



**REPUBLIC OF MOZAMBIQUE
MINISTRY OF PUBLIC WORKS, HOUSING AND WATER RESOURCES
NATIONAL DIRECTORATE FOR WATER RESOURCES MANAGEMENT
DEPARTMENT OF WATER RESOURCES MANAGEMENT**

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) - DRAFT

for

THE XAI-XAI AQUIFER SYSTEM, GAZA PROVINCE

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1. Project Description

1.1 Project Location and Regional Setting

The Xai-Xai Aquifer System is situated in the eastern part of Gaza Province, Mozambique, within a low-lying coastal plain shaped by the hydrological dynamics of the Limpopo River Basin and the Indian Ocean. The study area lies predominantly within Xai-Xai District, covering an estimated 1,865 km² and supporting a population of approximately 163,259 inhabitants (INE, 2024).

From an administrative perspective, Xai-Xai District comprises four Municipal Administrative Posts: Praia de Xai-Xai, Inhamissa, Patrice Lumumba, and Headquarters, which includes the locality of Chilaulene. The City of Xai-Xai functions as the district capital and a key urban center for the region. The district is bounded by the Limpopo River and Ponela Norte to the north, the Indian Ocean to the south, Chongoene District to the east, and Limpopo District to the west (Republic of Mozambique, 2020).

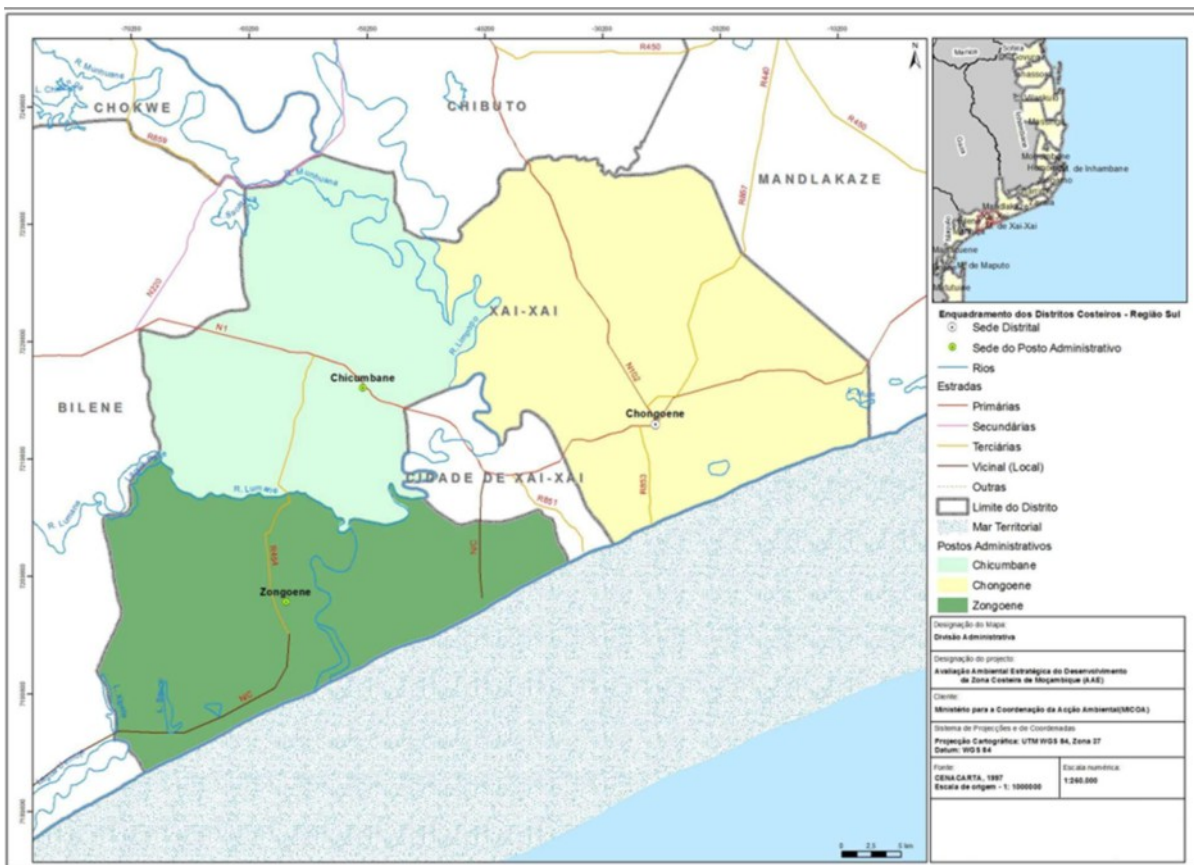


Figure 1 - Location of the Xai-Xai Aquifer Study Area.
Source: MICOA (2012).

