

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) SUMMARY

1. General Information and Project Description

Project Title	:	Massingir Dam Emergency Rehabilitation Project (MDERP)
Project Number	:	P-MZ-AAC-002
Country	:	Mozambique
Environmental Category	:	2
Department	:	OSAN
Division	:	OSAN.3

1.1 The Massingir Dam Emergency Rehabilitation project (MDERP) seeks to support the rehabilitation of the bottom outlet structure of the Massingir Dam to ensure the safety and operational efficiency of the dam. The proposed works will comprise (i) Repair to the bottom outlet conduits, (ii) Repair to the existing bottom outlet steel liner, and (iii) Rehabilitation of the bottom outlet hydro-mechanical equipment.

1.2 The engineering construction works entail rehabilitating lower outlet conduits which ruptured during an accident by demolishing the concrete surrounding the damaged sections of the conduits (three sections of the structure with an estimated length of 52 metres each), the repairs of the entire conduits especially the joints and the installation of steel lining encased in the concrete to a significant length (183 meters each) of the bottom outlets to ensure effective sealing of leaking joints and allow for full operation of the outlets, and the construction of the concrete structures for the hydro-mechanical equipment.

1.3 Engineering works entail alignment and reinforcement of the outlet radial gates, replacement of two hydraulic jacks, provision of electric hydraulic equipment and the rehabilitation of an intake gate of the third outlet conduit. The main component of the rehabilitation is full length steel liners to the conduits. The liners are 6.4 m internal diameter which allows for 800 mm of working space between the liners and the existing conduits for welding and concreting. Other components of the rehabilitation are: (i) a central reinforced concrete wall in the failed area which may be required to allow one of the conduits to be used as a temporary outlet and prevent water from entering the second conduit while the steel liner is being installed, (ii) The repair of the two radial gates, the replacement of two hydraulic jacks and the provision of electric/hydraulic operating equipment, (iii) Two new radial gate hoisting structures, a control room and ducting, (iv) Refurbishment of the intake gate for the upper (hydropower) conduit including all necessary repairs to hydraulics/electrics, (v) Repair and/or replacement of the downstream stop-logs, (vi) Dealing with water, including monitoring, well pointing and grouting, and (vii) The provision of all necessary monitoring facilities for the dam, including seepage monitoring.

2. Objectives of the ESMP

2.1 The Environmental and Social Management Plan (ESMP) describes the range of environmental and social issues associated with the MDERP and outlines the corresponding management procedures to mitigate potential adverse environmental and social impacts, and to optimize positive impacts. The ESMP is meant to strengthen the mobilization of the beneficiary

communities with regard to environmental and health aspects and render the dam more sustainable, both socially and environmentally. Given the type of engineering interventions associated with the repair works to the bottom outlet, most of the resulting impacts will be localized. The Project will comply with all local laws and regulations, which seek to ensure that the construction work does not adversely affect the community environmental and social resources.

2.2 The ESMP is a working document, which provides direction and assistance in, (i) Planning and design of construction activities and procedures to protect the environment, (ii) Environmental mitigation measures, (iii) Environmental emergency response measures. The implementation of the ESMP may be slightly modified to suit changes or emergencies that may occur on site at the time of project implementation. Consequently, a certain amount of flexibility should be allowed to maximize its implementation to the best advantage.

During construction, the Resident Engineer may periodically revise the ESMP in consultation with the Contractor. Revisions may be made to accommodate changes in work, weather and site conditions. During construction, monitoring will be undertaken to ensure that proposed mitigation measures for negative impacts and enhancement measures for positive impacts are implemented. Any adverse impacts that arise will be mitigated on an on-going basis.

2.3 The ESMP is designed to ensure that the project complies fully with the requirements of the Mozambique Environment Act (2006) and the environmental and social assessment procedures for funding under the African Development Bank requirements.

3. Context

3.1 The Massingir Dam and Reservoir is located in the Gaza Province of Mozambique and forms part of the Limpopo River Basin, an area which covers 80,000 km² of the Mozambican territory. The project area includes the immediate vicinity of the dam wall and downstream of the dam wall where the repair works will occur and any areas where temporary camps, store yards, workshops and crushing plants may be established by the Contractor. The Project area also includes areas where borrowed material may be obtained such as borrow pits or river courses for coarse aggregate and sand for use in construction activities.

