



ADAPTATION FUND

**REQUEST FOR PROJECT/PROGRAMME
FUNDING FROM THE ADAPTATION FUND**

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
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PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Category:	Regular
Country/ies:	Ramotswa Aquifer: Botswana and South Africa Limpopo Basin Aquifer: Mozambique, South Africa, Zimbabwe Sand and Gravel Aquifer: Malawi and Zambia Tuli Karoo Aquifer: Botswana, South Africa and Zimbabwe
Title of Project/Programme:	Enhancing Water and Food Security through Sustainable Groundwater Development in the SADC Region
Type of Implementing Entity:	Multilateral implementing entity
Implementing Entity:	International Fund for Agricultural Development (IFAD)
Executing Entity/ies:	SADC Groundwater Management Institute
Amount of Financing Requested:	\$13 932 000 (in U.S Dollars Equivalent)

Project / Programme Background and Context:

Sub Saharan Africa makes little use of its groundwater resources, which contributes only 1% of total renewable water resource withdrawals for agriculture. Projected and continuing changes to the amount, intensity and predictability of rainfall in much of Southern Africa due to climate change will lead to changes in the way the region views its groundwater resources. Increasing water scarcity will be particularly challenging for smallholder farmers who produce up to 90% of Africa's food. Comprehensive adaptation actions are required to ensure water security for Africa's most vulnerable smallholder farmers in the face of climate change.



Currently, only 6% of the total cultivated area in Africa is irrigated. Across the region the irrigation potential from groundwater is grossly underutilised. It has been estimated that irrigation could boost agricultural productivity by 50%, bringing significant resilience to rural livelihoods. Moreover, population growth and economic development will increase the demand for water across Sub-Saharan Africa, currently at around 50 litres per person, compared to 10 times that amount in the USA¹.

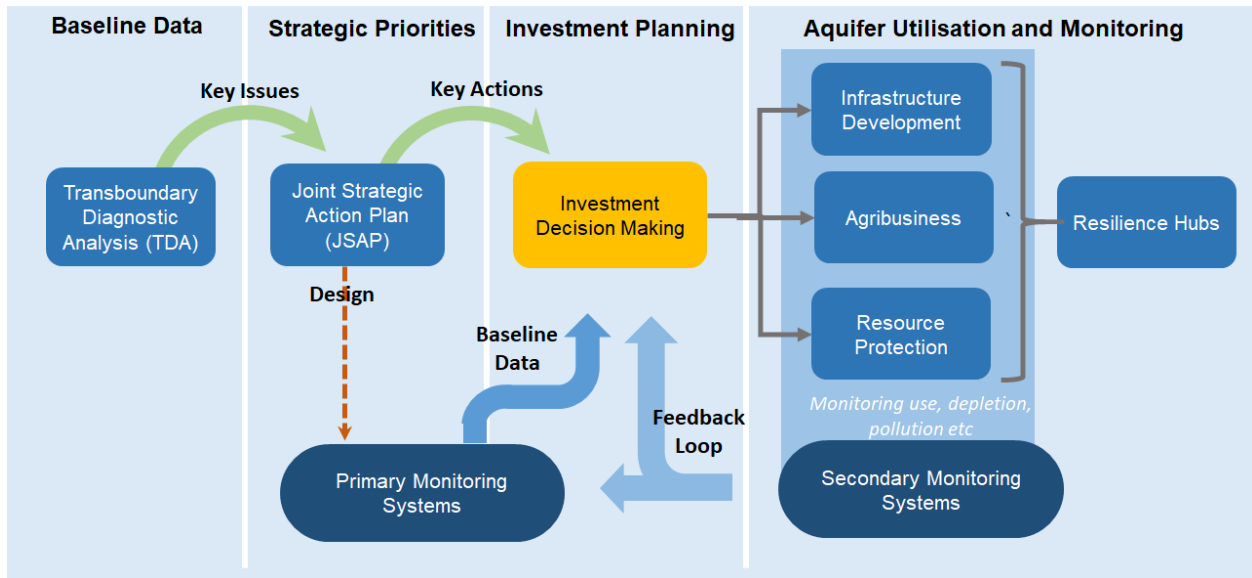
¹ <https://www.un.org/waterforlifedecade/africa.shtml>

The challenges of a dynamic and declining water availability situation under future climate projections will lead to greater pressure to exploit unrealised and little-known groundwater resources, particularly for rural smallholder farmers who will be under pressure from competing water users such as commercial agriculture, urban development and energy production (the Nexus challenge).

The existence of over 30 Transboundary Aquifers (TBA) in Southern Africa present both a climate change adaptation opportunity and an institutional and management challenge. Whilst holding a significant proportion of the region's water resources, with built in natural resilience against increasing temperatures, (groundwater is estimated to be 35% of the total water available in SADC (7,199m³)) there are no established transboundary mechanisms to govern, monitor and manage their sustainable utilisation. River Basin Organisations represent emerging good practice for transboundary surface water governance. Groundwater will require similar transboundary cooperation, agreement and management arrangements for the region to be able to utilise the shared resources as a climate change adaptation response in a sustainable manner. It will be ultimately self-defeating if one country implements a sustainable groundwater use and recharge policy in a shared aquifer whilst another abstracts with little regard to the future. The SADC Groundwater Management Institute (SADC-GMI) will execute this project to address the challenges described above. It is projected that 1,361,995 beneficiaries living in TBA areas would become more climate resilient and enjoy improved water, food and livelihood security from the sustainable, cooperative and equitable use of transboundary groundwater resources. The sustainable use of the water resources will also contribute to reducing poverty levels in these areas, which are high.

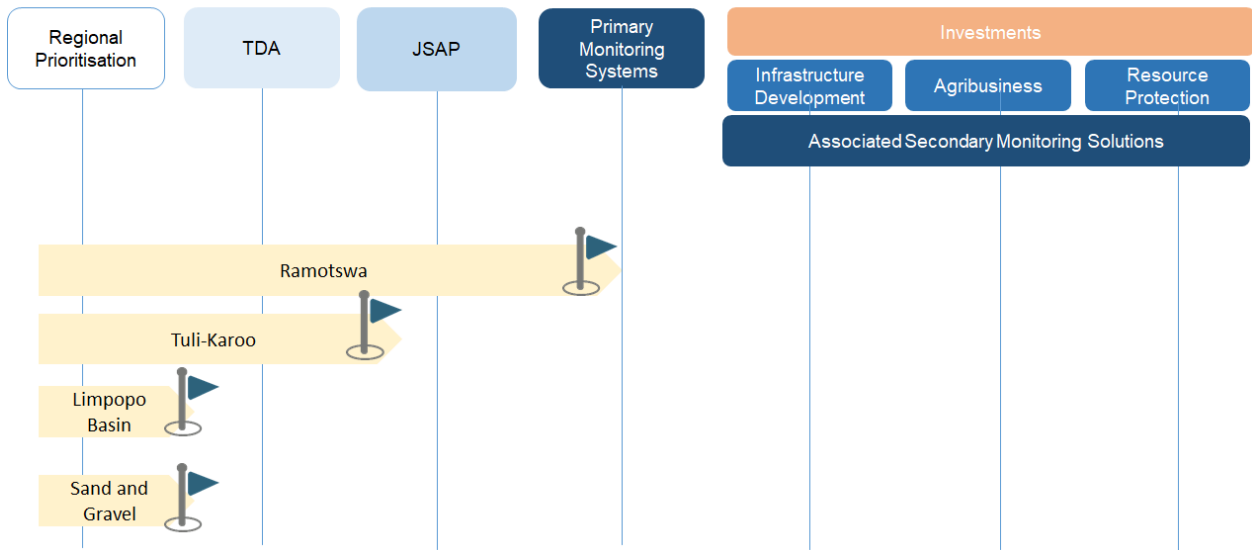
The GMI approach to aquifer development and governance in Southern Africa is a four stage process, as shown in the figure below. The process develops the baseline data and determines strategic priorities between the countries who share the transboundary aquifer, which enables investment decisions to be made and aquifer utilisation through infrastructure development and solutions for agriculture. The types of infrastructure include monitoring boreholes, production boreholes, storage tanks, distribution pipelines, irrigation, treatment facilities and domestic distribution and connections for potable supply. These enable the development of resilience hubs, communities with secured climate resilient water supply that can be used for domestic and agricultural purposes, to build resilient livelihoods. A monitoring system is a final stage, which forms a feedback loop to inform both the future development and investments, and provides real time data to ensure sustainable extraction in the face of climate change and variability.

Aquifer Development Phases



Four transboundary aquifers in the SADC region have been prioritised in this proposal. These are the Tuli Karoo, Ramotswa, Sand and Gravel and the Limpopo Basin Aquifers. More information is provided on the reason for selection and the characteristics of the aquifers in Part II. The aquifers are in various stages of development, as illustrated in the figure below.

Status of Aquifer Development



Project / Programme Objectives:

Impact Goal: To provide concrete adaptation measures to increasingly variable and scarce water resources by promoting the sustainable use of unexplored transboundary groundwater

resources to increase water availability, agricultural productivity, food security and build climate resilient livelihoods in Southern Africa.

Programme Objectives:

1. To increase technical knowledge and understanding of transboundary groundwater resources both now and under future climate scenarios to inform policy development and investment decision making at national and regional level in the SADC Member States
2. To develop strong and mutually agreed governance and cooperation frameworks, strategies and policies for sustainable use, management and protection of shared groundwater resources by SADC Member States
3. To develop information systems that provide robust, real time data that can be used for investment decisions, for domestic, agricultural and resource protection / payment for ecosystem services purposes for equitable access in a changing climate
4. To develop equitable, fair and climate resilient access to groundwater resources for smallholder farmers and agribusiness to increase agricultural productivity, increase income and support resilient livelihoods in local Resilience Hubs

Project / Programme Components and Financing:

Project/Programme Sub-Components	Expected Outcomes	Expected Outputs	Countries	Amount (US\$)
1. Transboundary Diagnostic Analyses (TDAs) for Groundwater Resources	Policy makers have robust, scientific and reliable data to enable decision making on transboundary groundwater management	Two transboundary Aquifers Diagnostics completed <ul style="list-style-type: none"> - Determination of the status of the water resources and its uses in the system, currently and under future climate scenarios - Output will include aquifer type and properties, hydrological properties, groundwater and surface water flows and the interaction between them, levels of flows, water quality, recharge rates, impact of climate change, environmental and ecological properties and dependencies, land use, and socio-economic characteristics of the supported population and economies. - Determination of the baseline sustainable abstraction rate under future climate projections to sustain agricultural livelihoods in the study area. 	Limpopo Basin Aquifer: Mozambique, South Africa, Zimbabwe Sand and Gravel Aquifer: Malawi and Zambia	\$400,000
2. Stakeholder Engagement and Joint Strategic Action Plans (SAPs)	Greater ability of transboundary and country level institutions to manage TBAs for climate resilient agricultural development	Two Joint Strategic Action Plans produced that are aligned to local, national and regional priorities. <ul style="list-style-type: none"> - Key stakeholders from each riparian Member State brought together and engaged - Disclosure and discussion of relevant issues for each Member State - Options for the use of the groundwater resources developed and a SWOT analysis undertaken, based upon the results of the TDA - Identification of the options that will deliver the greatest climate resilience, water and food security and economic development impacts, including payment for ecosystem services - Prioritisation of the options - Existing planned investments and projects identified, quantified and included - Joint implementation planning to determine programme of action - Mutual agreement on the governance and institutional arrangements to be established 	Limpopo Basin Aquifer: Mozambique, South Africa, Zimbabwe Sand and Gravel Aquifer: Malawi and Zambia	\$400 000

