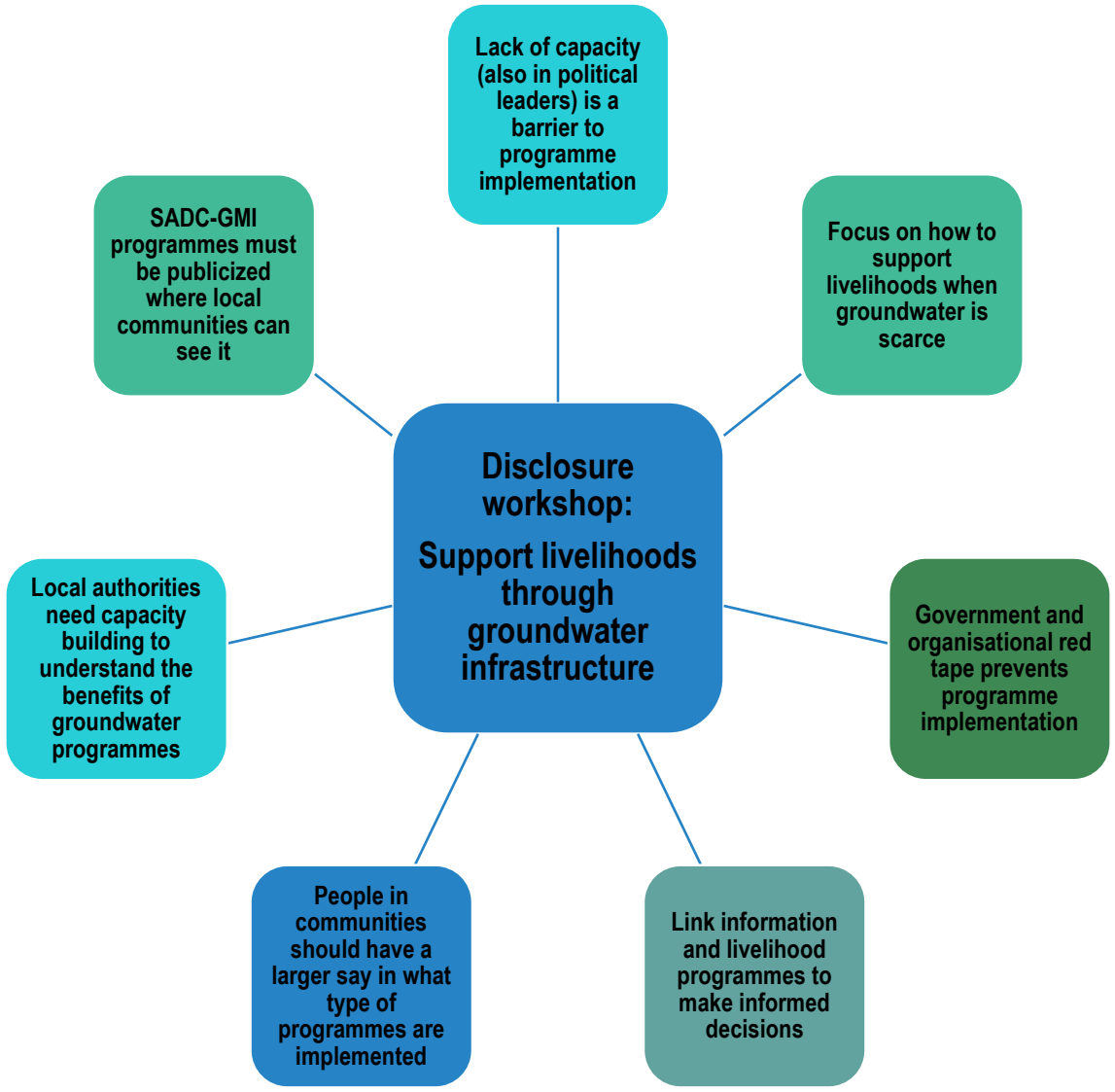
PDO Results Indicators	Unit (s) of Measure	Baseline (2020)[1]	Cumulative Targets					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (Indicator Definition)
			2021	2022	2023	2024	2025				
	• Percentage of participants to SADC-GMI events with a level of satisfaction of "Excellent = 80%" or better • Number of groundwater magazines published (e.g. "The well"). • SADC- GMI active on social media platforms	publicized annually. • X people following SADC-GMI on social media	event participants • Year-on-year increase in the number of participants in SADC-GMI's online initiatives • Ratings of SADC-GMI held at 80% excellent or better • Groundwater magazine publication rate maintained or improved. • Year-on-year cumulative increase in SADC - GMI social media followers	event participants • Year-on-year increase in the number of participants in SADC-GMI's online initiatives • Ratings of SADC-GMI held at 80% excellent or better • Groundwater magazine publication rate maintained or improved. • Year-on-year cumulative increase in SADC - GMI social media followers	event participants • Year-on-year increase in the number of participants in SADC-GMI's online initiatives • Ratings of SADC-GMI held at 80% excellent or better • Groundwater magazine publication rate maintained or improved. • Year-on-year cumulative increase in SADC - GMI social media followers	event participants • Year-on-year increase in the number of participants in SADC-GMI's online initiatives • Ratings of SADC-GMI held at 80% excellent or better • Groundwater magazine publication rate maintained or improved. • Year-on-year cumulative increase in SADC - GMI social media followers	event participants • Year-on-year increase in the number of participants in SADC-GMI's online initiatives • Ratings of SADC-GMI held at 80% excellent or better • Groundwater magazine publication rate maintained or improved. • Year-on-year cumulative increase in SADC - GMI social media followers				
Intermediate Results: KRA 3 – Developing Groundwater Management and Infrastructure for Resilient Livelihoods											
Intermediate Indicator – Innovative and Compliant Infrastructure Projects: Innovative and environmental and social safeguard compliant infrastructure projects piloted and upscaled in SADC Member States to promote sustainable groundwater management practices for socio-economic development	• No. of complete ESS and GESI compliant GW infrastructure projects supporting groundwater development and management for community livelihoods, resilience and socio-economic development • Number of gender disaggregated direct beneficiaries of the projects	• Updated sub-Grant Manual in place • ESS and GESI protocols and templates in place • Fourteen projects completed in 10 SADC Member States • X direct beneficiaries (Y male and Z female)	• Subgrantee manuals and protocols reviewed and updated. • Annual infrastructure project programme (at least 30% livelihoods oriented and 20% focused on livelihoods among women) • Lessons learned and carried forward	• Annual infrastructure project programme (at least 30% livelihoods oriented and 20% focused on livelihoods among women) • Lessons learned and carried forward	• Subgrantee manuals and protocols reviewed and updated. • Annual infrastructure project programme (at least 30% livelihoods oriented and 20% focused on livelihoods among women) • Lessons learned and carried forward	• Annual infrastructure project programme (at least 30% livelihoods oriented and 20% focused on livelihoods among women) • Lessons learned and carried forward	• Subgrantee manuals and protocols reviewed and updated. • Annual infrastructure project programme (at least 30% livelihoods oriented and 20% focused on livelihoods among women) • Lessons learned and carried forward	Bi-annual	Structured review of infrastructure projects	SADC-GMI, external support if required	Demonstrated implementation and progressive lesson-based improvement of a structured infrastructure programme
Intermediate Indicator – Community Capacity for Effective Groundwater Use Capacity of communities in SADC Member States enhanced to improve resilience and to promote socio-economic development	• Number of beneficiary communities and community level GW programmes implemented in the Member States as a result of the capacity building programme	• Four communities empowered with livelihood projects in Botswana (Gobajango & Tsetsebjwe) and Zimbabwe (Dite and Whunga). • Ongoing work to capacitate farmers on agricultural water management in	• Year on year growth in the number of communities and Member States benefitting from capacity building. • Year on year increase in the number of female-led community organisations	• Year on year growth in the number of communities and Member States benefitting from capacity building. • Year on year increase in the number of female-led community organisations	• Year on year growth in the number of communities and Member States benefitting from capacity building. • Year on year increase in the number of female-led community organisations	• Year on year growth in the number of communities and Member States benefitting from capacity building. • Year on year increase in the number of female-led community organisations	• Year on year growth in the number of communities and Member States benefitting from capacity building. • Year on year increase in the number of female-led community organisations	Annual	Collection of case studies and lessons. Linked to review process above	SADC-GMI, external support if required	Demonstrated examples of community involvement in GW management