This project is being implemented under the SADC Groundwater Management Institute (SADC-GMI) Programme, which invites Member States to develop initiatives for the sustainable management of groundwater resources. In response, Mozambique proposed the project entitled:

“Detailed Study for the Vulnerability Assessment and Hydrogeochemical Analysis of the Xai-Xai Aquifer System, Gaza Province.”

The project has been structured into three sequential phases, in alignment with international best practice (WB/IFC standards) and regional groundwater management priorities (SADC guidelines):

Phase I – Hydrogeochemical Analysis of the Aquifer System & Monitoring Infrastructure Development

Comprehensive hydrogeochemical characterization of the aquifer system to establish baseline water quality conditions.

Construction of two (2) groundwater monitoring boreholes, strategically located to support long-term monitoring of groundwater quantity and quality.

Supervision by a qualified site inspector to ensure compliance with environmental, social, health, and safety (ESHS) standards.

Preparation of an Environmental and Social Management Plan (ESMP) to guide the management of potential risks and impacts.

Training of Key Stakeholders on Environmental Management and Water Quality Monitoring. Design of the Groundwater Quality Monitoring Plan.

Manual of Good Environmental Management Practices and Procedures.

Identify potential sources of contamination in the Xai-Xai District.

Phase II – Aquifer Geometry Delineation and Mapping

Development of a hydrogeological model through geophysical surveys, borehole data analysis, and spatial mapping.

Delineation of aquifer geometry and recharge zones, essential for sustainable abstraction and climate resilience planning.

Phase III – Detailed Vulnerability Assessment

Evaluation of the aquifer’s susceptibility to contamination and overexploitation, taking into account land use, population growth, and climate change projections.

Recommendations for risk mitigation, monitoring protocols, and policy integration at district, provincial, and national levels.

The project’s outcomes are expected to strengthen evidence-based groundwater management, enhance water security, and ensure sustainable use of the Xai-Xai Aquifer System, in line with SADC’s Regional Strategic Action Plan (RSAP) and the World Bank Environmental and Social Framework (ESF).

2. Description of the Work to Which the ESMP Will Be Applied

This ESMP applies to all activities associated with the Xai-Xai Aquifer Project, covering both preparatory studies and the construction of a water supply system. The activities are organized into two main phases, each with distinct objectives, tasks, and environmental and social implications.

2.1 Activities Directly Related to the Project

Phase I – Preparatory and Analytical Activities

This phase focuses on establishing the technical, social, and environmental foundations required for sustainable groundwater development. It includes:

- a) **Procurement of Goods and Services – Acquisition of equipment, technical services, and specialized expertise in line with WB procurement standards.**
- b) **Inventory of Existing Water Sources – Mapping and documentation of all operational and non-operational boreholes, wells, and surface water sources to establish a baseline.**
- c) **Assessment of Water Demand – Determination of water needs for multiple uses, including domestic consumption, small-scale irrigation, and other socio-economic activities.**
- d) **Hydrogeological Assessment – Geophysical surveys and hydrogeological studies to identify potential sites for groundwater exploitation and sustainable abstraction rates.**
- e) **Stakeholder Consultation – Engagement with local communities, traditional leaders, district authorities, and water user associations to validate project relevance and ensure inclusivity.**
- f) **Project Management and Contract Administration – Oversight of contracts, compliance with environmental and social safeguards, and adherence to national and international standards.**
- g) **Monitoring and Evaluation – Continuous tracking of technical progress, social engagement, and environmental management practices.**

Phase II – Construction and Operationalization of the Water Supply System

This phase involves the development of physical infrastructure and community capacity to ensure sustainable water supply. Key activities include:

- a) **Pumping Test – Execution of pumping tests on the newly drilled borehole(s) to determine yield, aquifer response, and sustainable abstraction limits.**

3. Activities to Be Carried Out During the Different Phases

Under the drilling contract, the Contractor is responsible for the execution of all drilling and well-construction operations, including the provision of labor, materials, equipment, tools, transportation, lighting, and other required resources. The Client, acting as project owner, will oversee all drilling and construction activities to ensure technical quality, cost efficiency, and adherence to environmental and social standards.