3. Information systems to enable investment decision making	Investors have sufficient information to make investment decisions, and that information is regularly updated and monitored	Monitoring boreholes (48 across all the aquifers) are developed and the data fed into regional information systems <ul style="list-style-type: none"> - The monitoring borehole network in each aquifer is designed, aligning to any existing boreholes - Monitoring boreholes are installed in each country (8 per country who shares the aquifer) - Monitoring parameters for the quality and quantity of water are recorded - Information is inputted in real time into the GMP Groundwater Information Portal, a regional data portal that collates data sets from boreholes and monitors 	All aquifers / countries	\$400,000
4. Implementing the SAP in the Sand and Gravel and Limpopo Basin Aquifers	Smallholder farmers and agribusinesses are more resilient to climate change in the two aquifers through the implementation of priority adaptation actions and infrastructure	Priority adaptation measures, actions and infrastructure identified in the SAP are implemented <ul style="list-style-type: none"> - Priority measures are confirmed, based on the output of the SAP - Beneficiaries identified and consulted (30,000 Households direct beneficiaries and an additional 60,000 Households indirect estimated) - Activities and infrastructure as prioritised in the SAP are planned and budgeted - Activities and infrastructure are implemented e.g. Managed Aquifer Recharge Schemes, AgWater Solutions. 	Limpopo Basin Aquifer: Mozambique, South Africa, Zimbabwe Sand and Gravel Aquifer: Malawi and Zambia	\$4.85 million
5. Implementing Ramotswa SAP: Expanding Research and Knowledge on water needs and priorities for agribusiness in Ramotswa	Key water needs to support the resilience of agri-business and out-grower agricultural livelihoods are understood and priority infrastructure development initiatives are agreed	Based on the existing SAP, prioritised adaptation actions to enhance the resilience of agriculture <ul style="list-style-type: none"> -Review of large agri-businesses in the aquifer and identification of water stressed areas -Consultation with large agribusinesses and out-grower networks regarding current climate and water stress, and co-development of water infrastructure -Development of options for water solutions to current agricultural water challenges in the aquifer - Prioritisation by agribusinesses and government counterparts, in line with the SAP 	Ramotswa Aquifer: Botswana and South Africa	\$124,500

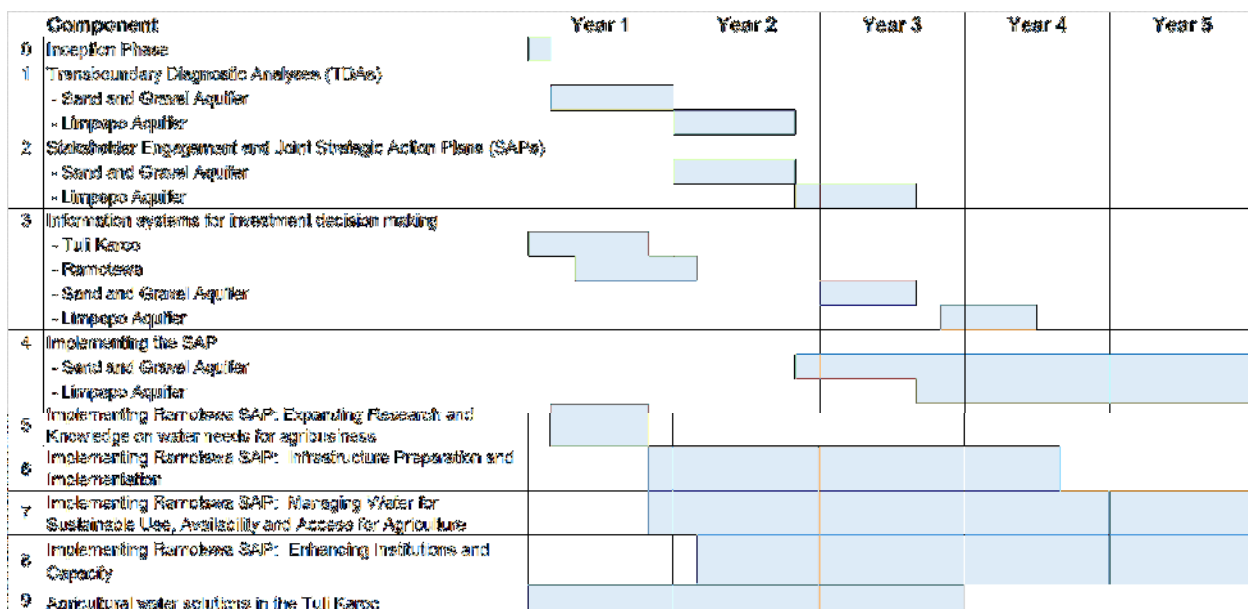
6. Implementing Ramotswa SAP: Infrastructure Preparation and Implementation	Production infrastructure identified as priorities are developed and enables farmers and agribusinesses to implement water management adaptation strategies to maintain production and safeguard livelihoods and food security	<p>A range of priority infrastructure will be designed and constructed. This may include boreholes, storage, transmission, irrigation.</p> <ul style="list-style-type: none"> - Technical design of adaptation infrastructure, as identified above in Outcome 4 - Full project preparation including social and environmental impact assessments, climate change assessment, institutional and legal arrangements and cost benefit analysis - Construction of adaption infrastructure <p>Note: It is expected that 5-10 medium sized projects will be implemented. Projects will be selected in line with portfolio budget of \$1.5 million</p>	Ramotswa Aquifer: Botswana and South Africa	\$3.28 million
7. Implementing Ramotswa SAP: Capacity building for Managing Water for Sustainable Use, Availability and Access for Agriculture	Appropriate measures are in place for the management of water for communities to support climate resilient access to water and the ability to develop resilient agricultural livelihoods	<p>Capacity building that supports management and monitoring arrangements that support the ongoing sustainable use of new resilient water sources for agriculture</p> <ul style="list-style-type: none"> - Technical training/capacitation for governmental technical staff (15 staff per country covering 300 communities) on environmental and social (and climate change) management and monitoring - Awareness raising and communication with local management - Review, harmonisation and revision of regulatory instruments regarding water rights and licensing, including borehole drilling - Stakeholder analyses to identify needs and priorities - Joint monitoring practices established and agreed for harmonised data collection for water and climate parameters - Needs assessment for institutions in regard to fulfilling their mandate - Training for municipalities to orient non-specialists on basics of groundwater - Mentors appointed to junior employees in departments across the water sector 	Ramotswa Aquifer: Botswana and South Africa	\$300,000

9. Agricultural water solutions to create resilience hubs in the Tuli Karoo	Climate resilience is built for smallholder farmers and agribusinesses through climate smart practices	Developing solutions for resilient agricultural practises (covering an estimated 10,000ha) <ul style="list-style-type: none"> - Identification of agribusinesses and estates in the basin - Installation of monitoring devices in the estates - Assimilation of crop and water use data - Developing practises to enhance the water use efficiency and yields - Training on other climate smart agricultural practises such as more resilient varieties and cropping techniques - Supporting the marketing of the crops 	Tuli Karoo Aquifer Botswana, South Africa and Zimbabwe	\$2.5 million
10. Project Execution cost (5%)				\$645 500
11. Total Project Cost				\$12 900 000
12. Project Management Fee charged by the Implementing Entity				\$1 032 000
Amount of Financing Requested				\$13 932 000

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Start of Project/Programme Implementation	October 2021
Mid-term Review (if planned)	June 2024
Project/Programme Closing	September 2026
Terminal Evaluation	February 2027



PART II: PROJECT / PROGRAMME JUSTIFICATION

- A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

Project Components

The project will bring about concrete adaptation actions in the form of new water infrastructure to build transboundary and regional climate change resilience. The process has a number of necessary components to ensure the infrastructure is prioritised, the design is resilient and developed in a way which is sustainable in the long term. This is particularly important for a regional project such as this, whereby adaptation actions are being implemented in shared water resources, which are utilised by two or more countries and the potential for unsustainable use, maladaptation or even conflict is real.

The project components have been designed and adapted based on lessons learned and good practices. As outlined above, they comprise:

1. **Component 1. Transboundary Diagnostic Analysis and Strategic Action Plan development:** This develops the information and knowledge about current water resources and future climate impacts to enable scientific and evidence-based decision making at national policy level. It will include the analysis of existing environmental and social conditions, risk and drivers that may influence or generate limitations, impacts and any other type of constraints on the management, use, availability and quality of the water. This is extremely important to ensure that adaptation investment is focused to where it is most impactful. The SAP development is vital in formulating a regional adaptation approach in shared water resources. The GMI seeks to bring regional solutions to climate change adaptation – an approach that can be complex and must be undertaken with due focus on strong stakeholder engagement processes to develop mutually agreed and supported adaptation actions.
2. Currently groundwater monitoring in the region is variable, with some countries maintaining monitoring boreholes, while other countries are lacking monitoring altogether. This creates unbalanced monitoring data for a transboundary aquifer, where two or three countries may be extracting groundwater from the same resource. In addition, where data exists, it is not currently being fed into a central database, modelling and software system that provides real time information on water need, usage and extraction patterns. Making investment decisions on where to best focus climate change adaptation efforts is difficult. This component will address this by designing a network of monitoring boreholes that will align to the current boreholes and fill the gaps. It will install the boreholes and establish a data monitoring system that feeds into the existing regional Groundwater Information Portal and will be complemented with other relevant environmental information. The Portal will be adapted to generate reports that will inform investment decisions.
3. **Component 2. Implementing the SAPs:** The SAPs will identify priority actions to sustainably utilise the aquifers for domestic, agricultural, commercial and environmental (payment for ecosystem services) use. The actions are developed and agreed jointly by the two or three countries who share the resource. This component allocates budget to implement the most impactful actions that will bring about the strongest climate change adaptation response.
4. The Ramotswa SAP has recently been finalised and agreed a comprehensive list of actions to sustainably develop the shared aquifer for resilient water supply. The new programme of work proposed in this proposal will focus on water use for agriculture, a key factor in food security and resilient livelihoods in Southern Africa. As such, this project component focuses on bringing agribusiness into the conversation to explore concrete adaptation actions together in a way that is win-win for both the aquifer development, the agri-business and importantly their outgrowers and local communities.

It will hone the list of priority actions to those with a clear demand, institutional owner, market and guaranteed impacts.