PDO Results Indicators	Unit (s) of Measure	Baseline (2020)[1]	Cumulative Targets					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (Indicator Definition)
			2021	2022	2023	2024	2025				
		the Tuli-Karoo TBA	who benefit from capacity building. • Lessons learned and carried forward	who benefit from capacity building. • Lessons learned and carried forward	who benefit from capacity building. • Lessons learned and carried forward	who benefit from capacity building. • Lessons learned and carried forward	who benefit from capacity building. • Lessons learned and carried forward				
Intermediate Indicator – Groundwater Monitoring Networks Groundwater monitoring networks in national and transboundary aquifers designed and installed to support sustainable use of groundwater for socio-economic development	• Cumulative establishment, expansion and operationalisation of SADC regional groundwater monitoring networks • Networks reporting real time / near real data to national / SADC-GMI data storage and management platforms.	• Five localised GW monitoring networks established in Eswatini, Lesotho, Malawi, Tanzania and Zimbabwe • Ongoing work to establish integrated monitoring network in the Tuli-Karoo	• Year-on-year improvement of indicators (number of monitoring networks in planning, set-up or use) • Examples of monitoring value-add and lessons shared • Demonstrated progress in piloting a real time / near real time data management and storage platform with practical use such as advance notification.	• Year-on-year improvement of indicators (number of monitoring networks in planning, set-up or use) • Examples of monitoring value-add, and lessons shared • Demonstrated progress in piloting a real time / near real time data management and storage platform with practical use such as advance notification.	• Year-on-year improvement of indicators (monitoring networks in planning, set-up or use) • Examples of monitoring value-add and lessons shared • Demonstrated progress in piloting a real time / near real time data management and storage platform with practical use such as advance notification	• Year-on-year improvement of indicators (monitoring networks in planning, set-up or use) • Examples of monitoring value-add and lessons shared • Demonstrated progress in piloting a real time / near real time data management and storage platform with practical use such as advance notification	• Year-on-year improvement of indicators (monitoring networks in planning, set-up or use) • Examples of monitoring value-add and lessons shared • Indicated the degree of scalability of data management and storage platform with practical use and recommendations for upscaling	Annual	Structured review of monitoring initiatives. Collection of value-adding case studies	SADC-GMI, external support if required	Demonstrated commitment to installing GW monitoring and tangible monitoring outcomes