All activities shall comply with the applicable legal and regulatory framework of Mozambique, specifically the requirements of the Ministry of Public Works, Housing, and Water Resources (MOPHRH), as well as with good international industry practice (GIIP) and World Bank Environmental and Social Standards.

3.1 Roles and Responsibilities

a) Compliance and Standards

The Contractor shall carry out all works in accordance with approved technical specifications, the drilling and construction plan, and professional standards.

The Client shall ensure that all work complies with relevant legislation, MOPHRH guidelines, and WB/SADC environmental and social safeguards.

b) Supervision and Daily Reporting

The Client shall appoint a qualified On-Site Supervisor, who will:

- o Monitor daily progress of drilling and construction activities.
- o Collect, verify, and certify daily reports prepared by the Contractor.
- o Submit reports to MOPHRH upon request and at contract completion.

c) Material Quality Assurance

The Contractor shall guarantee the quality of all materials (e.g., casing, tubing, gravel pack, pumps, and fittings).

Only materials meeting the approved specifications and standards shall be installed.

d) Work Progress Reporting

The Contractor shall prepare weekly and monthly progress reports, including:

- o Records of materials procured and installed.
- o Summary of drilling progress and challenges encountered.
- o Corrective actions taken, where necessary.

e) Certification of Work and Invoicing

Upon satisfactory completion, the Client shall:

- o Certify that works meet contractual requirements and standards.
- o Verify accuracy of invoices prior to authorizing payment.

3.2 Data Collection and Field Records

The Contractor shall systematically collect and maintain accurate field data, including:

Drilling penetration rates and lithological logs.

In-situ water quality parameters (conductivity, pH, total dissolved solids, temperature). Static and dynamic water levels, and compressed air yield tests.

Hydrogeological observations and complete borehole construction records (depths, casing, screen intervals, gravel packing, sealing).

All data shall be compiled in a standardized format and submitted to the Client and MOPHRH for future reference and decision-making.

3.3 Monitoring of Borehole Construction

The Client shall monitor all activities to ensure that:

Drilling operations optimize hydrogeological data collection.

Boreholes are constructed according to MOPHRH-approved designs and specifications.

Construction methods prevent cross-contamination between aquifer layers.

3.4 Health, Safety, and Environmental Protection (HSE)

The Contractor shall:

Implement an HSE management plan covering occupational safety, community health and safety, waste management, and spill prevention.

Prevent contamination of aquifers through proper drilling fluids management and sealing.

Ensure safe storage, handling, and disposal of drilling by-products (cuttings, wastewater, chemicals). Provide personal protective equipment (PPE) and training to all workers.

The Client shall verify that HSE requirements are applied consistently throughout all project phases.

3.5 Role of the On-Site Supervisor

The On-Site Supervisor shall act as the Client's official representative, with responsibilities to:

Ensure all works are carried out in compliance with the civil works contract, technical standards, and this ESMP.

Serve as the point of communication between the Client and Contractor.

Ensure fairness, transparency, and adherence to best practices in all aspects of service delivery.

Verify that all data, reports, and deliverables are complete, accurate, and of acceptable quality.

4. Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan (ESMP) provides a structured framework for managing the potential environmental, social, and health and safety impacts associated with the Detailed Study for the Vulnerability Assessment and Hydrogeochemical Analysis of the Xai-Xai Aquifer System. It outlines mitigation, management, and enhancement measures to ensure compliance with national regulations, World Bank Environmental and Social Framework (ESF) requirements, and SADC-GMI standards.

