

PRE-CONCEPT FOR A REGIONAL PROJECT/PROGRAMME

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project/Programme: Upscaling Groundwater-Based Natural Infrastructure (GBNI) to Support Water Resilience in Selected Transboundary Aquifers (TBAs) of Southern Africa

Countries: Malawi, Mozambique, and Zambia

Thematic Focal Area¹: Transboundary water management

Type of Implementing Entity: Multilateral Implementing Entity

Implementing Entity: International Fund for Agriculture Development

Executing Entities: SADC Groundwater Management Institute and (International Fund for Agriculture Development as PFG Executing Entity only)

Amount of Financing Requested: 14,000,000 (in U.S Dollars Equivalent)

Project Formulation Grant Request: Yes ☒ No ☐ ☐

Amount of Requested financing for PFG: 33 000 (in U.S Dollars Equivalent)

Letters of Endorsement (LOE) signed for all countries: Yes ☒ No ☐ ☐

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: <https://www.adaptation-fund.org/apply-funding/designated-authorities>

Stage of Submission:

☒ This pre-concept has been submitted before

☐ This is the first submission ever of the pre-concept

In case of a resubmission, please indicate the last submission date: Click or tap to enter a date.

Please note that pre-concept should not exceed 5 pages (in addition to this first cover page)

¹ Thematic areas are Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

Project Background and Context:

1. Joint development and management of shared waters are widely acknowledged for increasing resilience and enhancing water security. The importance of transboundary water cooperation is reflected in Sustainable Development Goal (SDG) 6.5 and considered a critical component to ensuring water and sanitation for all (SDG6) and a critical requirement and catalyst for achieving other SDGs on poverty, food security, health and wellbeing, sustainable energy, climate action, ecosystem protection and peace². However, many Member States in the Southern African Development Community (SADC) show deepening water scarcity and food and energy insecurity crises with limited implementation of climate change adaptation. The predictions are that climate change will significantly impact water resources globally and in Southern Africa, with more frequent hydrological droughts and extreme rainfall events. Projected and continuing variability of the amount, intensity, and predictability of rainfall in much of Southern Africa due to climate change will change how the region views its groundwater resources to support climate resilience. The dynamic and declining water availability under future climate projections will lead to greater pressure to exploit untapped and little-known groundwater resources. The Shire River Aquifer system within the Zambezi River Basin in southern Malawi and central Mozambique is experiencing high inter-annual climate variability³⁴. The average annual temperature shows a statistically significant increasing trend³ and rainfall patterns may continue to change. The Sand and Gravel Transboundary Aquifer (TBA) shared between Malawi and Zambia faces similar water insecurity issues. In addition, the impacts of existing climate extremes, including severe floods, are extensive, as illustrated by Cyclones Idai (2019) and Freddy (2023). The limited amount of infrastructure for regulating the flow of the Shire River Aquifer System, save the Kamuzu Barrage in Liwonde, indicates that natural infrastructure solutions for storage and flood attenuation, including aquifers, hold a lot of potential⁵. Further, the growing reliance on groundwater calls for understanding the biodiversity status of groundwater-dependent ecosystems (GDEs) to inform decisions around groundwater management.

Project Objectives:

- To reduce the adverse impacts of climate variability and change (i.e., floods and droughts) through joint conjunctive management of shared surface water and groundwater, including using natural infrastructure (e.g., aquifers and wetlands) and implementing early warning systems.
- To identify GDEs in transboundary settings, their role in ecological functioning and minimum thresholds of GDEs to respond to disturbances.
- To promote catchment management (e.g., reducing overexploitation, revitalising natural vegetation) to enhance water quality, stream flow and groundwater retention.
- To diversify and strengthen the livelihoods of the most vulnerable communities through piloting and demonstrating concrete climate change adaptation measures based on Groundwater Based Natural Infrastructures (GBNIs) in local Resilience Hubs.