Appendix D: Key recommendations from the workshop


Broader definition of capacity
Consolidate capacity building for RBOs and conjunctive water resources management
Increased internal capacity and security to correspond to increased demand
Disclosure workshop:
Institutional capacity building recommendations
Build member capacity on how to access funding
Increased focus on monitoring, evaluation and impact measurement
Increased collaboration with Universities for formal skills development programmes
Capacity building expanded to the private sector and post-graduate students

Plan for the impact of urbanization on ground water
Increased focus on issues in shared aquifers and conjunctive management
Attention to replicating programs at scale and provide more input into donor priorities
Disclosure workshop:
Generate and disseminate information
Data gaps and data quality need urgent attention
Increased focus on linkages between poverty alleviation, agriculture and groundwater
Facilitate better data collection, evidence-based knowledge about groundwater
Limit political influence and lobby for policy regarding investment


Disclosure workshop:
Support livelihoods through groundwater infrastructure
Lack of capacity (also in political leaders) is a barrier to programme implementation
Focus on how to support livelihoods when groundwater is scarce
Government and organisational red tape prevents programme implementation
Link information and livelihood programmes to make informed decisions
People in communities should have a larger say in what type of programmes are implemented
Local authorities need capacity building to understand the benefits of groundwater programmes
SADC-GMI programmes must be publicized where local communities can see it