5. This component is key to building resilience through concrete adaptation activities. It takes the research, knowledge and action plans developed above and implements them, to bring a sustainable and climate resilient water supply to farmers in the aquifers. Through the design and construction of various small scale water infrastructures, it will utilise a groundwater aquifer which is currently underdeveloped to enable adaptation strategies in agriculture to be realised.
6. This component will build strong management and monitoring processes for the infrastructure, the water use and the aquifer, to ensure the long term viability of the water resources and infrastructure. Environmental analysis will provide integrated information on potential actions that may contribute to ensure (or increase) aquifer recharge, preventing landscape degradation, soil erosion and pollution. This component will lead to more efficient water use, enabling diminishing resources to go further, which together with the climate resilient infrastructure development above will provide an adaptation response to the reduction in water resources and increased drought events being experienced in the region.
7. This component ensures the appropriate skills and capacity are present within institutions locally to continue to monitor and manage the water resources after the finalisation of this project. It will focus on skills required to monitor and manage the aquifer water levels and quality, importantly focusing on the management of sustainable extraction rates, recharge, how to bring future climate predictions in to the operational decisions of local water management authorities. It will also give local institutions sufficient skills and experience to continue to develop adaptive infrastructure outside of this programme of work. Where possible, the capacity development will include strong elements of cross-country sharing or cross- country training, to forge stronger and cooperative arrangements between the two countries involved in the Ramotswa development.
8. **Component 3. Agricultural water solutions to create resilience hubs in the Tuli Karoo:** The total irrigated area in the Aquifer Area is approximately 12,000 ha. The largest area under irrigation is in South Africa (6,900 ha), followed by Zimbabwe (2,900 ha) and then Botswana (2,000 ha). Total rainfed area is just over 84,000 ha. The largest area under rainfed production is in Zimbabwe (31,670 ha), followed by Botswana (28,440 ha) and then South Africa (24,780 ha). Overall, approximately 1 percent of the Tuli Karoo Aquifer Area is under irrigation, and just under 7 percent of the system is used for rainfed agriculture. Water consumption under irrigation was 133 million m³/a based on 2017 evapotranspiration data.
9. Most smallholder farmers use inefficient surface irrigation methods (e.g., furrow and border systems), indicating great potential to increase water use efficiency (WUE) by converting to drip systems and using soil and nutrient monitoring tools underscoring the need for smart agricultural interventions which will rely on groundwater. The Programme is expected to directly reach at least 30% of the existing farmers with the WUE activities (8,000 HHs with an estimated 10,000ha). The rainfed areas reach will be similar proportions for the land under production (30,000ha). Sustainability and efficiency will be promoted through the use of renewable energy e.g. solar, taking into account cost and efficiency, on pumping and water distribution.

Project Location and Climate Rationale

Of the 27 transboundary aquifers in the SADC region that have not yet been researched where there is also no data to inform sustainable abstraction, or where it has not been developed, three have been carefully selected as priorities for development.

Firstly, priority was given to those aquifers where the TDA process has already been undertaken and a SAP developed, as these represent “quick wins” where countries are engaged and already on the journey of developing their shared groundwater. In this situation, the SAP has prioritised the actions that are needed, this has been agreed by each member state sharing the aquifer, and technical assistance to implement the SAP can begin almost immediately. Infrastructure can be designed and constructed, and technical assistance to develop governance mechanisms and build local management capacity can begin.

In the SADC Region, only Ramotswa is in this position. Following the TDA in December 2016, a SAP was completed in 2019 and endorsed by the two riparian Member States of Botswana and South Africa during the Ramotswa 2 Project Closure workshop held in Gaborone, Botswana from 9-11 April 2019.

Of the remaining 26 aquifers that have not been researched, the Sand and Gravel Aquifer and Limpopo Basin are prioritised in this project as these are the most vulnerable to projected future climate change in Southern Africa² and there is significant potential to bring about large impacts in supporting agriculture, food security and livelihoods in these two climate- and water-stressed lower income areas.

Climate vulnerability was assessed using the SADC Groundwater Information Portal, a public GIS tool that contains hydrological, climatic and demographic data for Southern Africa³. This allows the overlay of transboundary aquifers with climate vulnerability maps and enables the identification of the aquifers at highest vulnerability to projected climate change. It also allows interrogation of population and identification of aquifers with the largest number of potential beneficiaries. Through this, the Sand and Gravel Aquifer and Limpopo Basin aquifer were selected.

The Tuli-Karoo is the fourth aquifer selected in this project. The aquifer is next to the Limpopo Basin Aquifer and is similarly one of the most vulnerable aquifers to climate change in the region. It has also started its development, and some initial work has been undertaken. The TDA will be published in the coming months and initial work on the SAP has been started.

Figure 1 below shows the location of the four target aquifers. In addition they are also generally geophysical and hydrologically representative of other aquifers and governance arrangements and Government commitment are supportive. They are therefore strong pilot projects that provide a foundation for replicating and upscaling to other aquifers across Southern Africa in a possible Phase 2.

² Villholth et al (2013) Integrated mapping of groundwater drought risk in the Southern African Development Community (SADC) region. Hydrogeology Journal, vol. 21(4), pp 863-885

³ <https://apps.geodan.nl/igrac/ggis-viewer/viewer/sadcgip/public/default>

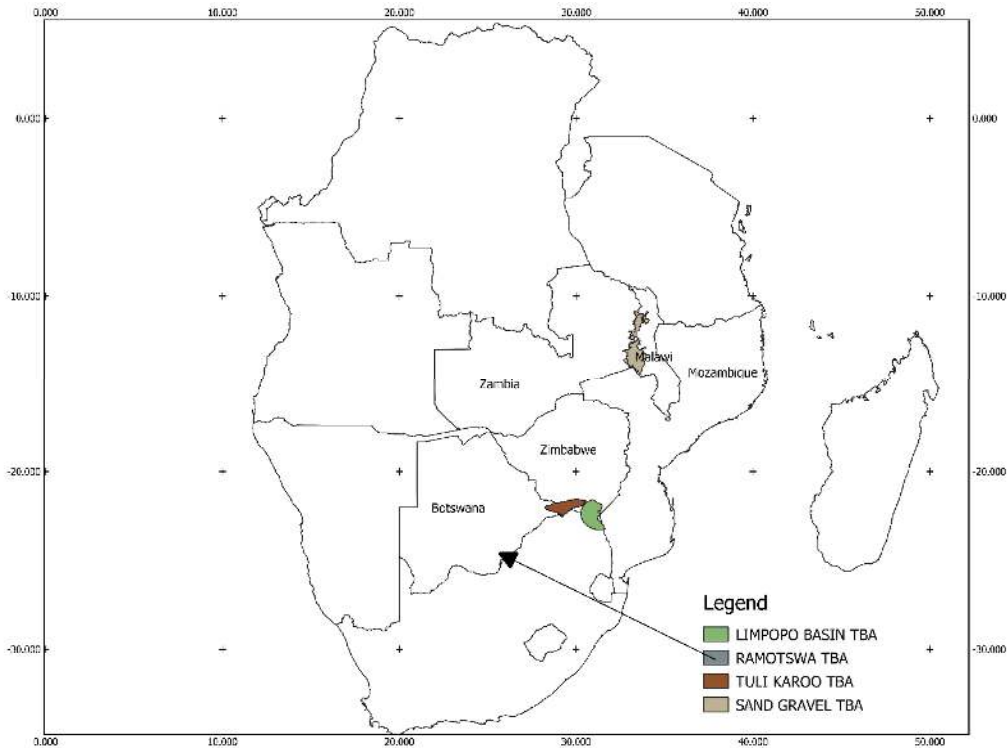


Figure 1: Targeted Transboundary Aquifers

The transboundary aquifers of focus are:

Name	Countries Sharing TBA	Area (km ²)	Estimated population
Ramotswa Aquifer	Botswana and South Africa	190	4694,995
Limpopo Basin Aquifer	Mozambique, South Africa, Zimbabwe	17,000	460,000
Sand and Gravel Aquifer	Malawi, Zambia	22,000	83,600
Tuli Karoo	Botswana, South Africa, Zimbabwe	12 000	123 400
Total		51 190 km²	1,361,995 people

The following paragraphs summarise the climate change impact and vulnerability in the areas of the Tuli Karoo, Limpopo Basin, Ramotswa and Sand and Gravel TBAs.

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Based on delineation provided by Yvan Altchenko, Nicole Lefore, Karen G. Villholth, Girma Ebrahim, Andrew Genco, et al. (2016). *Resilience in the Limpopo Basin: The potential role of the transboundary Ramotswa aquifer - Baseline report. [Research Report] USAID Southern Africa. 2016. hal-02329714.* Study Area Included Gaborone, Lobatse, Ramotswa, Tlokweng, Kanye and Ngwaketse

The summaries are based on data sourced through two methodologies: three future climate scenarios based on Self Organising Maps (SoMs) and a review of the current scientific literature on climate change impact in relevant region of the southern Africa.

The scenarios here presented depict the possible climate futures for a transboundary river basin, which is related to the forementioned aquifers. These scenarios are based on analysis of over 35 Global Climate Models that cover the relevant basin. They use a statistical technique called Self Organising Maps (SoMs) which acts like a neural network to identify the more likely climate pathways in the future. This methodology helps indeed to manage some of the uncertainty related to climate models and projections.

Both the literature review and the SoMs methodology were previously applied by the Climate Resilient Infrastructure Development Facility (CRIDF) to feed climate vulnerabilities analysis of several transboundary basins in Southern Africa. The data is drawn from the CRIDF Paper *Southern Africa Projections and Impacts Guidance Paper (2018, updated 2020)*.

TULI KAROO TBA, LIMPOPO TBA AND RAMOTSWA TBA

SoMs for Tuli Karoo TBA, Limpopo TBA:

The scenarios elaborated for the Limpopo River Basin can help to understand the climate change impact on the Tuli Karoo and the Limpopo Basin TBAs.

The first scenario shows higher temperature and less rainfall in the basin in the period between 2040s and 2080s. In the border area the temperature increases slightly more by 1.25°C in the 2040s rising to 2.5°C in the 2080s. In the east of the basin, close to Mozambique, the temperature increases by 2.0°C above the baseline by the 2080s. In terms of rainfall less evaporation, for most of the basin there are decreases of between 10 and 25% in the 2040s which remain similar in the 2060s and 80s with significant reductions of around 15-20%.

Temperature increases in the second scenarios are slightly less than in Scenario 1 averaging around 2.0°C, although the biggest increase is still in the order of magnitude of 2.5°C degrees. However, other domains see less temperature increases of roughly 1.5°C - 1.75°C rather than 2.0°C in scenario 1. In terms of rainfall less evaporation there are large differences across the basin. In the East of the basin there are significant increases in rainfall (Mozambique) where precipitation less evaporation could be 50% higher by the 2040s and 75% higher by the 2080s (however this scenario is less likely than the first scenario (30%)). The border area between South Africa, Zimbabwe and Botswana show around a 5-10% increase in precipitation and rising to 10-25% in the 2060s and up to 30% in the confluence area in the 2080s.

The third scenario, the less probable, shows much higher temperature and much less rainfall. This scenario shows a steady increasing temperature throughout the century rising to over 4°C in some places by the 2080s. The precipitation reductions are similar to scenario 2 and thus water availability decreases to less than 50% of the 1986 – 2006 baseline. The likelihood of extreme temperatures in the future defined as 3-year consecutive years in any one decade of having a temperature three standard deviations from the 1986-2006 average temperatures, increases between 0 and 17%. In terms of drought the likelihood of 3 years of consecutive drought equivalent to the 25 percentile changes slightly by 0 - 5% increases.

The likelihood of multiyear extreme events such as heatwaves would increase, the frequency of drought events will increase and wetter year frequencies will decrease in all three scenarios.

SoMs for Ramotswa TBA:

Projections of the western part of the Limpopo River Basin, the Waterberg area, are relevant to understand the climate change impact on the Ramotswa TBA.

According to the first scenario the temperature increases in the 2040s by 1.25°C which rises to 2.0°C by the 2080s. In terms of rainfall, the Waterberg area shows a roughly similar rainfall less evaporation as there is today with a slight increase of about 5% in the 2060s.

In the second scenario, this domain of the Limpopo Basin shows a significant decrease in rainfall less evaporation going from a 20% reduction in the 2040s to a 40% reduction in the 2080s. The third scenario, with only 5% of likelihood, shows a much stronger increase in temperature, they will increase by 1.5°C in the 2040s and rise to 4.0°C in 2080s, and a stronger decrease in rainfall, which is projected to decrease by 40% in 2040s.