Project Components and Financing:

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US\$)
1. Baseline assessment: Establishing the baseline and understanding of solutions	Technical assessment of GBNi solutions	1.1 TDA and Joint Strategic Action Plans (JSAPs) for the Shire River Aquifer System Sand and Gravel Transboundary Aquifer 1.2 Situational analysis undertaken and GBNi Solutions identified 1.3 GDEs mapped, and ecological functions understood 1.4 Flood and drought-prone areas mapped 1.5 Water Storage Scenarios Defined and decision criteria established	Malawi/ Mozambique/ Zambia	1,754,546
2. Groundwater protection zoning of GDEs and Ecosystem Restoration	Ecosystem protection Sustainability criteria and threshold limits	2.1 Groundwater protection zones or source water protection areas delineated in the Shire River Aquifer System and Sand and Gravel Transboundary Aquifer, incorporating ecosystem-based approaches to ensure sustainable management and protection.	Malawi/ Mozambique/ Zambia	750,000

² <https://unece.org/environmental-policy/events/contribution-transboundary-water-cooperation-achieving-sustainable>

³ IWMI, & SADC-GMI. (2018). Transboundary Diagnostic Analysis for the Shire River-Aquifer System.

⁴ MoAIWD. (2015). Thematic Assessment: Climate change - Development of a Basin Planning Framework Report on Climate Change Analysis

⁵ IWMI & SADC-GMI (2019). Strategic Action Plan for the Shire River-Aquifer System.

3. Managed Aquifer Recharge (MAR) solutions in the Shire River Aquifer System/Sand and Gravel Aquifer	Infrastructure resilience Community resilience and improved livelihoods	3.1 Pre-feasibility studies conducted at ten (10) potential MAR sites 3.2 5 Feasibility studies and detailed designs conducted 3.3 5 MAR schemes implemented, with groundwater monitoring and early warning systems (EWS)	Malawi/ Mozambique/ Zambia	4,000,000
4. Effective conjunctive land-use and water management	Improved food security Improved groundwater use efficiency Groundwater protection from contamination Climate shock buffering	4.1 Pre-feasibility studies conducted at ten (10) current community gardens 4.2 5 Feasibility studies and optimisation of current conjunctive use schemes conducted 4.3 Conjunctive land-use and water management practices implemented (reforestation, gully reclamation, sustainable land use) 4.4 Farmer awareness raised	Malawi/ Mozambique/ Zambia	4,000,000
5. Aquifer governance	Improved groundwater governance and management Sustainability criteria and threshold limits implement	5.1 Multi-Country Cooperation Mechanism for Groundwater established 5.2 Model agreements on aquifer utilisation shared with riparian countries for adoption 5.3 Local groundwater management institutions based on GESI considerations conducted 5.4 Citizen science groundwater monitoring programmes implemented.	Malawi/ Mozambique/ Zambia	950,000
6. Total				11,454,546
7. Project Execution cost				1,272,727
8. Total Project Cost				12,727,273
9. Project Cycle Management Fee charged by the Implementing Entity (if applicable)				1,272,727
Amount of Financing Requested				14,000,000

Project Duration: (5 YEARS)

PART II: PROJECT JUSTIFICATION

- In Malawi, Mozambique and Zambia, the populations living in TBAs face high poverty levels and vulnerability to floods and droughts. Climate change will increase temperature and intensify rainfall variability. Water quality is likely to decrease due to increased economic activity and population. Several barriers exist to the sustainable, cooperative and equitable use of transboundary groundwater resources for climate change adaption. These include⁶:
 - Insufficient transboundary collaboration and cooperation structures for coordinated sustainable use of TBAs.
 - Insufficient technical understanding of transboundary groundwater resources and future climatic scenarios for policy and investment decision-making at national and regional levels.
 - Insufficient knowledge on how groundwater over-abstraction and watershed degradation affect community livelihoods in a changing environment. This restricts farmers' and agribusinesses' access to climate-resilient methods and infrastructure for sustainable groundwater use.
 - Focus on new water storage often overshadows maximising current systems through rehabilitation, reoperation, and retrofitting.
 - Climate change may require water storage systems to fulfil new performance standards to provide the same services and safety to handle rising flood risks.