Appendix E: SADC-GMI Indicative Logical Framework

Narrative Summary	Objectively Verifiable Indicators[1]	Means of Verification	Assumptions
Programme Goal: **SADC**[2] • To promote sustainable and equitable economic growth and socio-economic development through efficient productive systems, deeper cooperation and integration, good governance and durable peace and security			
Project Purpose (Project Development Objective): • To strengthen capacity for sustainable management of groundwater to build resilience in the SADC Region	• Growing groundwater priority demonstrated at all levels	• Media • Institutional reporting	• SADC-GMI sustainably funded
Outputs (Key Result Areas) • Capacity of national and regional ***institutions*** built, and skills developed for groundwater management to improve resilience and support socio-economic development • Groundwater knowledge generated through analytics and through data and ***information*** sharing • Resilient livelihoods supported through sustainable groundwater management and innovative ***infrastructure*** for socio-economic development	***Output Indicators*** • Increasing priority given to groundwater management, with accompanying capacity • Growing use of groundwater knowledge • Evidence of climate shock response and resilience based on groundwater	• Media • Institutional reporting • Information portal usage monitoring • Publications and reports citing SADC-GMI information	• SADC-GMI sustainably funded • SADC-GMI capacity purposefully enhanced and sustained • Continued and effective participation of transboundary and national institutions
Inputs / Activities (Key Result Sub-Areas) ***Institutions*** • Activities to enhance SADC-GMI capacity to support national and transboundary institutions (to be defined in detail) • Activities to improve the groundwater management capacity of the SADC Secretariat, River Basin Organisations and Member State National Departments (to be defined) • Activities to develop technical and vocational skills among stakeholders at local, national and transboundary levels in the SADC region (to be defined)	***Institutions*** • Purposeful initiatives and activities to enhance capacity • Evidence of improved capacity at these levels (e.g. dedicated management and staff) • Trainees entering groundwater management institutions	• Institutional reporting • SADC-GMI internal monitoring and reporting • SADC-GMI internal monitoring and reporting	• Effective channels and means of cooperation between SADC-GMI and partner / beneficiary institutions, organisations and groups
Information • Activities to expand the SADC Groundwater Portal (SADC-GIP) and the SADC Groundwater Literature Archive (SADC-GLA) (to be defined) • Activities to develop sector-specific knowledge products and information (to be defined) • Activities to promote groundwater research (to be defined) • Activities to facilitate knowledge sharing (to be defined)	***Information*** • Growing usage of the Portal and the Archive • Demonstrated use of sector-specific products • Growing body of research • Knowledge sharing events	• Media • SADC-GMI internal monitoring and reporting • Information portal usage monitoring • Institutional reporting	• Sector awareness of information portals and resources • Knowledge resources seen to have value by a broad spectrum of users
Infrastructure • Activities to implement and upscale infrastructure projects in SADC Member States (to be defined) • Activities to promote community capacity in SADC Member States (to be defined) • Activities to promote groundwater monitoring networks in national and transboundary aquifers (to be defined)	***Infrastructure*** • Examples of successful piloting and upscaling • Community participation in local groundwater management • Monitoring implemented in national and transboundary aquifers	• Media • SADC-GMI internal monitoring and reporting • Information portal usage monitoring • Institutional reporting	• National-level capacity and willingness to build on pilot lessons and examples, and to support community capacity building

[1] Generalised indicators presented as examples. Detailed indicators to be developed when project activities have been fully defined
[2] Captured in the SADC Mission

Appendix F1: Funding model considerations

Outline of a funding model

- State and quantify the value proposition to the beneficiary:
  - Access to water
  - Access to sanitation
  - Agricultura an economic activity
  - Lives reached
- Provide tangible and lasting solution to a major problem in a foreseeable time frame created.
- Articulate how SADC GMI will use large-scale funding to achieve goals.
- Who SADC GMI goals align with individuals' corporations' or foundations interested in an issue or solution.
- Clearly show that SADC GMI is a natural match with one or more large, pre-existing government, donor or foundation's programs.
- Demonstrate that SADC GMI will do a better job than our "competitors".
- Display willingness to take the time to secure contract renewals on a regular basis (reporting, due diligence, alignment).
- Provide an innovative approach that surpasses the status quo (in impact and cost) and is compelling enough to attract government funders, which tend to gravitate toward traditional solutions.
- Provide funders with evidence that programs work.
- Willingness and ability to cultivate strong relationships with decision and policy makers who will advocate change.
- That there are sufficient pressures to necessitate change – environmental, economic and social, quality of life etc.
- Ability to form partnerships and working relationship with strategic partners and academic organisations and governments.
- Established local footprint and knowledge base that will improve implementation and successful and satisfactory outcomes.

Appendix F2: Ten step budget and planning process

Implementation of a 10 step project budget and planning checklist:

1. Determine timeline

    - Set target date for board approval
    - Allow time for each step and for review and discussion

2. Agree on goals

    - Prioritise program delivery goals
    - Set organisational financial goals
    - Clarify annual goals from strategic plan

3. Understand current financial status

    - Review current year income and expense compared to budget
    - Forecast to the end of the year
    - Analyse and understand any variances

4. Agree on budget approach

    - Assign roles and responsibilities
    - Identify resource and capacity gaps
    - Agree on authority to make decisions
    - Agree on how much uncertainty can be included (how many unknowns)

5. Develop draft expense budget

    - Determine costs (expenses) to reach program goals – direct project expenses
    - Determine costs to reach organisational and strategic goals - overheads

6. Develop draft income budget

    - Project income based on current fundraising and revenue activities
    - Project new income based on new activities

7. Review draft budget

    - Verify that the draft meets program and organisational goals
    - Review and discuss all assumptions
    - Make adjustments, based on goals and capacity, to match income and expenses
    - Review final draft for all goals and objectives