As for the other domains of the Limpopo river basin, the likelihood of multiyear extreme events such as heatwaves would increase, the frequency of drought events will increase, and wetter year frequencies will decrease in all the three scenarios.

Hydrological impacts

Projections for climate change impact in the region of Limpopo Basin TBA, Tuli Karoo TBA and Ramotswa TBA suggest that aridity of desert and semiarid environments will persist in the future. The west of the country will probably know a decrease in rainfall, which will perhaps reach 20% in parts by 2025. Projections for 2055 show more severe conditions of aridity with increased wind erosion, migration of sand dunes, decreased air quality and pollution. Increased water demand may lead to unsustainable borehole extraction, causing the decrease of the groundwater table. Some ephemeral rivers will become permanently dry, perennial rivers may become ephemeral. Groundwater recharge will be reduced under all scenarios, as well as general water supply. Frequency of drought and heatwaves events are also expected to increase by 2025 and soil moisture anomalies may negatively affect agriculture systems and sustainability in the area by 2055. Indeed, by 2055, increased aridity may result in more severe food insecurity, increased spread of invasive plant and insect species and loss of rainfed agriculture, making subsistence agricultural systems less viable. Also, the reduction of surface water availability may result in higher health and sanitation risk.

SAND AND GRAVEL TBA

SoMs:

Projections on the Lake Malawi basin elaborated with the SoMs methodology are useful to understand the climate change impact on the Sand and Gravel aquifer.

The first scenario shows higher temperature and less rainfall. Steady rise in temperature throughout the century from 1.5°C in 2030 to 2.0°C by 2080. Precipitation less evaporation in the early season reduces throughout the century. From 5 % in 2030 to 15% by 2080. However, the later season sees a slight increase in rainfall of 5% by 2060 and 10% by 2080. In terms of the extremes indices they suggest a decrease in wet spells and an increase in dry spells by perhaps by 5-10% in both cases. In short, extended periods of heat, longer dry spells, briefer wet spells, and sometimes heavier rainfall events when these occur can be expected. Earlier season will be affected more than the later by extended warm and dry spells, and also reduced wet spells; most likely any changes in rainfall intensity would be distributed throughout the rainfall season. This scenario suggests the greater change in the climate than the average from the literature.

The second scenario shows higher temperature but more rainfall. There is a rise in temperature in the second half of the century but slightly less than in scenario 1. (1.25°C in 2060 to 1.50°C by 2080). Precipitation less evaporation in the early season increases in the second half of the century by 5% in the 2060s and 10% by the 2080s. However, the later season sees no change in rainfall less evaporation throughout the century. In terms of the extremes indices they suggest a decrease in wet spells and an increase in dry spells by perhaps by 5-10% in both cases. However, as the temperature is less than in scenario 1 this is expected to be exhibit less change. In short, extended periods of heat, longer dry spells, briefer wet spells, and sometimes heavier rainfall events when these occur can be expected.

The third scenario shows a slight increase in temperature is expected by the 2030s however by the 2060s this grows to 2.5°C and 3.5°C by the 2050s. Precipitation will remain the same by 2030 but then decrease significantly by 2060 (20%) and by 2080 (30%). The extremes indices are likely to exhibit more extreme version of the same trends mentioned in Scenarios 1 and 2.

Hydrological impacts

Projections for climate change impact in the region of Sand Gravel TBA suggest that there would be more erratic precipitation and temperature regimes, resulting in some likely increase in extreme flood and drought events by 2025. The likelihood, the severity and the duration of these events will further increase by 2055, worsening thereby the climate vulnerability of the area. By 2055, increased overall drying trend and decreased winter rains result in decreased food production, land surface degradation and soil erosion due to increased aridity and soil moisture loss. Climate vulnerability is also worsened by increased deforestation and biodiversity loss. Rain-fed agriculture will likely be less reliable in many areas and irrigated agriculture will become more significant, thereby increasing pressure on water resources and posing problems for famers' access to technology, investment and training (including provision of GM seeds).

Innovation

The very nature of the project and its goal is innovative. The traditional approach for use of aquifers has been for each country to exploit the resource on a national scale with little regard for the effect on water resources across the border. The infrastructure that will be implemented is proven and well known, however the joint utilisation of transboundary aquifers to support livelihoods and promote climate resilience, and to establish a joint monitoring network between countries is innovative and new to Southern Africa and indeed Sub-Saharan Africa where groundwater in general is under-utilized and under-developed.

The project also goes beyond research and action research, to directly link research to implementation, development impact and climate resilience on the ground. This transcends the common issue whereby research outputs and reports are generated and the information does not get acted on. By linking research to direct implementation, we ensure that adaptation investment is targetted according to robust evidence and that research investment is targeted to where the results will be acted upon in the same programme.

The SADC region is generally a data scarce region with regards to scientific data on groundwater and climate change impacts. Data scarcity is more pronounced in transboundary aquifers. The TDAs in the Sand and Gravel Aquifer and the Limpopo Basin Aquifer will develop and test big data methodologies to help provide an innovative solution to this common problem. This will draw from a pilot project on the application of big data approaches in Transbouardy

Aquifers, implemented by Water Research Commission (WRC), US Geological Survey (USGS) and the IBM Research Africa Lab in South Africa with funding from USAid and others.

Approach to climate change and building adaptation resilience

Through improved monitoring systems and data on water flows, decision makers will be better able to make informed adaptation investment decisions. They will be able to target funds where most needed, where water resources are most vulnerable or climate affected in order to increase water use efficiencies, climate proof infrastructure and build resilience.

The infrastructure prioritised for development will be prepared in line with the climate resilience guidelines of CRIDF, who are partners in this proposal. CRIDF have developed a range of tools to guide the development of infrastructure that both builds resilience to climate change and also infrastructure that is suitable for future climatic scenarios.

In particular, the Risk and Vulnerability Assessment Tool (RVAT) evaluates the climate risk and vulnerability of communities, as well as water infrastructure projects. The tool assesses how current and future climate hazards (such as temperature, rainfall, droughts and floods) impact the broader community, as well as existing and potential water infrastructure projects in communities. Based on the prevailing risk and vulnerability, the tool explores potential interventions that will improve climate resilience prioritizing best practices and sustainable technologies, such as the use of renewable energy e.g. solar for water pumping and distribution. It utilises the updated Intergovernmental Panel on Climate Change (IPCC) methodology and the Vulnerability Sourcebook by Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ).

- B.** Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project / programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Economic, Social and Environmental Benefits

Further to responding to the needs of access to water and a sound and sustainable management of this vital resource, the project aligns with international, regional and national legislation. It is also aligned with policies on agriculture, water and natural resources management, climate change adaptation, land tenure, public procurement, decentralization, farmers' organizations and unions, employment, women's rights, among others, promoting integrated and intersectoral sustainability.

This programme will bring about significant socio-economic and environmental benefits, to a number of stakeholders. These include:

- Climate resilient water supply for smallholder farmers, including youth, women and other most vulnerable communities
- Promote integrated water resources and landscape management ensuring integrity and availability of ecosystem services;
- Reduce the loss and degradation of soil and prevent pollution of soil and water
- Contribute to make visible the role of women, to advance gender equality, to incorporate gender-sensitive actions

- Increased youth participation in agricultural productivity and natural resources management
- Increased and more secure agricultural livelihoods through improved productivity
- Enhanced food security for local communities resulting from improved productivity and diversification on farms
- Reduced climate risk to agri-businesses, under changing climate conditions
- Enhanced productivity of agribusinesses and related economic benefits, with the potential to create sustainable jobs and increased tax contribution to national economies
- Enhanced natural resources and environmental management capacity
- Increased awareness on interlinkages between environment, climate change, agriculture and human well being
- Strengthened capacities of local stakeholders to empower them to implement adaptation actions.

Guided by IFAD's mainstreaming agenda for gender and youth as well as IFAD's targeting policy, the project will aim to reach at least 50% women among the beneficiaries and 25% youth. Social inclusion, particularly of inclusion of vulnerable and marginalised groups will be part of the targeting strategy for the project.

The economic, social and environmental benefits will be further quantified at design stage and included in Environmental and Social Management Framework (ESMF) that will guide the project implementation. The ESMF will be developed by applying IFAD's Social, Environmental and Climate Assessment Procedures (SECAP) and national regulations. The ESMF will detail the measures to avoid and minimize any adverse impact of the project activities on the environment and social structures. The ESMF will be developed to ensure adherence to the Environmental and Social Policy of the Adaptation Fund. The implementing environmental authorities will ensure compliance with pertinent standards and regulations in collaboration with the SADC-GMI team. The Environmental and Social Management Frameworks of the SADC-GMI will guide the management of the environmental and social impacts of infrastructure projects such as Managed Aquifer Recharge sites, agricultural plots, borehole drilling sites etc.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

Cost Effectiveness

This programme of activities builds upon a tested approach that the SADC GMI have been implementing and improving over the past 4 years. Three TDAs and three SAPs have been undertaken in the SADC region, managed by the GMI. Through this the method and implementation has been honed to become as efficient and effective as possible.

For example,

1. Stakeholder meetings will be arranged back to back with other regional gatherings, e.g. river basin meetings, to reduce travel costs and accommodation. We will use virtual meetings where possible
2. Use of young professionals to reduce the time input of expensive senior professionals
3. Where possible we will use in-country experts to reduce travel costs for data collection and stakeholder engagement.
4. We will ensure stakeholder buy-in and encourage in-kind contributions from the governments through use of, for example, government board rooms for meetings and government transport of in-country travel for field excursions.

Taking the regional approach to implementation and in particular undertaking two TDAs and SAPs concurrently we will bring efficiencies, for example using the same teams to deliver both processes, sharing management costs, and facilitating knowledge and data transfer.

- D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

Alignment with Regional and National Development Strategies

SADC Water Division provides the regional framework for water and provides ongoing guidance to support the various Member States in collectively supporting and attaining the objectives within this regional framework. This regional framework consists of the SADC Regional Water Policy (2005), SADC Regional Water Strategy (2006), SADC Regional Strategic Action Plan (through various phases of development) and SADC Revised Protocol on the Shared Watercourses (2000). The proposed work makes a significant contribution to the protocol, by advocating for joint planning and development and management of the transboundary aquifers. The pertinent policy documents are summarized below.

- The SADC Regional Water Strategy (2006) describes the strategies for achieving development and poverty reduction within SADC, through integrated planning, development and management of water (SADC, 2006). It seeks to address the historical practice where surface water and groundwater resources are compartmentalized instead of viewing and managing them as an inter-linked hydrological unit under the rubric water and environment. Two key strategies directly relate to groundwater, with both focusing on ensuring livelihoods and food security:
 - The first is aimed at ‘promoting construction of multi-purpose storage facilities that will benefit irrigation and ground water recharge to enhance food security’. This recognises the importance of groundwater resources to rural communities that are not supported by reticulated water supply systems.
 - The second is to ‘attain Regional Food Security through sustainable irrigated agriculture, rainfed agriculture, aquaculture and livestock production, through optimal use of both surface and ground water with the ultimate goal of poverty reduction’.
- The Regional Strategic Action Plan (Phase Four) (RSAPIV) (2016 -2020) has the key objective to unlock the potential for water (and related resources) to play its role as an engine and catalyst for socio-economic development. To do this, the RSAPIV recognises the importance of both ecological infrastructure and built infrastructure in providing the basis for water supply and sanitation, for energy security, for industrial development, for food security and for protection from water-related disasters. Groundwater resources not only provide support in maintaining ecological infrastructure, but are also a key source of supply. RSAPIV recognizes the need to modernize and harmonize legal, policy and regulatory frameworks to address gaps in the prevailing institutional groundwater management tools at national and transboundary levels. Key to this is the advancement of transboundary and national groundwater knowledge through various initiatives and studies.