The ESMP is organized into thematic sections, covering general ESHS management, protection of the environment, health and safety, labour and community relations, traffic and public safety, emergency preparedness and response, monitoring and evaluation, and climate resilience. For each section, the plan identifies specific measures, verification methods, responsible parties, and monitoring procedures to ensure effective implementation.

This structured approach facilitates systematic supervision, timely reporting, and continuous improvement throughout the project lifecycle, ensuring that environmental and social risks are minimized and that the project contributes positively to the local community and ecosystem.

Environmental and Social Management Plan (ESMP) Detailed Study for the Vulnerability Assessment and Hydrogeochemical Analysis of the XaiXai Aquifer System, Gaza Province				
Item	Mitigation, Management and Enhancement Measures	Means of Verification	Responsibility	Monitoring Procedure
A. General Requirements for ESHS				
Responsibilities and Liabilities	Ensure all workers, suppliers, and subcontractors are familiar with and comply with the ESHS requirements and specifications of this ESMP. Implement World Bank ESF safeguards, SADC-GMI ESCP, ESMF, and ESS standards.	- Records of induction training- Signed contracts with subcontractors and suppliers	Contractor / SADC-GMI/Ministry of Public Works, Housing and Water Resources (MPWHWR) / National Directorate for Water Resources Management	- Review training records- Review contracts to confirm integration of ESMP requirements
Resources for ESHS Management	Contractor to designate an on-site focal person to liaise with the Ministry's hydrogeologist on ESMP implementation. This requirement shall be explicitly stated in the contract. MPWHWR to appoint qualified ESHS staff and ensure an E&S Consultant is assigned and trained to discharge ESHS tasks effectively.	Signed contract for Xai-Xai Water Supply System Monthly ESHS reports prepared and signed by designated ESHS staff	(DNGRH) Contractor / SADC-GMI /MPWHWR /DNGRH Contractor / SADC-GMI /MPWHWR / DNGRH	Review contractor's records to confirm presence of responsible person on site Review project records to check instances of non-compliance attributable to insufficient ESHS capacity
Reporting	ESHs staff to record and report progress, incidents, accidents, observations, and near misses, in line with SADC-GMI ESMF. Contractor to submit monthly reports via the ESS Consultant to MPWHWR. MPWHWR to monitor and forward reports to SADC-GMI. SADC-GMI to review, provide feedback, and enforce compliance.	- Number of compliant monthly reports- Reporting protocol consistent with SADC-GMI ESMF and ESCP	Contractor / ESS Consultant / SADC-GMI /MPWHWR / DNGRH /	- Contractor/ESS Consultant submit monthly reports to MPWHWR- MPWHWR reviews and forwards to SADC-GMI- SADC-GMI conducts monthly review and enforces compliance
Code of Conduct	Disseminate and ensure adherence to the SADC-GMI Code of Conduct (Sub-Grant Manual, 2022). Provide induction sessions for all personnel.	- Code of Conduct shared with staff- Induction records- Reference: SADC-GMI Sub-Grant Manual (2022)	Contractor / SADC-GMI /MPWHWR	- One-time review of induction records at project start- Monthly review of reported misconduct and grievance records
ESHs Training	Deliver H&S induction and awareness training to the workforce (including indirect workers) on project-specific H&S risks and mitigation measures. Training to be jointly provided by Contractor, MPWHWR (DNGRH), and SADC-GMI at project inception.	Training reports prepared and signed by Contractor, ESS Consultant, and SADC-GMI	Contractor / SADC-GMI /MPWHWR / DNGRH /	- One-time review of training reports by SADC-GMI- Monthly review of ESMP implementation reports to identify training gaps