8. Approve budget

    - Present to any committees as needed
    - Present to the board for approval

9. Document budget decisions

    - Create a consolidated budget spreadsheet and file
    - Write down all assumptions

10. Implement budget

    - Assign management responsibilities
    - Incorporate into accounting system
    - Monthly/Annual/Project reporting

- Monitor and respond to changes as needed

Appendix F3: Scope of work for financial service provider

Financial/Professional Services and Support	
Service	**Detail/Requirements**
Internal auditing function	• Standard internal auditing function on all financial transaction per industry norm • Special focus on correct implementation and execution of financial policies and procedures • Review tender and adjudication processes • Review of all procurement transaction as per value matrix set in financial process document and/or funder/grant requirements • Monthly feedback report with corrective actions needed and process and policy improvement • Feedback on corrective actions taken and improvements for board input and review • Assist with capacity building if gaps identified to support staff development
Monthly/annual statutory reports, payments and submission and general support provided	• Reconciliation of all accounts • 3rd signatory on all approval and release of all payments • Financial software and system general support • VAT • Company Taxation • Payroll • All other statutory reporting and submissions • Appointed public officer • International bank transfers • Preparation of draft financial statements • General support with external audit
Other ad-hoc	• Specialist budgeting and financial reporting preparation • Assistance with funding/grant applications • Assistance with design and implementation of project/grant specific financial and reporting requirements • Assistance with the management and accounting of extraordinary transactions
Estimate: monthly/annual total hours of support needed	• Internal Auditing: 40 hours per month • Monthly financial and statutory routines: 10 hours per month • Annual external audit support and financial statements: 60 hours per annum • Ad Hoc financial services and support: 60 hours per annum