- The overarching legal framework governing transboundary water in SADC is the Revised Protocol on Shared Watercourses in the Southern African Development Community (2000). The scope of the Protocol includes shared “watercourses,” which are defined as seas, lakes or aquifers.
- Recently the SADC-GMI completed a Regional Framework for Groundwater Data Collection and Management, which was presented to the Water Resources Technical Committee of the SADC. The proposed work will make a significant contribution to regional groundwater data collection and management.

The project will have a footprint in Botswana, Malawi, Mozambique, South Africa, Zambia and Zimbabwe. The national frameworks to which the proposed work will contribute are summarised below.

Botswana:

The Botswana Draft Climate Change Response Policy 2017 notes that the country’s development and growth potential depends in-part on the availability of water for domestic and economic purposes. The Botswana National Adaptation Strategy 2020 acknowledges that the country is facing the negative impacts of climate change as evidenced by the endemic droughts, heavy rainfall, heat waves, and severe thunderstorms. It also recognises that agriculture, water, health and biodiversity are most vulnerable. The Botswana’s Third National Communication to UNFCCC (2019) recognizes that whilst surface water resources are highly exposed to climate change through increase in temperature and reduced rainfall, groundwater is sensitive to climate change through reduced recharge and increased abstraction to meet the water demands. Therefore, climate change could transfer pressure to groundwater through scarcity of surface water resources.

The Government of Botswana also recognizes that food production is closely linked to water availability and will face increased stress in districts where water stress is exacerbated. In the Climate Change Response Policy, the Government has committed to adopting water management strategies that would achieve sustainable water conservation and use efficiency and among them are:

- Utilization of shared water courses for the benefit of Botswana.
- Integrating climate change response measures in the water planning processes across all economic sectors.
- Consideration of defining potential water aquifers and adopting appropriate measures of protection for water security and sustainability.
- Promotion of rainwater harvesting, water re-use and recycling for domestic, agriculture, industrial and commercial purposes.
- Employing accounting and valuation tools to support water management decision systems.

Malawi

The Second National Communication (SNC) of Malawi to the Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) 2011 states that Malawi derives the bulk of its revenues from the agriculture sector, whose viability depends on the availability of water (adequate and reliable rainfall). As such, the country’s economy, prosperity and the wellbeing of its people are highly vulnerable to climate change and climate variability. Malawi’s water policy (National Water Policy (2005)) aims to protect groundwater by preventing pollution and overuse. It promoted Integrated Water Resources Management (IWRM) and consideration of cross cutting issues such as climate change. The Water Resources Act of 2013, Water Resources Regulations (2018)

and Environmental Management Act (2017) explicitly address the use, management, and protection of groundwater and provides the necessary tools for the state to regulate, manage, control, protect and develop groundwater resources in conjunction with surface water resources in Malawi. It specifies the need for long term plans to ensure the sustainable use of groundwater, including drought management plans and cross-sectoral coordination. The Malawi National Adaptation Framework 2020 notes that every year, Malawi loses an average of 1.7% of its GDP as a result of climate change-related disasters, mainly floods and drought. The successful implementation of the Malawi Growth and Development Strategy (MGDS) also hinges on the pursuance of key priority areas of agriculture and food security, irrigation and water development among others. Malawi's Nationally Determined Contributions (NDC) includes key and integrated, actions addressing the sustainable use of water such as upscaling afforestation, reforestation and forest conservation and protection of catchments, dissemination of climate resilient agronomic practices (e.g.: on-farm water conservation technologies, improved land and water use practices, capacity building integrated water resources management).

South Africa

The National Climate Change Adaptation Strategy (NCCAS 2019) provides a common vision of climate change adaptation and climate resilience for the country, and outlines priority areas for achieving this vision. The country has identified a number of adaptation options in the agriculture sector, including those related to water availability and management; to hazards; the natural resource base etc. South Africa's NDC assumes commitment in addressing climate change based on science and equity promoting a flexible adaptation on sector policies and measures into national and sub-national policy frameworks to enable implementation of climate change adaptation programmes and projects. Sector adaptation plans will be integrated into broader sector plans consistent with relevant sector planning or regulatory legislation.

More recently, the Government has strived to allocate water resources to meet the needs of a growing economy, to ensure food security, and to maintain ecological integrity and environmental quality. It is noted in the UNFCCC report that the sustainable use of several trans-boundary aquifers would benefit from improved forms of management and investment in scientific understanding. Several large dams and inter-basin transfer schemes have been installed to address various needs such as urban development areas, water requirements of thermal power generation, mining centres and some regions of agricultural activity. "South Africa's groundwater aquifers are estimated to store roughly 235 000 Mm³ of water (DWA 2004) but the quality and availability of data on groundwater resources and their recharge rates compromise sound management decisions. Current estimates of exploitable groundwater range from 4 800 Mm³ /yr, 6 000 Mm³ /yr, 10 000 Mm³ /yr and 19 000 Mm³ /yr", (UNFCCC Report 2011). Groundwater is used extensively in rural and more arid parts of South Africa. It is a significant resource to many irrigation farmers, small towns in more arid parts of the country and areas where surface-water resources are already fully committed. Rural communities in many parts of the country are largely or wholly dependent on groundwater. A result of the reliance on groundwater is indicated by the constant slow decline in groundwater levels, despite the seasonal fluctuations, attesting to unsustainable rates of use. Monitoring programmes in some regions are not adhered to and there is a lack of proper management of groundwater resources at national and local levels. Impacts of mining projects and their practice of groundwater removal are severe. Acid mine drainage is almost certainly the biggest threat to groundwater, especially in the vicinity of coal and gold mining activities. Further such exploitation of groundwater could have significant adverse environmental effects.

Mozambique

The 2007 Mozambique National Adaptation Programme of Action has objectives related to early warning systems, improving the capacities of family farmers to dealing with adverse effects of climate change and strengthening the management of river waters. There has not been any specific groundwater strategy to guide the subsector actions. Consequently, and despite that Mozambique's NDC aims at improving the capacity for integrated water resource management, including building climate resilient hydraulic infrastructures, actions are supported by non-robust planning tools, mostly adapted by those based on the surface water.

Mozambique is one of Africa's most vulnerable countries to climate change. The country is exposed to a number of extreme weather events including droughts, floods and tropical cyclones and climate change is likely to exacerbate this vulnerability to flooding, as it is situated downstream of nine major river systems. Water resources in Mozambique are affected by pollution from mining, industrial, agricultural, and household waste. There are areas in the regions classified as semi-arid and arid (Gaza, Inhambane, and Maputo), where rain, even when above average is inadequate and results in critical water shortages leading to limited agriculture productivity. Strengthening research and systematic observation for the collection of data related to vulnerability assessment and adaptation to climate change, increase effectiveness of land use and spatial planning are also included in NDC objectives related with sustainable use of water, activities and vulnerable groups dependent on availability and quality of water.

Zambia

The National Water Policy revised in 2010 does not address issues of transboundary water management (including transboundary aquifers). The National Policy on Climate Change (NPCC) 2016's vision is "A prosperous and climate resilient economy by 2030". The NPCC identifies that the agricultural sector, which employs 67% of the labour force and contributes 16 to 20% of the country's national GDP, is highly dependent on rainfall and vulnerable to climate change. The resultant adverse impacts on crops, livestock and fisheries lead to reduction of agricultural productivity thereby contributing to food insecurity. Climate variability has kept a proportion of the population dependent on subsistence agriculture, below the national poverty line (NPCC, 2016). The Zambia National Climate Change Response Strategy (NCCRS, 2010) seeks to develop sustainable land use systems to enhance agricultural production, and to ensure sustainable management and resiliency of water resources under the changing climate. Zambia's NDC includes several objectives linked with water management, such as forest enhancement including natural regeneration and afforestation/reforestation; promotion of conservation agriculture activities leading to adaptation benefits and enhancing climate resilience, especially in rural areas; adoption and promotion of integrated water management (including ground and surface water monitoring systems), protection of catchment forests, improvement of monitoring systems for infrastructures, training for farmers, extension and technical staff on natural resources and climate change management and planning.

Zimbabwe

The current Zimbabwe Water Policy (2012) details support to groundwater management as follows: Data collection, management and research, Integrated water resources management, Water and the hydrological cycle, Ownership of Water, Catchment as a unit of water management, Water for Primary needs. The Zimbabwe Climate Response Strategy

has specific objectives to deal with promoting sustainable development, management and utilization of water resources under changing climatic conditions; promoting sustainable land-use systems that enhance agricultural production, ensure food security and maintain ecosystem integrity and address climate change through evidence-based research, technology development and transfer among others. The Strategy further deals with strengthening monitoring institutions for hydro-meteorological parameters; conducting more frequent yield assessments of surface and groundwater resources, promoting water use efficiency in all sectors. It also outlines the development, rehabilitation, maintenance and protection of surface and groundwater resources. Zimbabwe's NDC gives special focus to strengthen management of water resources, including the promotion and support of water harvesting as a climate change adaptation strategy, combined with the development and rehabilitation and maintenance of surface and groundwater resources, and enhancement of monitoring systems for hydro meteorological parameters.

- E.** Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

Technical standards in infrastructure preparation and construction will be central to the project. The project design will be assessed following the social, environmental and climate assessment procedures (SECAP) of IFAD, fully aligned with the AF and the SADC GMI Operational, Environmental and Social policies, which are flexible to enable tailoring to national requirements as per its 15 country membership.

The compliance with the Environmental and Social Policy of the Adaptation Fund will be ensured during the project design and implementation phases. The compliance includes an initial screening of the environmental and social risk of the project as outlined in Section K of this Concept Note. The screening will inform the Environment and Social Management Framework (ESMF) for the project that will be developed during the design phase. The ESMF will guide the project implementation and ensure identified environmental and social risks are managed in each of the prioritised TBAs.

- F.** Describe if there is duplication of project / programme with other funding sources, if any.

There is no duplication of the project with other funding sources. Co-financing will be sourced for additional activities such as improving agricultural productivity, which IFAD as the implementing agency invests in.

- G.** If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

Knowledge Management

The approach to Knowledge Management will be two pronged, ensuring both learning from knowledge that has been generated in similar projects, and dissemination of the learning from this project to others in the region and wider. The SADC-GMI is mandated by SADC as

a Regional Centre of Excellence in groundwater, and it has formed trusted relationships with the relevant government institutions in each SADC member State, therefore it is ideally placed to act as a regional convenor of knowledge and a dissemination hub.

Learning

Learnings on the implementation of the TDAs and the SAPs will be sought from the aquifers where the process has already been undertaken, such as the Ramotswa and Stampriet Aquifers. The SADC-GMI implemented TDA/SAP work in the Shire TBA (shared between Malawi and Mozambique), also implementing a similar project in the Eastern Kalahari Karoo Transboundary Aquifer (shared between Botswana and Zimbabwe) and is also collaborating with the International Water Management Institute (IWMI) to implement a TDA/SAP in the Tuli-Karoo TBA (shared between Botswana, Zimbabwe and South Africa). Through these processes the SADC-GMI has built capacity to effectively implement TDA/SAP projects. Understanding the key success factors from these projects will be important to designing and adapting the process in each specific country context.