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B. Protection of the Environment				
Protection of Adjacent Areas	Restrict excavation during intense rainfall. Implement temporary bunding and containment systems to prevent sediment, oil, or chemical runoff into receiving waters. Backfill unsuccessful boreholes. Suspend excavation if heavy rainfall occurs.	Approved construction drawings/plans; supervisory checklists; boreholes backfilled; works halted during rainfall.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Review weather forecasts before field activities; on-site inspection before and during excavation.
	Minimize impacts on vegetation, soils, groundwater, surface water, biodiversity, drainage, and water quality by applying least-impact construction methods.	Approved construction drawings/plans; absence of significant impacts in adjacent areas; supervisory checklist.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Monthly supervision, including monitoring of adjacent ecosystems.
	Ensure works are confined within approved site boundaries. Clearly mark boundaries with danger tape and signage. Inform nearby communities of restricted zones.	Approved drawings/plans; site borders marked; community awareness records.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Pre-construction inspection; regular field supervision by DNGRH.
	Maintain minimum buffer distances from permanent watercourses, flood-prone areas, sensitive infrastructure (schools, health centers, water points), and housing.	Approved drawings/plans; site boundaries marked with warning signs.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Pre-construction inspection; monthly supervision by DNGRH.
	After construction, reshape disturbed land to ensure long-term stability, adequate drainage, and suitability for natural regeneration or planned land use.	Visual inspection; comparison with undisturbed areas.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Site inspection before and after completion of works.
Pollution Prevention	Implement strict pollution prevention measures (liquid effluents, air emissions, dust, noise, vibration). Ensure safe fuel, oil, and chemical handling and storage (≥50 m from sensitive receptors, stored above catch pans). Maintain equipment in good condition.	Site inspection reports; pollutant storage locations; disposal records.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Routine site inspections; review of disposal and storage records.
General & Construction Waste Management	Segregate, store, and dispose of all general and construction waste in compliance with Mozambican law and WB EHS Guidelines.	Waste transfer notes; disposal certificates; inspection reports.	Contractor (implementation); MPWHWR /DNGRH/ARA Sul (monitoring)	Pre- and post-construction inspections; review of waste records.
Emissions & Dust	Control dust using water bowsers. Provide workers with PPE (e.g., face masks). Raise community awareness on maintaining safe distances. Enforce vehicle engine shutdown when not in use.	Visual inspections; supervisory checklist; grievance records.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul Contractor	Monthly supervision visits; spot checks of grievance records.

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B. Protection of the Environment				
Noise & Vibration	Prohibit noisy operations (drilling, heavy vehicle movement) at night (20:00–06:00). Position generators and noisy equipment away from sensitive receptors. Ensure noise levels ≤120 dB.	Site inspection records; noise measurements; grievance records.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Pre-construction review of site setup; noise monitoring during works; monthly review of
Borrow Areas, Stockpiles & Access Roads	Select borrow areas, stockpile sites, and access roads in designated low-value locations, avoiding sensitive ecosystems or productive land.	Approved designated areas; supervisory records.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	grievances. Verification once during site selection.
Vegetation Clearing	Limit vegetation clearing strictly to approved work zones. Avoid clearing mature or endangered species. Prior approval required from DNGRH/MPWHWR. Apply selective clearing methods, avoid native vegetation removal, and plan for rehabilitation/replanting. If endangered species are discovered, halt works, assess impacts, and implement mitigation before resuming.	Visual inspections; records of approvals; comparison of tree cover before/after works.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Pre-construction site inspection; ongoing supervision during works; final inspection post-construction; monthly grievance record review.

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C. Health and Safety				
Accident Reporting	Record and report all H&S-related incidents, observations, near misses, and accidents on site. Include procedures for Gender-Based Violence (GBV) incidents under the Code of Conduct and grievance mechanism.	H&S incident reporting protocol in place (World Bank ESF and SADC-GMI Sub-Grant Manual); completed incident/accident forms; grievance logs.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Site inspections during each visit; review incident logs and grievance records; verify corrective actions implemented.
Personal Protective Equipment (PPE)	Provide all workers with appropriate PPE (hard hats, masks, gloves, safety glasses, safety boots, high-visibility vests). Consultant to define PPE requirements in the technical specifications and quantity map.	Daily visual inspections; supervisory checklists; PPE inventory records.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Inspect PPE usage and stock during each site visit; ensure proper maintenance and replacement.

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C. Health and Safety				
First Aid	Maintain minimum first aid provisions on site. Include at least one trained first-aid technician among staff, as specified in technical documentation.	First aid kits present and stocked; supervisory checklist; records of trained personnel.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Regular site visits to check availability and functionality of first aid kits; confirm trained personnel are on site.
Hygiene, Accommodation, and Food Safety	Ensure provision of hygienic facilities (toilets, bathrooms, handwashing stations) at all work sites. Define safe practices for food preparation and provision. Include recreational areas as appropriate for staff well-being.	Daily visual inspections; site cleanliness records; food safety checklists.	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Conduct regular inspections; verify facilities are functional and hygienic; check compliance with food and sanitation protocols; record observations in site reports.