3.2 The Limpopo National Park (LNP), covering an area of approximately 10, 000 km² is located immediately to the north of the Massingir Reservoir in the area bounded by the Elefantes River in the south and the Limpopo River in the north. The LNP also forms part of the Great Limpopo Tranfrontier Park which covers an area of 35, 771 km² and includes the following conservation areas: (i) Limpopo National Park - located in Mozambique, the former Coutada 16, was declared a National Park in 2001, (ii) Kruger National Park – Presently the largest and most famous African wildlife sanctuary located in South Africa, and (iii) Gonarezhou National Park - Located in Zimbabwe.

4. Beneficial and Adverse Impacts

4.1 The nature and scope of the construction works and the environmental setting of the project are such that many of the adverse impacts often associated with river modification of

projects will cause insignificant environmental impacts. No adverse impacts are anticipated in respect to sensitive habitat, wildlife or cultural heritage. In essence, the already existing structure of Massingir Dam will be rehabilitated, strengthened and saved. It does not warrant any acquisition of land, rehabilitation or resettlement. There will be positive impacts associated with creation of safety structure for Massingir Dam, increased efficiency of the irrigation system linked with the dam and possibly water availability for additional agricultural lands. During construction, the contractors' work force is expected to be largely recruited locally, which will enhance economic opportunities for the local population belonging to working age group.

4.2 The emergency repair works to the bottom outlet will allow for a controlled release of water to ensure the protection of the downstream ecosystem. Minimal environmental impacts are likely to occur during the construction work associated with the emergency repairs as follows: Construction camps are likely to be a source of potential public health problems and therefore would be kept clean and hygienic. Provision of proper sanitation would be crucial, especially in the case of preventing the introduction and spread of water-borne diseases. In addition, run off from the vehicle yards containing fuel and lubricants, and from material stock piles containing particulate matter can all lead to contamination of soil and water. The project will ensure that proper disposal for all types of wastes generated on-site is carried out according to the specifications outlined in the ESMP.

4.3 When the construction of the outlet is completed and is commissioned for operations, it is not likely to cause any significant noise, air, water pollution or in any way threaten the normal control and maintenance of the Limpopo National Park located upstream of the dam. The use of borrow material from the vicinity of the dam or the river bank will not likely cause changes which may be irreversible or cannot be mitigated.

4.4 Significant beneficial impacts are expected to result from the project. The most important of these being a major improvement in the operational efficiency and safety of the Massingir Dam along with guaranteed and increased water flow to Xai Xai and Chokwe irrigation schemes. This, in turn, is expected to bolster a range of agricultural activities through increased productivity and outputs and ultimately raise the quality of life of the beneficiaries.

5. Enhancement and Mitigation Program

Measures to ensure that the Contractor follows environmentally friendly procedures will be implemented. This will entail incorporating contract clauses with restrictions to the working areas, and also those which prevent pollution of the reservoir and river, ensure proper sanitation, disposal of waste and garbage, landscaping and site clearance as follows:

5.1 Material handling, use and storage: The Contractor will implement procedures and restrictions (including "no go" areas) required to comply with the project Specifications, and also provide a site layout plan to the Resident Engineer indicating all proposed storage and work fabrication areas along with any other areas required for the contractor's use. Construction material will be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, will have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor will also be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. All manufactured and/or imported material will be

stored within the Contractor's camp (Contractor's demarcated working area), and, if so required by the Resident Engineer, out of the rain. All lay down areas outside of the construction camp will be subject to the Resident Engineer's approval. All imported materials will be free of weeds, litter and contaminants. Stockpile areas will be approved by the Resident Engineer before any stockpiling commences.

5.2 Erosion and sedimentation control: The Contractor will take all reasonable measures to limit erosion and sedimentation occurring as a result of construction activities and will, in addition, comply with the project Specifications. The integrity of riparian vegetation will be protected at all times to prevent or minimize river bank erosion. Where erosion and/or sedimentation occurs, whether on or off the Site and despite the Contractor complying with the foregoing, rectification will be carried out in accordance with details specified by the Resident Engineer.

During construction, the Contractor will protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes or river banks.

Any tunnels or erosion channels developed during the construction period will be backfilled and compacted, and the areas restored to a proper condition. Stabilisation of cleared areas to prevent and control erosion will be actively managed. The method of stabilisation will be determined in consultation with the Resident Engineer. Traffic and movement over stabilised areas will be restricted and controlled, and damage to stabilised areas will be repaired and maintained to the satisfaction of the Resident Engineer.