Dissemination

The aim of our dissemination activities will be to support decision makers and other stakeholders involved in the governance of transboundary aquifers, with relevant information. The following are planned as part of the Knowledge Management initiatives:

1. For each riparian country a research dissemination workshop will be held
2. Dissemination of research results on existing web-based platforms through a two-pronged approach:
 - a. Data collected and generated for each TBA (boreholes, water quality, yields, aquifer maps, groundwater contour maps), will be made available to stakeholders through the SADC Groundwater Information Portal (SADC-GIP). This is owned and maintained by the SADC-GMI who will create a dedicated platform within the portal for each TBA.
 - b. Reports collected and generated will be distributed through the SADC Groundwater Literature Archive (SADC-GLA), a portal dedicated to making groundwater literature available to stakeholders.
 - c. Dissemination of knowledge and information through national, regional and international fora
 - i. At National level the National Focal Groups on Groundwater, which the SADC-GMI is implementing in all the SADC Members States will be used. The National Focal Groups have the primary function of advocating for national and transboundary groundwater management and comprise of all the key groundwater stakeholders in each Member States.
 - ii. At the regional level knowledge will be disseminated through platforms such as;
 - The Annual SADC groundwater conference
 - Southern Africa Development Community (SADC) River Basin Organisations (RBOs)
 - The Annual WaterNet Symposium
 - SADC Multi-Stakeholder Water Dialogue
 - d. The SADC-GMI has a network of international partners through which the knowledge generated can be disseminated, this Network includes, UNESCO-

IGRAC, UNESCO-IHP, British Geological Survey, the BGR, IWMI, CRIDF etc. SADC-GMI constantly organize joint events to elaborate on groundwater development and management in the region with these international partners. Hence they provide a ready platform through which to disseminate results from the TDA/ SAPs.

- H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

Stakeholder Engagement

Effective stakeholder engagement develops a “social license” to operate based on mutual trust, respect and transparent communication between an organisation and its stakeholders. Strong, equitable and fair stakeholder engagement and consultation is central to this programme of work. The transboundary nature means that without firm stakeholder agreement on both sides of the national boarder, the aquifer development will not succeed. For this reason, the GMI have developed a robust approach to stakeholder engagement, based on the foundation of SADC policies and refined during the three previous SAP processes and the implementation of infrastructure projects in all 15 SADC Member States. This involves stakeholder identification and analysis, timely disclosure of project information, inclusive dissemination of and access to information, public participation, consultations and feedback, and access to a mechanism to raise and remedy grievances.

To better understand priority issues and raise consensus on joint (cross-border) management of water resources in the aquifer system, joint stakeholder dialogues will be held with participation of government representatives, national experts and other interest groups.

The stakeholder dialogues will;

1. Place emphasis on inter-sectorial participation and consultation
2. Seek stepwise consensus building through validation workshops to ensure a wider stakeholder buy-in
3. Validate the options for interventions at technical, management, socio-economic and policy levels

The Stakeholder engagement techniques will be grounded in International Best Practice and will include the following:

1. One-on-one interviews with key representatives of identified stakeholder groups
2. Formal meetings
3. Workshops
4. Focus group meetings

SADC-GMI will rely on its network of civil society and government partners to identify ‘left behind’ groups for targeting and inclusion. Focus will be given to ensure the voices of women, the elderly, youth, disabled and other vulnerable groups are heard – this will be particular important when determining the priority actions for agricultural adaptation measures, due to the sector traditionally being implemented by women but controlled by

men. SADC-GMI will also ensure appropriate consultation and engagement with smallholder farmers, not just commercial agri-business.

At this stage it is envisaged that the following stakeholders will be consulted at the different stages of the project. Cognisance has to be taken that a full list of stakeholders through a stakeholder mapping exercise at the onset of project implementation.

The table below summarises, the different stages of the project cycle and the key stakeholders to be consulted.

Project Stage	Project formulation	TDA	JSAPs	Implementation of JSAPs through agribusiness, infrastructure development, resource protection
Key Stakeholder	Groundwater national Focal Persons National Focal Groups in the Member States Ministries/Departments responsible for Agriculture Local Authorities within the TBA. Youth and Women organisations Farmer organisations Climate Focal Persons for each Member State. International cooperating partners active in the TBAs	Groundwater national Focal Persons National Focal Groups in the Member States International cooperating partners active in the TBAs	Groundwater national Focal Persons National Focal Groups in the Member States Ministries/Departments responsible for Agriculture Local Authorities within the TBA. Youth and Women organisations Farmer organisations Climate Focal Persons for each Member State. International cooperating partners active in the TBAs Traditional Leadership	Groundwater national Focal Persons National Focal Groups in the Member States Ministries/Departments responsible for Agriculture Local Authorities within the TBA. Youth and Women organisations Farmer organisations Climate Focal Persons for each Member State. International cooperating partners active in the TBAs Traditional Leadership

- I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Justification for Funding

The programme of work has been developed to balance the needs of research and stakeholder engagement to inform action, with concrete adaptation activities on the ground. One cannot happen without the other, yet this can often take time and is often not the priority for adaptation funding. For this reason, aquifers in two different stages of development have been selected, to be able to build the groundwork for action in one and undertake the implementation and bring about adaptation impact in the other.

The challenges of a dynamic and declining water availability situation under future climate projections will lead to greater pressure to exploit unrealised and little-known groundwater resources. The project aims to fill an extremely relevant gap linked with the lack of solid data series that can feed the decision-making processes related with underground water resources management. With the strengthening and integration of the monitoring systems, and the capacity building provided, the project will contribute to the development of a robust regional information system, assisting local authorities and farmers to better assess risks

and to adopt different approaches to address the impacts of climate change and variability. Comprehensive adaptation actions are required to ensure water security for Africa's most vulnerable smallholder farmers in the face of climate change. However, the investments proposed in this project cannot be undertaken by the countries alone, specially under a post-COVID -19 financial scenario. The economic slowdown caused by the COVID-19 pandemic also reduces the capacity of the countries to make huge financial contributions to development programmes as they must reorient financial resources to mitigate the effects of the pandemic. In addition to investments in urgently needed measures, the project will develop the mechanisms that will allow sustainability of long-term adaptation activities.

J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project / programme.

Sustainability of project outcomes will be ensured in a number of ways. Implementation of the project will be through existing government structures, in particular through the local leadership and extension network, which will be strengthened to augment the numbers of extension officers and agents on the ground as well as capacities and capabilities to support farmer groups and organisations. This will ensure that there is institutional support for the project activities after the grant ends.

The TDAs would be undertaken using the most advanced groundwater and climate change modelling techniques, ensuring that the models are built on the highest quality data available and model future climate predictions appropriately to ensure results will remain relevant under all future scenarios.

Decision making will be undertaken based on sustainable groundwater abstraction rates in line with the aquifer recharge rates, to ensure that the utilisation of the water resources is sustainable and does not lead to mal-adaptation.

The SAP process will be based upon tried and tested national stakeholder engagement processes. It will be designed to be equitable, fair and give due time to ensure that all parties buy into the final product, to ensure long term commitment to the agreement. This process is extremely important, and has the potential to uncover potentially conflicting priorities between member states, which if not facilitated appropriately, could diminish the sustainability of the outcomes.

The sustainability of the groundwater infrastructure will be ensured in a number of ways. Firstly, the infrastructure specifications will be determined based on future water demand and availability under climate change. Secondly, the preparation studies will be robust and adhere to international best practise across all areas, including social and environmental assessments. The SADC GMI has recently developed an Environmental and Social Policy, which is in line with the requirements of the World Bank, Adaptation Fund, GCF, and IFAD's Social, Environmental and Climate Assessment Procedures (SECAP).

Thirdly, the beneficiaries will be trained on the operation and maintenance of the infrastructure. Fourthly, livelihood projects and components will be implemented and the capacity of smallholder farmers will be built, which will enable them to increase their income and in turn, their ability and willingness to pay for the water, in order to provide revenues for ongoing operation and maintenance.

Strong and inclusive stakeholder engagement processes will seek to ensure that there is full buy in at each decision making stage, and at implementation. It will be important to identify the infrastructure priorities of each affected party, including government, water authorities, the private sector, residents, farmers, and other beneficiaries, and to duly include them in the prioritisation process.

The SADC-GMI has commenced formulation of National Focal Groups (NFGs) in the SADC Member States. These NFGs are led by the National Focal person, with NFG including all stakeholders identified in through a stakeholder mapping exercise. Through this structure the SADC-GMI has successfully mobilised stakeholders in the previous TDA/SAP processes that it has undertaken. This structure is very important in consulting with the end users of the infrastructure to be developed and taking on board their aspirations and preferences. SADC-GMI will seek to directly consult the following groups of end users through their local structures: farmer organisations, local authorities, water user associations, indigenous people, youth and women organisations (including the disabled) and the River Basin Organisations. Protocols will be set in place for end user participation in the conceptualisation, design and implementation of the interventions, end user participation will be viewed as an integral process of the selection of preferred options to ensure sustainability of the infrastructure. Local government structures have worked with the end users and will continue to do so.

The GMI will draw upon its Mainstreaming GESI Guidelines that are currently in development and the CRIDF GESI tools, which assess the impacts of the project on women and vulnerable groups and determine ways to maximise the benefits for these groups and enhance inclusivity. In line with IFAD's target that all projects benefit at least 50% women and 25% youth, the gender aspects will also be taken into account.

The project will produce reader-friendly and eye-catching knowledge products including audio-visual material, based on the evidence generated in English and local languages. The project will provide technical contributions through coordinating structures at the ground water management Hubs on sustainable ground water management practices and the Projects Steering Committee. Workshops will be held for dissemination of results to policy makers in order to advance policy development on ground water management and climate change adaptation practices. This will aid the sustainability and longevity of the support for the overall solutions that are developed.

Sustainability in the adoption of sustainable ground water practices will be promoted through supporting a motivated and knowledgeable extension service through recruitment of facilitators to fill the gaps, greater technical support from the extension network and investing in work 'enablers' at the extension level to secure greater involvement in results monitoring and reporting. This is intended to improve the institutional support given to the farmer groups and de facto improve the quality of the demonstration plots. Sustainability of adoption rates will be promoted through working with women and men's groups separately. Participatory approaches used for the agricultural component will support farmer own priorities based on farmers' own knowledge of what works and challenges in order to ensure relevance. Sustainability will also be strengthened through agro-biodiverse farming strategies, which is intended to contribute to a stabilisation of production yields, and associated means to continue sustainable livelihood strategies in future years, but with minimum levels being substantially higher than at present, due to improved varieties based on landraces adapted to the availability and sustainable use of groundwater resources and recharge of aquifers. The farming strategies are expected to contribute to improved infiltration of water in the agricultural productive landscape. The project will implement a participatory approach based on indigenous knowledge and farmer to farmer knowledge sharing.

Sustainability will also be enhanced and supported by technical capacitation on environmental management and monitoring as well as awareness will promote best practices by water end users.

K. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

The potential negative environmental and social impacts are associated with the agricultural activities and the development of infrastructure in the TBAs. The expansion or intensification of agricultural activities following the improved water availability may lead to localised land clearing, loss of biodiversity, increased erosion risk, pollution of surface water and land resources and social risks related to competing uses of water resources. The construction of agri-business facilities and agricultural production infrastructure such as irrigation schemes and boreholes may result in vegetation clearing, increased generation of waste, economic displacement and influx of migrant labour with social implications on community health and labour conditions. These risks will be further assessed during the design phase and appropriate measures identified to avoid or minimise the potential negative impacts.