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D. Labour and Community Issues				
Local Recruitment	- Prioritize hiring of qualified local personnel for construction, supply, and service provision. - If qualified personnel are unavailable locally, recruit from neighboring areas. - Apply gender-sensitive hiring practices. - Establish a written complaints mechanism for labour issues, including integrity and fairness. Complaints must be addressed within one week, aligned with WB Code of Conduct. - Contractors must comply with Mozambique labour laws, the national Labour Management Procedures (LMP), and contractual obligations. - ESS Consultant appointed by subgrantee to report monthly on compliance issues.	- Labour Management Procedures (LMP) - Supervisory checklists - Daily labour roster - Employment contracts	Contractor / MPWHWR / DNGRH/ARA Sul	- Regular supervisory visits to verify local recruitment and gender balance - Review contractor staff establishment and employment records - Monthly compliance report by ESS Consultant

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D. Labour and Community Issues				
Community Interaction & Consultation	- Engage communities and local authorities throughout project implementation: 1. Pre-construction consultation 2. During construction 3. Project closure - Disclose and explain the Grievance Redress Mechanism (GRM) at the first meeting. - Incorporate local knowledge into project design, particularly regarding land use, cultural sites, and sensitive areas. - Provide local labour opportunities and training through the consultancy.	- Minutes of meetings - GRM logs - Photos/videos of consultation sessions	Contractor / MPWHWR / DNGRH/ARA Sul	- Review of grievance register and responses - Review minutes of consultation meetings - Verification of participation of local labour
Chance Finds (Cultural Heritage / Archaeological / Fossil Discoveries)	- Cease all works immediately upon discovery. - Document and notify the relevant authorities (e.g., Ministry of Culture, National Heritage, Archives). - Engage authorities for assessment and advice. - Implement mitigation measures as per SADC-GMI Sub-Grant Manual (2022). - Resume works only after clearance. Continue regular monitoring and reporting.	- Site reports - Incident notification records	Contractor; MPWHWR; Ministries responsible for Environment, Heritage, Archives, and Water Resources	- Review of site reports - Verification that authorities were notified and mitigation measures applied - Monitoring post-clearance to ensure compliance with mitigation measures

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E. Traffic, Access & Public Safety				
Traffic Management	Implement traffic management plan: control vehicle speed, mark access roads, separate pedestrian routes from construction areas, provide signage and barriers	Traffic management plan; site signage; visual inspection	Contractor / MPWHWR / DNGRH/ARA Sul	Daily inspection of traffic arrangements; review incident logs; ensure compliance with traffic management plan
Community Awareness	Inform communities about construction schedules, vehicle movements, and safety measures; display notices; conduct briefings	Notices; community meeting minutes; photos/videos	Contractor / MPWHWR / DNGRH/ARA Sul	Pre-construction briefing; monthly community updates; check that messages are communicated effectively

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F. Emergency Preparedness & Response				
Emergency Plan Development	Develop and implement an Emergency Response Plan (ERP) covering accidents, spills, fires, flooding, and other emergencies. Define roles, responsibilities, and communication channels.	Approved ERP document; staff training records	Contractor / MPWHWR / DNGRH/ARA Sul	Review ERP prior to construction; ensure staff understand roles; update plan as needed
Staff Training & Drills	Train workers on ERP procedures; conduct quarterly drills simulating real emergencies.	Drill reports; training attendance sheets; photos/videos	Contractor / MPWHWR / DNGRH/ARA Sul	Conduct quarterly drills; evaluate performance; implement corrective measures
Emergency Equipment & Materials	Ensure availability of first aid kits, fire extinguishers, spill kits, communication devices, and PPE for emergency situations.	Inventory logs; inspection checklists	Contractor / MPWHWR / DNGRH/ARA Sul	Weekly inspections; monthly supervisory checks; replenish and maintain equipment
Incident Reporting & Response	Record all emergency incidents; ensure rapid response, documentation, and reporting to MPWHWR and relevant authorities; implement corrective actions.	Incident logs; notification forms; corrective action records	Contractor / SADC-GMI /MPWHWR / DNGRH/ARA Sul	Immediate reporting of incidents; monthly review of incident log; confirm follow-up actions completed