Integrated Storage Planning Framework

- The World Bank developed an Integrated Storage Planning Framework to address the water storage gap efficiently while being cognizant of the environmental and social risks inherent in water resources planning and development⁷. The framework recognises that managing and optimising groundwater storage increases resilience during droughts and controls floods during periods of heavy rainfall. Based on this framework, the project's first component establishes baseline conditions by characterising the current system and the potential for additional water management options or other solutions. The second component identifies source water protection areas and delineates them in the Shire River Aquifer System and Sand and Gravel Aquifer. The third component implements managed aquifer recharge solutions in the Shire river Aquifer System/Sand and Gravel Aquifer. MAR ensures a reliable and sustainable groundwater supply, even during drought or dry seasons, reducing reliance on unpredictable rainfall or surface water sources. By storing water underground during wet seasons, MAR provides an essential reserve for communities during water shortages, ensuring access to water for drinking, agriculture, and industry. MAR also supports year-round farming, enabling multiple cropping cycles and diversifying income sources. Groundwater is a natural storage system, providing a buffer against climate variability. Community-led MAR projects, such as recharge wells and check dams, have successfully restored groundwater levels in regions under water stress, thereby allowing farmers to cultivate crops throughout the year and enhancing rural livelihoods.

⁶ World Bank. 2023. ["What the Future Has in Store: A New Paradigm for Water Storage."](#) World Bank, Washington, DC.

⁷ Ibid

Existing early warning system for groundwater will be supported for maintaining groundwater and MAR operations' effectiveness, sustainability, and safety. This system facilitates monitoring and predicting potential risks, including early detection of depletion, water quality concerns, over-recharge incidents, or system malfunctions, enabling prompt and appropriate interventions. The fourth component will select and implement climate-smart solutions in the TBAs. The fifth component focuses on improved food security through improved groundwater use governance. Optimising GBNIs assists with water security and regulating floods so that communities quickly adapt to shocks and stresses. Furthermore, there are shared benefits of cooperative, integrated management and groundwater system development across international boundaries to deal with water risks as proposed in the fifth component.

Added value through a regional approach

4. GBNIs actively use and manage groundwater and subsurface systems and processes to increase water storage, retention, quality, and environmental functions or services for water security, human resilience, and environmental sustainability. They include subsurface floodwater storage, sand dams, and natural stormwater treatment. Using a regional strategy makes interventions easy to scale and implement across SADC and beyond. Because aquifers, rivers and climate change traverse borders, a regional strategy is needed. SADC-GMI has a regional presence, mission for regional integration, and expertise to develop collaborations in water resource management to improve transboundary socio-economic livelihood activities and ecological services.

Alignment with regional and national strategies and policy

5. The supreme law in each participating country is its respective Constitution, providing a broad framework for legislation on water management. The Constitution of the Republic of Malawi of 1994 (as amended) recognises water or access to water as a human right, implicitly in the Bill of Rights that provides for the rights to life, dignity, and social and economic development, among other rights. The Constitution of the Republic of Mozambique of 1990 (as amended) frames water as a resource vested in the state. It is operationalised through the Five-Year Plan 2020 – 2024 and the National Sustainable Development Plan (PNDS) for Rural, Sustainable and Inclusive Growth with a time horizon of 2030. In Zambia, the vision of the National Policy on Climate Change (NPCC) of 2016 is "A prosperous and climate-resilient economy by 2030". The countries' plans emphasise inclusive, agriculture-led and gender-equitable green growth and the need for health and drinking water services.