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Economic, social and environmental benefits will be further identified and qualified at design stage and included in Environmental and Social Management Framework that will guide the project implementation. The implementing environmental authorities will ensure compliance with pertinent standards and regulations. The ESMFs of the SADC-GMI will guide to manage the environmental and social impacts of infrastructure projects such as Managed Aquifer Recharge sites, agricultural plots, borehole drilling sites etc.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>		Adherence to laws will be ensured by observing the SADC protocols. Necessary approvals will be obtained prior to any infrastructure development.
<i>Access and Equity</i>		The TDAs, SAPs and the stakeholder consultation will ensure improved access to natural resources for different users. Equity will also be ensured by adhering to the protocols and in the implementation of the SAPs.
<i>Marginalized and Vulnerable Groups</i>		Marginalised and vulnerable groups will be a key target group for the project starting with their identification during the design phase. The targeting strategy that will be developed for the project implementation will ensure social inclusion and the reach of marginalised and vulnerable groups in the TBAs
<i>Human Rights</i>		Human rights will be respected during the project implementation with specific considerations also made during project design. IFAD as a UN specialized agency will ensure adherence to various conventions with the ratifications made in the

		different countries where the project will be implemented. Particular attention will be devoted to the right to water and food as basic needs to face the challenges of climate change variability.
<i>Gender Equity and Women's Empowerment</i>		The focus on gender equity and empowerment is illustrated through the target to reach at least 50% women as project beneficiaries. Further assessments will be made during design to articulate specific activities to promote women's empowerment and ensure gender equity.
<i>Core Labour Rights</i>		The ESMF that will be developed to guide project implementation will assess the risk related to labour conditions particularly for the infrastructure development and agri-business facilities. Specific measures will be articulated to adhere to acceptable working conditions and respect labour rights.
<i>Indigenous Peoples</i>		Indigenous peoples and their territories are not expected to be adversely impacted by the project activities. However, during design, indigenous peoples in the TBAs will be identified and specific activities to ensure their effective participation in the project activities included. The principles of Free Prior and Informed Consent will also be applied to project activities.
<i>Involuntary Resettlement</i>		The project activities are not expected to result in any involuntary resettlement. The risk will be further assessed during design and avoided through the application of Free Prior and Informed Consent during project implementation.
<i>Protection of Natural Habitats</i>		The project activities are not expected to be implemented in protected areas. Any adverse impacts on natural habitats will be avoided or minimised through specific measures to be articulated in the ESMF. They would include promoting agricultural intensification as opposed to expansion, safe use, handling and disposal of agro-chemicals and restoration of areas following any infrastructure installation.
<i>Conservation of Biological Diversity</i>		The conservation of biological diversity will be promoted through diversity on the agricultural production landscape, avoiding or minimising any land clearing and habitat restoration at any infrastructure development sites.
<i>Climate Change</i>		Climate change is expected to have an impact on the availability of water resources in the TBAs and thus adversely impact the agricultural productivity of the target beneficiaries. The project activities will improve the climate change resilience of the communities in the TBAs.
<i>Pollution Prevention</i>		The agricultural production activities may result in

<i>and Resource Efficiency</i>		increased use of agro-chemicals and therefore pollution of water and land resources. This will be managed through capacity of smallholders in the optimal use and safe handling and disposal of agrochemicals. Water use efficiency will also be promoted through technologies such as drip irrigation systems.
<i>Public Health</i>		The increased use of agro-chemicals and the influx of migrant workforce and the infrastructure development may have adverse impacts on community health. Specific measures to manage dust and noise levels, site waste as well as hygiene during the infrastructure development phases will be articulated in the ESMF. In the context of the COVID-19 pandemic, protocols and messages of prevention will also be articulated during design.
<i>Physical and Cultural Heritage</i>		The project activities are not expected to have any adverse impacts on physical and cultural heritage sites. However, the potential risk will be further assessed during design and specific measures, including for chance finds during the infrastructure development phases, outlined in the ESMF.
<i>Lands and Soil Conservation</i>		The land and soil health will be impacted by the agricultural activities and infrastructure development. However to minimise any adverse impacts sustainable intensification of agricultural production, optimal use of agro-chemicals and measures such as integrated soil fertility management will be promoted in the project areas.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

The project implementation arrangement will comprise IFAD as the Implementing Entity assuming fiduciary responsibility and implementation oversight. SADC-GMI will be the Executing Agency. CRIDF is an Implementing Partner tasked with providing Technical support on Adaptation and resilience building. The River Basin Organisations (RBOs) LIMCOM and ZAMCOM will have the role of Cooperating partners, with the role of Institutionalising Interventions. National Focal Groups in each of the Member States will serve the purpose of coordinating national to local level stakeholder input and participation. The Groundwater-National Focal Groups (NFG) bring together groundwater stakeholders across various sectors in the country to support sustainable groundwater resource management, development and use. Membership of the NFG represent relevant mandated government institutions (multiple levels), academic and research institutions, the private sector (including drilling companies and consulting firms), Non-Governmental Organisations (NGOs), community-based organisations, service suppliers and the main user sectors. The NFG structure ensures that all stakeholders are involved and reaches all levels of stakeholders. The proposed project organogram is shown below.

Member State Partners who will provide national and regional policy integration and facilitation are:

Ramotswa Aquifer:

- Botswana: Department of Water Affairs
- South Africa: Department of Water and Sanitation

Sand and Gravel Aquifer:

- Malawi: Depart. of Water Resources
- Zambia: Min. of Environment, Energy & Climate Change and Water

Limpopo Basin Aquifer:

- Mozambique: National Directorate of Water Supply and Sanitation
- South Africa: Department of Water and Sanitation
- Zimbabwe: Ministry of Environment, Water and Climate

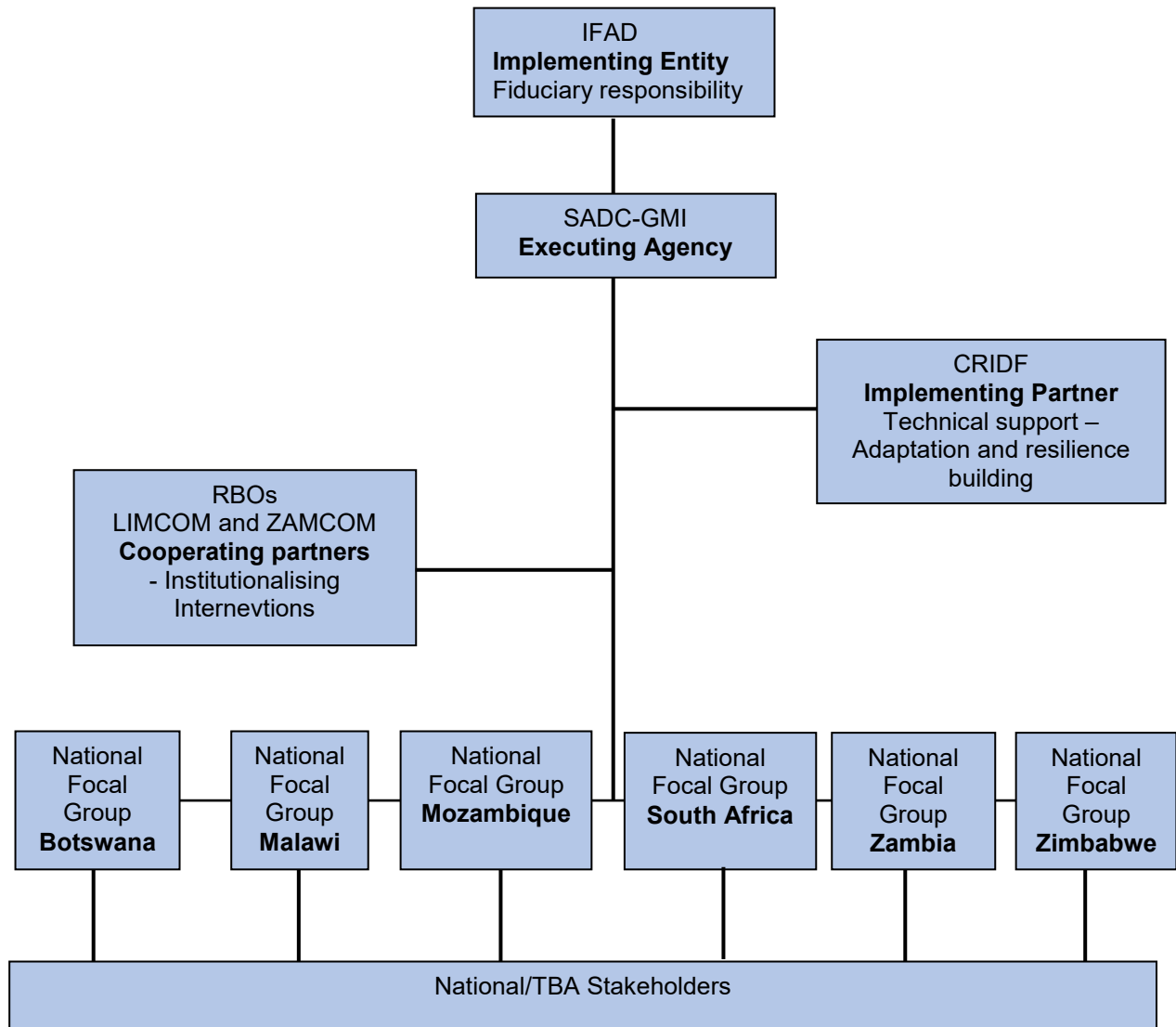
Tuli Karoo Aquifer:

- Botswana: Department of Water Affairs
- South Africa: Department of Water and Sanitation
- Zimbabwe: Department of Water Development

SADC-GMI is a subsidiary of the SADC Secretariat which draws its mandate as a Centre of Excellence for groundwater management in Southern Africa from the Regional Strategic Action Plan on Integrated Water Resources Development and Management Phase 4 (RSAP IV: 2016-2020). It is the key convener able to link local level action to regional policy and scale up.

CRIDF, is a UKAid funded programme that works across Southern Africa in the SADC region. CRIDF facilitates long-term solutions to water challenges within SADC, delivering water infrastructure and building climate resilience for poor communities. CRIDF is a project preparation facility for climate resilient water infrastructure and projects include water supply, sanitation, irrigation, dams, and hydropower in both urban and rural settings.

ORGANOGRAM FOR IMPLEMENTATION



B. Describe the measures for financial and project / programme risk management.

SADC GMI has implemented projects from various development partners and in the process developed well-established procedures for reporting on funds. These procedures with the financial management of IFAD as the implementing entity will guide the financial and procurement operations of this Project. Adherence to the Adaptation Fund reporting

requirements will be ensured by IFAD's oversight. Specific financial and project risk management measures will be assessed throughout the implementation of the project particularly during the supervision missions to be conducted by IFAD. A comprehensive and detailed risk management framework will be developed during design including measures to manage any identified risks and fill any capacity gaps. The risk management framework will take into account the fiduciary procedures of IFAD and the Adaptation Fund.

C. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

The environmental and social risk management will be fully articulated during the design phase and build on the screening exercise outlined in Part II section K. The articulation will be done through the development of an ESMF given that specific sites for some of the project activities are unknown and will remain as such until the SAPs are formulated.

D. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

Specific M&E arrangements and budget will be outlined during the full design of the project. The implementation team in SADC GMI will include an M&E specialist that will be responsible for the selection and reporting on key indicators from the results framework that will be developed and the project M&E system.

E. Include a results framework for the project proposal, including milestones, targets and indicators.

The results framework will be developed during the design phase of the project. The key results will include the number of beneficiaries reached (disaggregated by age and sex), the number of beneficiaries adopting climate change adaptation technologies, the SAPs developed, the number of prioritised SAPs implemented etc.