5.3 Stream diversion

The Contractor will not divert, dam or modify any watercourse or stream without the approval of the Resident Engineer. The Contractor will submit a method statement to the Resident Engineer for approval prior to commencing construction. Diverted streams will be reinstated to the satisfaction of the Resident Engineer.

5.4 Stream crossing: Temporary bridges will be built in order for the Contractor to cross rivers as and if required and, where appropriate, the structure of the bridge will be such that there is nothing placed in the water (i.e. the bridge will be "bank-to-bank" in a single span). The fording of rivers by machinery and vehicles will be undertaken at slow speed and with clean vehicles (i.e. no oil leaks, etc) and along a single track.

5.5 Water abstraction from rivers or groundwater: Abstractions from natural water resources require prior approval by the Resident Engineer.

5.6 Borrow areas: Borrow areas are proposed in river courses for removal of sand and aggregate materials. All proposed borrow sites will be clearly indicated on plan. Prior to the onset of any borrow activities the Contractor will establish from the Resident Engineer whether authorisation has been obtained from the relevant authorities. No excavation or will commence before the necessary authorisations are in place. The borrow area should be located in areas that, (i) minimize the removal of riverine vegetation especially riverine forest, and (ii) the river bank is

of gentle slope. Only a single access road to the borrow area is permitted and access of other vehicles will be controlled.

Vehicles leaving borrow pits will not deposit/shed mud, sand and debris onto any public road. All loads will be covered with a tarpaulin or similar to prevent dangers and nuisance to other road users. During the rehabilitation of borrow areas the slope of the borrow area will be graded to blend with the natural topography of the river and will be rehabilitated and stabilised to prevent erosion and in such a way that natural regeneration may take place

6. Environmental Monitoring Plan

6.1 During the planning stage, the project will ensure that all the relevant legal and statutory requirements are complied with, and that all design features related to the repair works have been incorporated into the design to ensure proper operation of the dam.

6.2 During the construction phase, it is particularly important to ensure that all the features of the designs as presented in the design reports and drawings are implemented. Monitoring during the operation period has to ensure that the operating and performance standards of irrigation are followed and achieved. Monitoring activities are currently on-going through the supplementary loan, and they include, (i) Water quality of the reservoir (water chemistry, nutrient chemistry, organic carbon, biomass and composition of phytoplankton measured on samples from several stations along the length of the reservoir, (ii) Salt balance in the lower Limpopo Valley, (iii) environmental flows, and (iii) salt balance in the Lower Limpopo Valley.

7. Responsibilities

7.1 The Resident Engineer and Contractor will ensure that the mitigation measures set out in the Environmental and Social Management Plan (ESMP) are included in the Tender Documents prepared by the Design Engineer. They will also will undertake primary supervision of the ESMP implementation, including activities requiring environmental due diligence during the construction phase.

7.2 During the construction phase, environmental due diligence will be incorporated in the Project implementation, mainly to, (i) Control the residual risk of accidental environmental damage, and (ii) Prevent the negative environmental impacts during construction.

The contractor(s) and Resident Engineer will have the primary responsibility for the due diligence. The Resident Engineer will be required to include environmental considerations in the Monthly Progress Reports and indicate progress in the implementation of mitigation measures as outlined in the ESMP. The construction risks to be monitored will include, but not limited to the following issues, (i) Handling of hazardous materials, as part of the construction activities, (ii) Movement of machinery, (iii) Management of borrow areas, (iv) Occupational safety and health at the contractor's camp and on site, (v) Collection and disposal of wastes, and (vi) Management of pollution incidents.

8. Public consultations and disclosure requirements

During pre-appraisal and appraisal stages of the project design, consultations were carried out with all significant stakeholder groups in the area where the project will be implemented. These stakeholder groups include: Government and regulatory agencies, Non-government organizations, and local stakeholders i.e. district councils and committees, and local population. The ESMP will be publicly released through the AfDB Public Information Center and made available to the AfDB Board 30 days prior to project submission.

9. Estimated costs

The costs for incorporating environmental and social mitigation and monitoring measures are estimated at USD 200,000 over the two-year project implementation period.

10. Implementation schedule and reporting

Measures outlined in the ESMP were incorporated into the project design and will, therefore, be implemented following the same project schedule. Environmental and social management issues arising from project implementation will be reported in the project quarterly/annual progress reports and should be timely addressed by the project management and the Bank.