Innovation

6. Historically, countries used aquifers nationally without considering the impact on water resources across borders. Recharge and protection have been neglected in favour of groundwater abstraction. Nature-based infrastructure will be developed, and opportunities for scaling will be identified. The use of transboundary aquifers to improve livelihoods, promote climate resilience, and form a collaborative monitoring network is novel in Southern Africa and Sub-Saharan Africa, where groundwater is underutilised and underdeveloped.

Cost-effectiveness

7. The proposed GNBI solutions will undergo a detailed cost-benefit analysis to achieve the highest environmental and social gains during the feasibility assessment. About USD 8.0 million of the Project Funds (62%) will be allocated to Components 3 and 4 to implement concrete actions for climate change adaptation measures that will put sustainable groundwater development, ecosystems, and improved livelihoods in place.

Consultative process and adherence to environmental and social norms, policies, and safeguards

8. The SADC Groundwater Management Institute (SADC-GMI) serves SADC Member States and promotes international cooperation. As amended, the SADC-GMI is a section 21 not-for-profit business registered under the South African Companies Act No. 71 of 2008. A Board of Directors from SADC Member States, the University of the Free State, an Executive Director, and the SADC Secretariat's Water Division Chair runs the institute. The SADC-GMI implements infrastructure projects in all 16 SADC Member States based on its robust Stakeholder Engagement Strategy (2023–2028) and SADC regional policies and legislative frameworks for participatory sustainable development, regional integration, and resilience building. The proposed project will include stakeholder identification and analysis, timely disclosure of project information, inclusive dissemination and access to information, public participation, discussions and feedback, and a grievance mechanism. Using its Gender Equality and Social Inclusion (GESI) Mainstreaming Strategy, SADC-GMI can engage its civil society and government partners to identify 'left behind' groups for targeting and inclusion. Women, the elderly, youth, the disabled, and other vulnerable populations will be heard when choosing climate-resilient interventions.
9. The project commits to full compliance with Adaptation Fund's Environment and Social Policy, and IFAD's Social, Environmental, and Climate Assessment Procedures (SECAP). Environmental and social risks will be systematically identified and assessed at concept note, proposal stage and managed throughout implementation, ensuring adherence

to both IFAD and the Fund's safeguard requirements. IFAD will integrate an environmental and social risk assessment framework. This will include a screening mechanism to classify USPs based on potential environmental and social risks at concept note level and proposal stages, ensuring that feasibility studies incorporate comprehensive risk identification and mitigation strategies. IFAD will also establish a monitoring system with clear review and approval processes for USPs at proposal stage before implementation, ensuring alignment with the Adaptation Fund's safeguard requirements. Additionally, stakeholder engagement during concept note further refined at proposal stage and participatory planning will be prioritized to assess risks at local levels and integrate adaptive management measures. Capacity-building initiatives for executing partners, particularly SADC-GMI and national focal institutions, will ensure adherence to the USP guidelines throughout project implementation.

Sustainability

10. 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 affected by climate change, to increase water use efficiencies, climate-proof infrastructure and build resilience.

Learning and knowledge management

11. Component 1 focuses on the learning and knowledge generation required to implement the GBNI solutions. SADC-GMI hosts the SADC Groundwater Information Portal (SADC-GIP), which will serve as a repository and share the data generated by the project. This will be used to generate regional knowledge on adaptation measures to the impacts of climate change. Moreover, SADC-GMI runs annual SADC Groundwater Conferences where regional knowledge and research results are shared. It also has a training calendar on several topics, including the sustainable use of groundwater to support resilient livelihood approaches under climate change impacts. With these offerings, SADC-GMI's value proposition as the implementer of this regional initiative is invaluable as the only regional groundwater institution recognised by all 16 SADC Member countries.