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G. Monitoring & Evaluation				
KPI Tracking	Track Key Performance Indicators (KPIs) for all environmental, social, and H&S measures, including incidents, grievances, compliance with ESMP, PPE usage, water quality, biodiversity, and training completion	Monthly monitoring reports; KPI dashboards; site inspection records	Contractor; ESS Consultant; MPWHWR/DNGRH	Review KPIs monthly; implement corrective actions; verify documentation

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G. Monitoring & Evaluation				
Site Inspection & Verification	Conduct regular inspections to ensure ESMP measures are implemented, verify mitigation measures, and document observations	Inspection checklists; photographic evidence; supervision reports	Contractor; MPWHWR/DNGRH/ARA Sul; ESS Consultant	Weekly site inspections; monthly summary reports; follow up on deviations
Reporting	Submit monthly monitoring reports detailing compliance, progress, incidents, and lessons learned, with recommendations for improvements	Monthly reports submitted to MPWHWR and SADC-GMI	Contractor; ESS Consultant; MPWHWR/DNGRH	Review reports monthly; provide feedback; ensure follow-up on recommendations
Continuous Improvement	Identify gaps, lessons learned, and implement improvements to ESMP measures throughout project lifecycle	Updated ESMP documents; corrective action logs	Contractor; ESS Consultant; MPWHWR/DNGRH	Review during monthly monitoring meetings; Update ESMP accordingly; track corrective actions

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H. Climate & Resilience Considerations				
Climate Adaptation Measures	Integrate climate resilience into project planning: secure equipment and materials during heavy rainfall or storms; maintain flood protection measures; schedule construction activities considering seasonal weather patterns	Construction plans; site inspection reports; weather records	Contractor; MPWHWR/DNGRH	Pre-construction review of risk assessments; continuous monitoring during adverse weather; document adaptations and protective measures
Extreme Weather Preparedness	Identify flood-prone areas and implement protective measures; ensure temporary works (bunds, drainage channels) are robust against storms	Site inspection; photos; technical reports	Contractor; MPWHWR; DNGRH	Monitor weather forecasts; inspect site before and after heavy rainfall or storms; update protective measures as needed

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H. Climate & Resilience Considerations				
Climate-Resilient Design	Ensure boreholes, water supply infrastructure, and related facilities are designed to withstand extreme weather events (flooding, high winds, storm surges)	Engineering design documents; approval certificates	Contractor; MPWHWR; DNGRH	Review design prior to construction; verify construction compliance with resilient design specifications
Monitoring & Reporting	Maintain records of weather events and any climate-related impacts; document corrective or adaptive measures taken	Weather logs; incident reports; site diaries	Contractor; MPWHWR; DNGRH	Continuous site monitoring; monthly reporting on climate-related issues; implement lessons learned for future works

5. Conclusion and Implementation Guidance

The Environmental and Social Management Plan (ESMP) outlined in this report provides a comprehensive framework for mitigating potential impacts and enhancing positive outcomes associated with the Detailed Study of the Xai-Xai Aquifer System. By clearly defining responsibilities, monitoring procedures, and verification methods across all thematic areas, the plan ensures alignment with national regulations, World Bank Environmental and Social Framework (ESF) standards, and SADC-GMI guidelines.

Successful implementation of the ESMP relies on the active engagement of all project stakeholders, including the Contractor, Ministry of Public Works, Housing and Water Resources, the National Directorate for Water Resources Management, the appointed ESS Consultant, and the local community. Regular monitoring, timely reporting, and periodic reviews will ensure that all mitigation and management measures are effectively executed, risks are minimized, and corrective actions are applied when necessary.

The ESMP should be treated as a living document, adaptable to unforeseen conditions, project modifications, or emerging environmental and social issues. Continuous communication, capacity building, and adherence to the outlined measures will safeguard the aquifer system, surrounding environment, and local communities while supporting the long-term sustainability of the project.