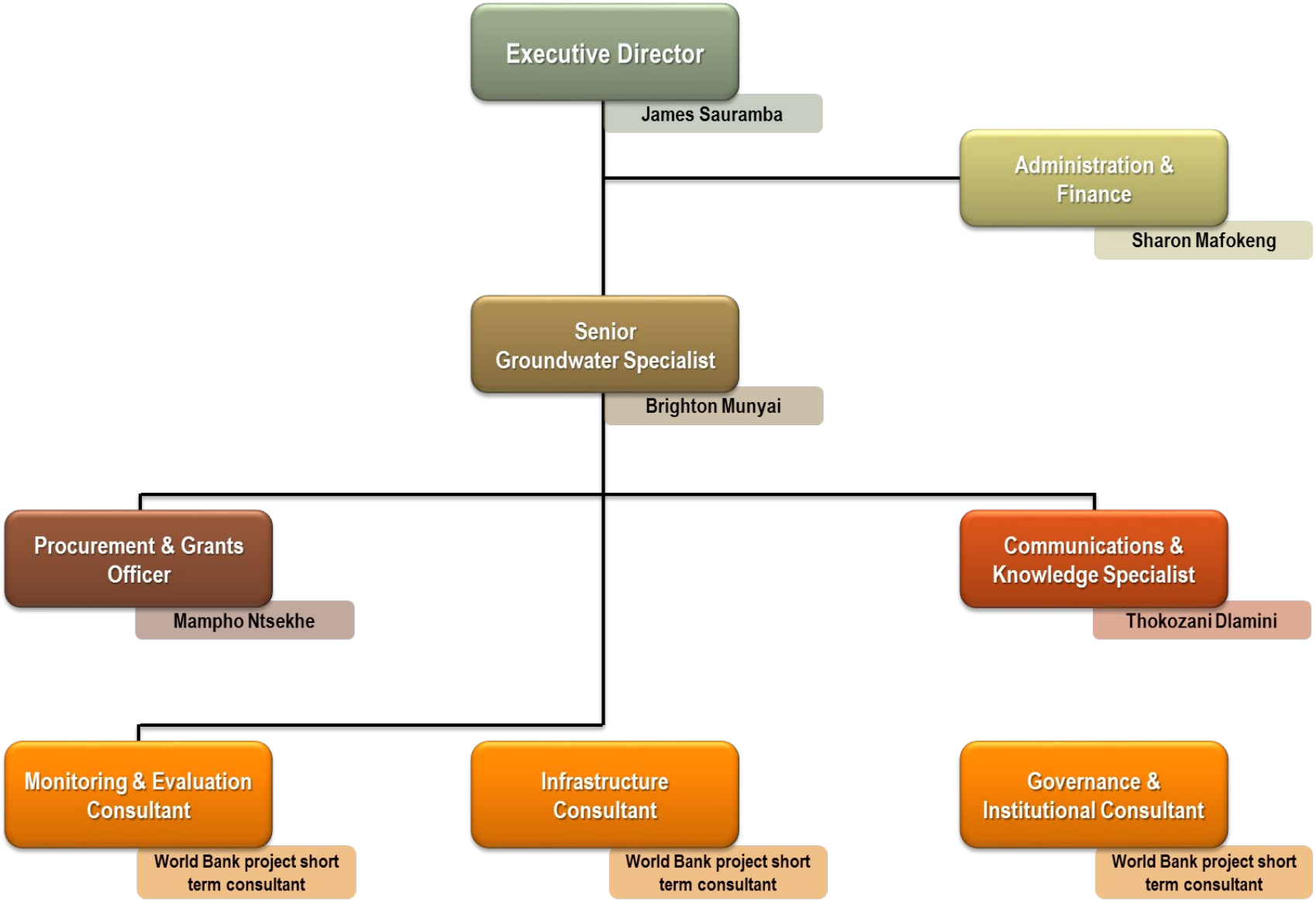
Appendix G1: BoD and staff compliment

SADC-GMI Board of Directors and staff compliment

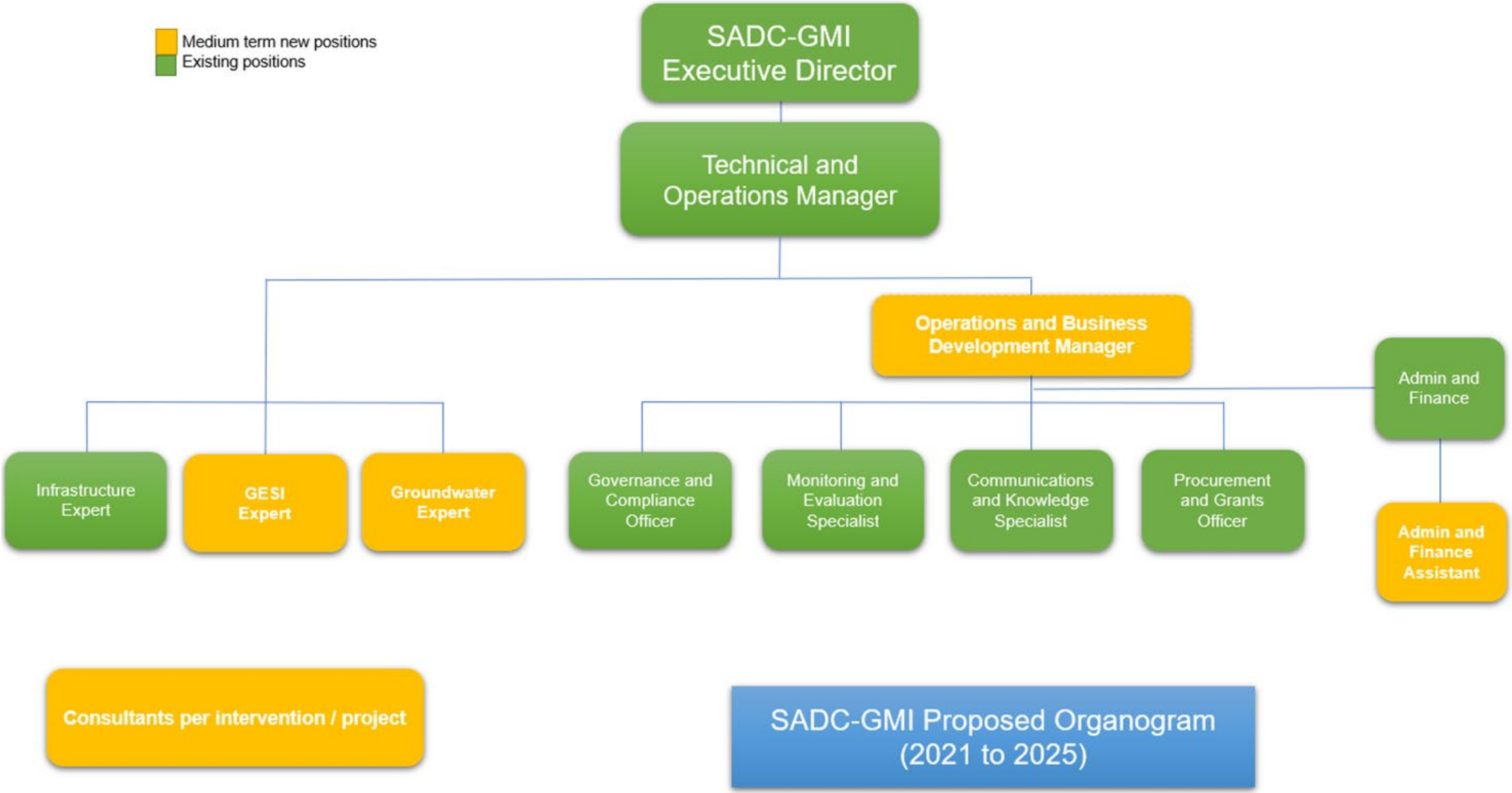
Board of Directors	Mr James Sauramba: SADC-GMI Executive Director – South Africa
	Dr Patrice Kandolo Kabeya: SADC Secretariat – Botswana (Board Chairperson)
	Ms Ana Isabel Fotine: Mponda Ministério de Obras Públicas Habitação e Recursos Hídricos, (Departamento dos Rios Internacionais) - Mozambique
	Mr Eelco Lukas: Institute for Groundwater Studies (UFS) – South Africa
	Ms Maria Amakali: Ministry of Agriculture, Water and Forestry – Namibia
	Dr George V. Lugomela: Ministry of Water – Tanzania
	Ms Zandile Kabini: Independent Non- Executive Director - Finance
	Prof. John Mubangizi - University of the Free State
	Mr Michael Marler: Independent Non-Executive Director - Business Development
	Mrs. Perle Du Plessis: SADC-GMI Public Officer
Permanent Staff	Mr James Sauramba: SADC-GMI Executive Director
	Mr Brighton Munyai: Senior Groundwater Specialist
	Ms Mampho Ntsekhe: Grants and Procurement Officer
	Mr Thokozani Dlamini: Communications and Knowledge Management Specialist
	Ms Sharon Mofokeng: Admin and Finance Officer
Consultants	Mr Micah Majiwa: Governance & Institutional Consultant (based in Zimbabwe)
	Mr Kasonde Mulenga: Infrastructure Consultant (based in Port Elizabeth)
	Mr James Manda: Monitoring & Evaluation Consultant (based in Malawi)