PART III: IMPLEMENTATION ARRANGEMENTS

12. IFAD will be the Implementing Entity with fiduciary and technical oversight. While IFAD will also be the Executing Entity for the PFG, SADC-GMI will be the Executing Entity of the project. Multi-stakeholder Groundwater National Focal Groups (NFGs) in each participating country will coordinate national and local stakeholder participation. Groundwater-NFG stakeholders from different sectors will work together to manage, develop, and use groundwater sustainably. NFG members include mandated government organisations, academic and research institutions, the business sector, NGOs, community-based organisations, service suppliers, and primary users. The Malawi, Mozambique, and Zambian water ministries and National Designated Authorities for the Adaptation Fund will oversee implementation.


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

A. Record of endorsement on behalf of the government⁸

Billy Katonka, NDA, Ministry of Green Economy and Environment, Zambia	Date: 8 August 2024
Emilia Fumo, NDA-Permanent Secretary, Ministerio Da Terra E Ambiente, Mozambique	Date: 17 November 2023
Robert Mwanamanga, Director Debt Aid, Ministry of Finance, Economic and Affairs, Malawi	Date: 18 December 2024

B. Implementing Entity certification


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 and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

Implementing Entity coordinator: Pierre-Yves Guedez Lead Multilateral Climate & Environmental Funds (AF, GCF, GEF), IFAD 	e-mail: p.guedez@ifad.org
Mr Juan Carlos Mendoza Casadiegos Director Environment, Climate, Gender and Social Inclusion Division, IFAD	
Date: 12/18/2024	e-mail: ecgmailbox@ifad.org
Project contact persons:	
Mr Claus Reiner Regional Climate and Environment Specialist, IFAD	e-mail: c.reiner@ifad.org

Annex 1 Letters of Endorsement

All communication should be addressed to the
Permanent Secretary
Telephone: 0211-252395
0211-252394
0211-252391

In reply please quote
No.:
NDA/71/21/9


REPUBLIC OF ZAMBIA
MINISTRY OF GREEN ECONOMY AND ENVIRONMENT
OFFICE OF THE PERMANENT SECRETARY
Corner of John Mbita & Nationalist Roads
P.O. BOX 30147
Lusaka-Zambia


8th August, 2024

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

**RE: ENDORSEMENT FOR THE SADC-GMI/IFAD REGIONAL CONCEPT NOTE TITLED
'UPSCALING GROUNDWATER-BASED NATURAL INFRASTRUCTURE (GBNI) TO
SUPPORT WATER RESILIENCE IN SELECTED TRANSBOUNDARY AQUIFERS (TBAS) OF
SOUTHERN AFRICA'**

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

Accordingly, I am pleased to endorse the above project concept note with support from the Adaptation Fund. If approved, the project will be implemented by International Fund for Agriculture Development (IFAD) and executed by SADC Ground Water Management Institute (SADC-GMI).


Billy Katontoka (Mr.)
National Coordinator
National Designated Authority
MINISTRY OF GREEN ECONOMY AND ENVIRONMENT

Telephone: (265) 1789 355
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E-mail finance@finance.gov.mw



MINISTRY OF FINANCE
AND ECONOMIC AFFAIRS
CAPITAL HILL,
P.O. BOX 30049,
LILONGWE 3
MALAWI.

Ref. No. FIN/DAD/RM/5/2/124

18th December, 2024

The Adaptation Fund
1818H Street, NW,
MSN 7N-700
Washington, DC 20433,
USA.

Dear Adaptation Fund Secretariat,

Subject: Endorsement for the SADC-GMI/IFAD Regional project titled "Upscaling Groundwater-Based Natural Infrastructure (GBNI) to Support Water Resilience in Selected Transboundary Aquifers (TBAs) of Southern Africa"

In my capacity as Designated Authority for the Adaptation Fund in Malawi, I confirm that the above regional project is in accordance with our national priorities in implementing adaption activities to reduce adverse impacts of and risks posed by climate change in Malawi, as well as the broader region. The project also advances the role of groundwater in climate proofing vulnerable communities in rural and remote areas.