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

The alignment of the project with the Adaptation Fund Results Framework is outlined below. Further analysis of the alignment will be done during the design phase of the project. The specific indicators for the project objectives and outcomes as well as the grant amounts will be determined during design.

Project Objective(s) ⁵	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
Increase technical knowledge and understanding of transboundary groundwater resources to inform policy development and investment decision making	TBD	Improved policies and regulations that promote and enforce resilience measures	Climate change priorities are integrated into national development strategy	TBD
Develop strong and mutually	TBD	Strengthened	2.1. Capacity of staff	TBD

⁵ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

agreed governance and cooperation frameworks, strategies and policies for sustainable use, management and protection of shared groundwater resources		institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	
Develop information systems that provide robust, real time data that can be used for investment decision making	TBD	Support the development and diffusion of innovative adaptation practices, tools and technologies	Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level.	TBD
Develop equitable, fair and climate resilient access to groundwater resources for smallholder farmers and agribusiness in local Resilience Hubs	TBD	Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2. Percentage of targeted population applying appropriate adaptation responses	TBD
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
Policy makers and country level institutions have robust, scientific and reliable data to enable decision making on transboundary groundwater management	TBD	Output 7: Improved integration of climate-resilience strategies into country development plans	7.2. No. of targeted development strategies with incorporated climate change priorities enforced	TBD
Smallholder farmers and agribusinesses are more resilient to climate change in the prioritised aquifers through the implementation of priority adaptation actions and infrastructure	TBD	Output 2.1: Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	TBD
Climate resilience is built for smallholder farmers and agribusinesses through climate smart practices	TBD	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1. No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	TBD

Appropriate measures are in place for the management of water for communities to support climate resilient access to water and the ability to develop resilient agricultural livelihoods	TBD	Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	TBD
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- G.** Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

The detailed budget and notes will be provided as part of the design of the project. Estimated costs have been provided for each of the project sub-components under Part I of this Concept note.

- H.** Include a disbursement schedule with time-bound milestones.

The disbursement schedule and time-bound milestones will be provided as part of the design of the project. Based on the estimated timeline for project implementation the first disbursement would be expected in Q4 of 2021 and the final one in Q2 of 2026.

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government⁶ *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Zambia: Date: 30 December 2020
Mr Francis Mpampi,
National Coordinator-National
Designated Authority for GCF
and AF
Ministry of National
Development Planning

Mozambique: Date: 4 February 2021
Ms. Emilia Dique Fumo
Permanent Secretary
Ministry of Land and
Environment

Botswana: Date: 5 February 2021
Mr. Balisi Gopolang
Senior Climatologist
Department of Meteorological
Services
Ministry of Environment, Natural
Resources conservation and
Tourism

⁶. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Zimbabwe
Mr. Washington Zhakata
Director, Climate Change
Management Department,
Adaptation Fund Focal point
Ministry of Environment,
Climate, Tourism and Hospitality
Industry

Date: 19 January 2021

Malawi
Mr. Peter K. Simbani
Designated Authority for the
Adaptation Fund in Malawi
Ministry of Industry

Date: 29 January 2021

South Africa
Ms. Nomfundo Tshabalala
Director General
Department of Forestry,
Fisheries and the Environment

Date: 12 March 2021

B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

<p>I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans of Botswana, Malawi, Mozambique, South Africa, Zambia and Zimbabwe and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>	
<p>Jyotsna Puri, Director Environment, Climate and Social Inclusion Division, IFAD</p> <p><i>Name & Signature</i> Implementing Entity Coordinator</p>	
<p>Date: 22/07/2021</p>	<p>Tel. and email: +393316235485 - j.puri@ifad.org</p>
<p>Project Contact Person: Janie Rioux , Senior Technical Specialist (Environment and Climate Change), IFAD HQ Paxina Chileshe, Regional Climate and Environment Specialist, East and Southern Africa</p>	
<p>Tel. and email: +393316954996 - j.rioux@ifad.org; +254 207621035 - p.chileshe@ifad.org</p>	

Telephone: 0211-252395

0211-252394

0211-252391



In reply please quote

No:..... NDA/71/21/9

REPUBLIC OF ZAMBIA

MINISTRY OF NATIONAL DEVELOPMENT PLANNING

Corner of John Mbita & Nationalist Roads

P.O. BOX 30145

Lusaka-Zambia

30th December 2020

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax 202 522 3240/5

Endorsement for the SADC-GMI/IFAD/ CRIDF regional proposal to the Adaptation Fund titled “*Enhancing Water and Food Security through Sustainable Groundwater Development in the SADC Region*”

In my capacity as a National Focal Person representing Zambia on the SADC Sub-Committee on Hydrogeology, I confirm that the above regional project is in accordance with our national priorities to implement adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Zambia, as well as the broader region. The project also advances the role of groundwater in climate proofing the vulnerable communities in the rural and remote areas.

Accordingly, I am pleased to endorse the regional project concept note for submission to the Adaptation Fund. I am aware that If approved, the project will be implemented by the SADC-GMI, IFAD and the CRIDF.

Please accept the assurances of my highest consideration.

Yours Sincerely,

A handwritten signature in blue ink, appearing to read 'Francis Mpampi'.

Francis Mpampi

National Coordinator-National Designated Authority for the GCF and AF
MINISTRY OF NATIONAL DEVELOPMENT PLANNING



República de Moçambique
Ministério da Terra e Ambiente
Gabinete do Ministro

The Adaptation Fund Board
C/o Adaptation Fund Board Secretariat
Email: Secretariat@AdaptationFund.org
Fax 202 522 3240/5

Refª 19 /MTA/GM-SP/SC0/21

Maputo, 04 de Fevereiro de 2021

Subject: Endorsement for the SADC-GMI/IFAD/ CRIDF regional proposal to the
Adaptation Fund titled *“Enhancing Water and Food Security through
Sustainable Groundwater Development in the SADC Region”*

In my capacity as the Designated Authority for the Adaptation Fund in Mozambique,
I confirm that the above regional project is in accordance with our national priorities
in implementing adaptation activities to reduce adverse impacts of, and risks, posed
by climate change in Mozambique, as well as the broader region.

Accordingly, I am pleased to endorse the regional project concept note for
submission to the Adaptation Fund. If approved, the project will be implemented by
the SADC-GMI, IFAD and the CRIDF.

Please accept the assurances of my highest consideration.

Yours Sincerely

Emília Leonor Dique Fumo

(Permanent Secretary)

PRIVATE BAG BO 199
GABORONE
BOTSWANA
REFERENCE: ENT 177 XX (22)



TEL: (+ 267) 3914955
FAX: (+ 267) 3951092

REPUBLIC OF BOTSWANA
MINISTRY OF ENVIRONMENT, NATURAL
RESOURCES CONSERVATION AND TOURISM

5th February, 2021.

The Chairman,
Adaptation Fund Board,
c/o Adaptation Fund Board Secretariat
1818 H Street NW
Washington DC 20433
USA.
Email: Secretariat@Adaptation-Fund.org
Fax 202 522 3240/5

Dear Sir,

Endorsement for the SADC-GMI/IFAD/ CRIDF Regional Proposal to the Adaptation Fund titled "Enhancing Water and Food Security through Sustainable Groundwater Development in the SADC Region"

In my capacity as the Designated Authority for the Adaptation Fund in Botswana, I confirm that the above regional project is in accordance with our national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Botswana, as well as the broader region.

Accordingly, I am pleased to endorse the regional project concept note for submission to the Adaptation Fund. If approved, the project will be implemented by the SADC-GMI, IFAD and the CRIDF.

Please accept the assurances of my highest consideration.

Yours Sincerely

B.J. Gopiang
For Permanent Secretary

Our Mission: To protect the environment; Conserve the country's renewable and natural resources; Derive value out of environment for the benefit of Botswana.



All communications should be addressed, "The Secretary for Environment, Climate, Tourism and Hospitality Industry"

P Bag 7753 Causeway,
Zimbabwe
Telephone: 701681/3
Fax: 252673

Your Ref.:
Our Ref:



ZIMBABWE

MINISTRY OF ENVIRONMENT,
CLIMATE, TOURISM AND
HOSPITALITY INDUSTRY
11th Floor,
Kaguvi Building
Cnr 4th Street/Central Avenue
Harare

19 January 2021

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax 202 522 3240/5

Subject: Endorsement for the SADC-GMI/IFAD/ CRIDF regional proposal to the Adaptation Fund titled "Enhancing Water and Food Security through Sustainable Groundwater Development in the SADC Region".

In my capacity as the Designated Authority for the Adaptation Fund in Zimbabwe, I confirm that the above regional project is in accordance with our national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Zimbabwe, as well as the broader region.

Accordingly, I am pleased to endorse the regional project concept note for submission to the Adaptation Fund. If approved, the project will be implemented by the SADC-GMI, IFAD and the CRIDF in collaboration with national institutions.

Please accept the assurances of my highest consideration.

Sincerely,

A handwritten signature in blue ink, appearing to read 'W. Zhakata'.

W. Zhakata
Director Climate Change Management
Adaptation Fund Focal Point



Telephone: 265 770 244
Telegrams: TRADEMIN, Lilongwe
Fax: 265 770 680
E-mail: minci@malawi.net



In reply please quote No.

Ministry of Industry
P.O. Box 30366
Capital City
Lilongwe 3
MALAWI

Ref. No. MOI/AF//100

29th January 2021

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat,
Email: Secretariat@Adaptation-Fund.org,
Fax 202 522 3240/5

Dear Sir/Madam,

Subject: Endorsement for the SADC-GMI/IFAD/ CRIDF regional proposal to the Adaptation Fund titled “Enhancing Water and Food Security through Sustainable Groundwater Development in the SADC Region”

In my capacity as the Designated Authority for the Adaptation Fund in Malawi, I confirm that the above regional project is in accordance with our national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Malawi, as well as the broader region.

Accordingly, I am pleased to endorse the regional project concept note for submission to the Adaptation Fund. If approved, the project will be implemented by the SADC-GMI, IFAD and the CRIDF.

Please accept the assurances of my highest consideration.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'Peter K. Simbani', written over a horizontal line.

Peter K. Simbani

DESIGNATED AUTHORITY FOR THE ADAPTATION FUND IN MALAWI



environment, forestry & fisheries

Department:
Environment, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

Private Bag X447, Pretoria, 0001, Environment House, 473 Steve Biko Road, Pretoria, 0002 Tel: +27 12 399 9000, Fax: +27 86 625 1042

Ref: EDMS 202621

Enquiries: Shahkira Parker

Tel: 012 399 9240 **Email:** sparker@environment.gov.za

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat

Fax 202 522 3240/5

Email: Secretariat@Adaptation-Fund.org

Adaptation Fund Board

ENDORSEMENT FOR THE PROPOSAL TO THE ADAPTATION FUND TITLED “*ENHANCING WATER AND FOOD SECURITY THROUGH SUSTAINABLE GROUNDWATER DEVELOPMENT IN THE SADC REGION*”

In my capacity as the Designated Authority for the Adaptation Fund in South Africa, I confirm that the above regional project is in accordance with our national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in South Africa, as well as the broader region.

Accordingly, I am pleased to endorse the regional project concept note for submission to the Adaptation Fund. If approved, the project will be implemented by the Southern African Development Community Groundwater Management Institute, the International Fund for Agricultural Development and the Climate Resilient Infrastructure Development Facility.

Please accept the assurances of my highest consideration.

Yours Sincerely

Ms Nomfundo Tshabalala
DIRECTOR-GENERAL
DATE: 12/03/2021