Appendix G2: Current Organogram

Current SADC-GMI Organogram



Appendix G3: Scope of Work and Organogram


Medium term new positions
Existing positions
SADC-GMI Executive Director
Technical and Operations Manager
Operations and Business Development Manager
Admin and Finance
Infrastructure Expert
GESI Expert
Groundwater Expert
Governance and Compliance Officer
Monitoring and Evaluation Specialist
Communications and Knowledge Specialist
Procurement and Grants Officer
Admin and Finance Assistant
Consultants per intervention / project
SADC-GMI Proposed Organogram (2021 to 2025)

Appendix H: NPC, NPO and for-profit company

Comparison between NPO, NPC and for profit organisation

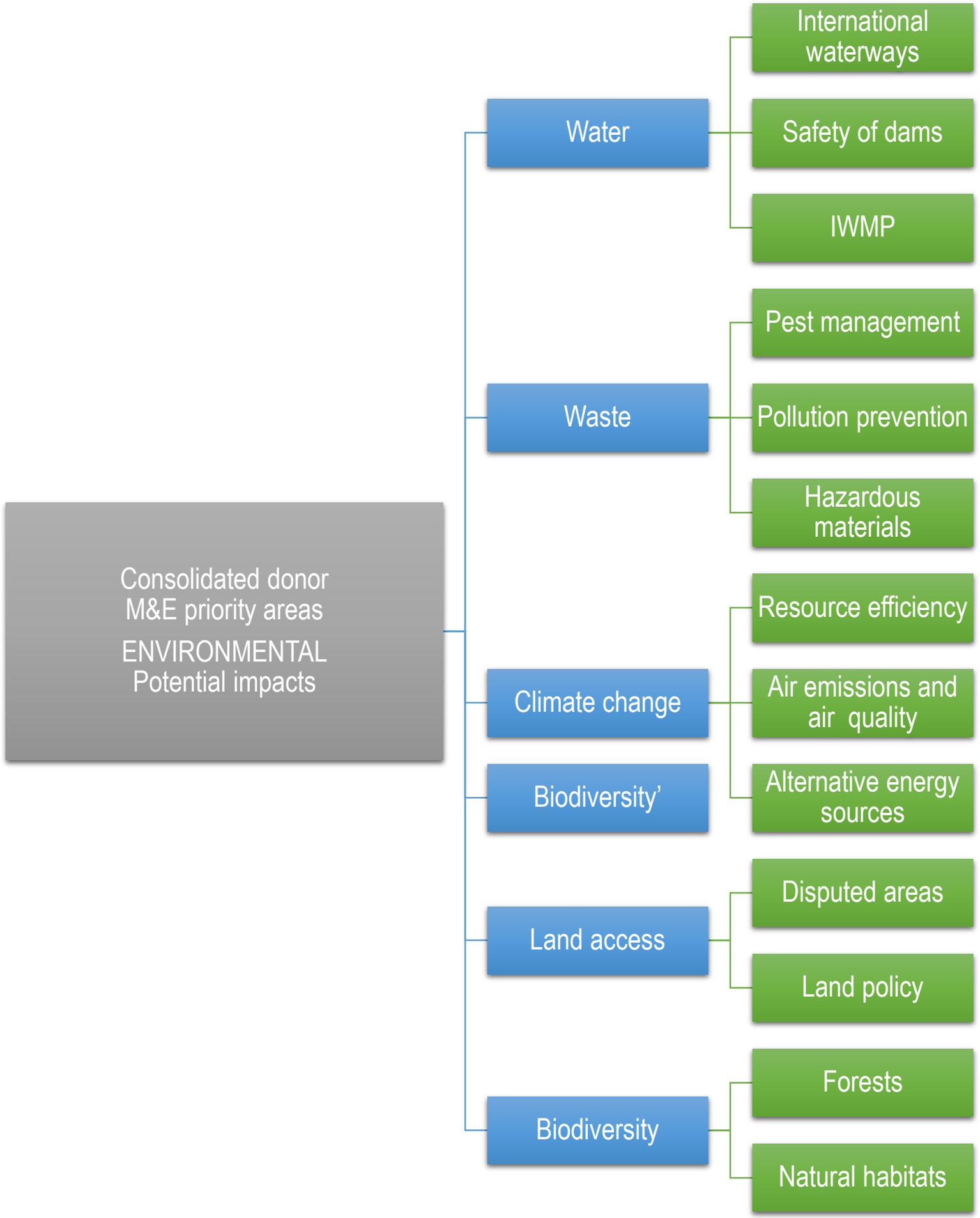
Non-profit company	For-profit company	Non-profit Organisation
Is a legal entity	Is a legal entity	Can be a legal entity or not
Name ends with NPC	Name ends with PTY	NA (NPC/Trust/VA)
Regulated by Companies act no. 71 of 2008	Regulated by Companies act no. 71 of 2008	Regulated by Non-profit Organisations Act 71 of 1997
Provide some public service or have some public purpose that goes beyond serving the personal interests of the members of the NPO (such as the promotion of social welfare, economic development, religion, charity, education or research).	Operate for the purpose of making profits.	Provide some public service or have some public purpose (such as the promotion of social welfare, economic development, religion, charity, education or research).
May make a profit but may not distribute their property or profits to their members. They use any profits they make to further their public interest objectives.	Distribute profits to their owners or members.	May make a profit but may not distribute their property or profits to their members. They use any profits they make to further their public interest objectives.
Frequently do not generate enough income to cover all their expenses, so they fundraise from the public or donors.	Frequently borrow money, at a specified interest rate, if they cannot self-finance all their capital and operating costs. They calculate that they will be able to pay back the loan plus interest from the profits they intend to make.	Frequently do not generate enough income to cover all their expenses, so they fundraise from the public or donors.
On dissolution, any surplus assets, after payment of all debts, are given to an NPO with similar objectives. Assets are not distributed to the members.	On dissolution, after payment of all debts, distribute any surplus assets to the owners or members.	On dissolution, any surplus assets, after payment of all debts, are given to an NPO with similar objectives. Assets are not distributed to the members.

Appendix I: High Level M&E Framework

Consolidated donor M&E priority areas

SOCIAL

- Potential Impacts
  - Resettlement
  - Health and safety
  - Cultural heritage
  - Indigenous people
  - Gender equality and social inclusion
  - Human rights
- Stakeholder engagement and informed consent
- Grievance procedure
- Labour and working conditions
- Potential Benefits
  - Skills development
  - Local procurement
  - Socio-economic development


Consolidated donor M&E priority areas
ENVIRONMENTAL Potential impacts
Water
International waterways
Safety of dams
IWMP
Waste
Pest management
Pollution prevention
Hazardous materials
Climate change
Resource efficiency
Air emissions and air quality
Alternative energy sources
Biodiversity'
Land access
Disputed areas
Land policy
Biodiversity
Forests
Natural habitats