Taking note of the above, I am pleased to endorse the above project for submission to the Adaptation Fund. I am aware that if approved, the project Implementing Entity will be International Fund for Agriculture Development (IFAD), while SADC-Groundwater Management Institute (GMI) shall be the Executing Entity.

Yours faithfully,

For: **SECRETARY TO THE TREASURY**



REPÚBLICA DE MOÇAMBIQUE
MINISTÉRIO DA TERRA E AMBIENTE
GABINETE DO MINISTRO

To:

The Adaptation Fund Board
C/O Adaptation Fund
Board Secretariat
E-mail: secretariat@adaptation-fund.org
Fax: 202 522 3240/5

N/Ref.ª nº 128 MTA/GM-SP/2023

Maputo, 17 de Novembro de 2023

Subject: Endorsement for the SADC-GMI/IFAD Regional Concept note/Proposal to the Adaptation project titled "Upscaling Groundwater-Based Natural Infrastructure (GBNI) to Support Water Resilience in Selected Transboundary Aquifers (TBAs) of Southern Africa"

In my capacity as National Designated Authority for the Adaptation Fund in Mozambique, I confirm that the above regional project is in accordance with our national priorities to implement adaptation activities to reduce the adverse impacts of, and risks, posed by climate change in Mozambique, as well as the broader region. The project also advances the role of groundwater in climate proofing vulnerable communities in rural and remote areas.

Taking note of the above, 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 Groundwater Management Institute (SADC-GMI) and the International Fund for Agricultural Development (IFAD).

Please accept the assurances of my highest consideration.

Kind regards

Permanent Secretariat





Revised PFG Submission Form¹
Project Formulation Grant (PFG)

Submission Date:

Adaptation Fund Project ID:

Country/ies: Mozambique, Malawi, Zambia

Title of Project/Programme: Upscaling Groundwater-Based Natural Infrastructure (GBNI) to Support Water Resilience in Selected Transboundary Aquifers (TBAs) of Southern Africa

Type of IE (NIE/RIE/MIE): MIE

Implementing Entity: International Fund for Agricultural Development (IFAD)

Executing Entity/ies: International Fund for Agricultural Development (IFAD) for the PFG, SADC Groundwater Management Institute for the project

A. Project Preparation Timeframe

Start date of PFG	Upon Pre-Concept Note approval date
Completion date of PFG	(10 months) after Pre-Concept Note approval date

B. Proposed Project Preparation Activities (\$)

List of Proposed Project Preparation Activities	Output of the PFG Activities	US\$ Amount	Budget note²
Workshops	3 National Stakeholder Consultation Reports based on National workshops with stakeholders and local communities	6,000	Stakeholder workshops
Consultants	A full Concept Note document for submission to AF	18,500	Consultancy fees for proposal development
Travel	Travel expenses for project activities	5,200	

¹ As presented in AFB/PPRC.33/40 Annex 1.

² The proposal should include a detailed budget with budget notes indicating the break-down of costs at the activity level. It should also include a budget on the Implementing Entity management fee use.


Project formulation grant for concept note		29,700	Total PFG allocation for concept preparation
Implementing Entity (IE) Fee (10.0%)		3,300	IE fee based on 10% of total PFG
Project Formulation Grant + IE fee		33,000	Total PFG budget inclusive of IE fee

Please describe below each of the PFG activities and provide justifications for their need and for the amount of funding required:

C. Implementing Entity

IFAD will be the Implementing Entity with fiduciary and technical oversight. While IFAD will also be the Executing Entity for the PFG, the SADC Groundwater Management Institute will be the Executing Entity of the project.

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

Implementing Entity Coordinator, IE Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Addresses
Mr Pierre Yves Senior Climate Finance Specialist ECG Division, IFAD		12/16/2024	Mr Claus Reiner Regional Climate and Environment Specialist, IFAD	+254 11 5492302	email: p.guedez@ifad.org e-mail: c.reiner@ifad.org