

# Environmental and Social Impact Assessment for the proposed Protection of Simiyu River Banks in Maswa District, Simiyu Region

## Comprehensive Project Brief

Submitted to:

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## Abbreviations and Acronyms

BA	Bachelor of Arts
BSc	Bachelor of Science
CMIC	Co-Management Intervention Committee
CO <sub>2</sub>	Carbon dioxide
DCDO	District Community Development Officer
DED	District Executive Director
DEMO	District Environmental Management Officer
DFO	District Forestry Officer
DFPO	District Focal Point Officer
DLFC	District LVEMPII Facilitation Team
DPLO	District Planning Officer
EAC	East African Community
EIA	Environmental Impact Assessment
EIC	Education, Information and Communication
EMP	Environmental Monitoring Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
IWRM	Integrated Water Resources Management
ILO	International Labour Organization
LVEMPII	Lake Victoria Environmental Management Project II
MDC	Maswa District Council
MSc	Master of Science
NEMC	National Environment Management Council
NO <sub>x</sub>	Nitrogen Oxides
O & OD	Opportunities and Obstacles to Development
OSHA	Occupational Safety and Health Administration
PEA	Preliminary Environmental Assessment
PPEs	Personal Protective Equipment
SO <sub>x</sub>	Sulphur Oxides
STC	Standard Test Conditions
STDs	Sexually Transmitted Diseases
TBS	Tanzania Bureau of Standards
TZS	Tanzania Shillings
WDCs	Ward Development Committees
WEO	Ward Executive Officer
WHO	World Health Organization
WUAs	Water Users Associations

# Chapter One

## Project Background

### 1.1 Introduction

The Lake Victoria Environmental Management Project phase two (LVEMP-II) is a regional initiative implemented by the five East African Community (EAC) partner states of Tanzania, Kenya, Uganda, Rwanda and Burundi. In Tanzania, the project became effective on the 20<sup>th</sup> August, 2009, and its implementation covers Lake Victoria basin.

LVEMP II in collaboration with Maswa District Council (MDC) intends to implement a project on the protection of Simiyu River Banks in 14 villages of Maswa District. The project will be implemented through a proposed co - management natural resources conservation interventions, an initiative of LVEMP II.

The project's main objective is to reduce environmental stress in selected degraded sub-catchments and to improve the livelihoods of communities who depend on the natural resources of Simiyu River and Lake Victoria as a whole. The project responds to the current threats facing the Simiyu catchment area within Maswa district as identified by Maswa district staff in consultation with the communities along Simiyu River through O&OD approach. The threats include; soil erosion and expansion of Simiyu River banks, deteriorating water quality, deforestation and forest degradation and lack institutions to manage water resources. The project is planning to minimize the effects of the threats through sensitization of the community and build their capacity on environmental protection. The project will establish water user associations, demarcate and mark permanent Simiyu river boundaries; improve catchment vegetation cover by planting new trees and grasses and conduct effective monitoring and evaluation activities. The project benefits include: pollution reduction (silts, sediment and agrochemicals) to Simiyu River and Lake Victoria, increasing community's income from non-wood products, improve community knowledge in conservation and water governance, improve equity in water allocations and well protected water resources base. Despite that the project will be implemented within Maswa district its impact will go far downstream beyond the district boundaries.

Projects of this nature are not specifically mentioned in the First Schedule of the Tanzania EIA and Audit Regulations of 2005 as requiring EIA. However, in order to comply with the Tanzania Environmental Management Act, Cap 191 (2004), LVEMP II wants to ensure that the project is operated in an environmentally and socially acceptable manner. As such, LVEMP II has commissioned a registered EIA expert (Appendix 2) to carry out the ESIA study for this project. The project has been successfully registered with NEMC and the screening decision directed that the proposed project does not exude negative impacts of considerable significance to warrant the need for detailed assessment. Instead, the original Project Brief report has to be made more comprehensive by adding detailed description of project activities and environmental management plan(Appendix 1).

## **1.2 Objectives of the Project Brief**

The project brief was prepared to compile environmental and social considerations into the proposed Simiyu River conservation project design in Maswa District. The overall objective is therefore to ensure that the project delivers minimum disruption to the environment and social settings. Specifically, the brief intends to:

- ≈ provide adequate description of activities to be undertaken
- ≈ predict adverse (negative) and/or beneficial (positive) environmental and social impacts associated with the project.
- ≈ propose appropriate mitigation measures and recommend ways in which the proposed mitigation measures could be incorporated into designs.
- ≈ provide cost estimates required to cover the proposed mitigation measures
- ≈ provide environmental and social management and monitoring plan

## **1.3 Methodology**

The data and information for compilation of this report were gathered between November 2013 and January 2014. In the first place, data and information gaps were identified and strategies were put in place for collecting the information to better compile this report. Generally, the information was collected from a variety of sources including:

- ≈ Review of relevant documents: Policies, guidelines and standards, and legislation etc;
- ≈ Project documents: Concepts, design and schedule of the proposed project; maps and photographs of the project area;
- ≈ Existing secondary information and data on different environmental, social, economical and cultural characteristics of the area obtainable at relevant offices.
- ≈ Consultation with project administrators and experts; project planning teams; and implementers.
- ≈ Field visits for data/information collection - using interviews and discussions with experts, key informants, as well as observations

## **1.4 Structure of the report**

This report is consists of Seven Chapters. The First Chapter presents an introduction, background information, objectives of this project brief and the methodology adopted in data/information gathering exercise. Chapter two presents detailed project description by explaining major project components and activities. Chapter Three is about potential environmental and social impacts of the proposed project and chapter four presents mitigation measures. Chapters Five and Six presents Environmental Management and Monitoring plans, respectively. Chapter Seven provides conclusion remarks whereas the last section of the report presents references and a list of appendices, which among other things consists of maps, photos and list of stakeholder.



## Chapter Two

### Project Description

#### 2.1 Nature of the Project

River Simiyu is among the potential water source of Lake Victoria, which suffers from severe degradation. The proposed project is therefore a typical river bank rehabilitation and management initiative, in response to the above-mentioned degradation. Realization of the great potential for healthy and sustainable socio-economic and environmental development of the Lake Victoria basin lies in combining efforts and integrating the management of common resources. Maswa district reiterates this need by taking positive measures to conserve and protect the deteriorating Simiyu sub-catchment by involving efforts from various departments and stakeholders in Maswa district. Simiyu River traverses through Maswa district and pour its water into Lake Victoria. Simiyu sub-catchment is threatened by excessive gully formations, deteriorating water quality due to human activities, deforestation, and infestation of water hyacinths, inadequate community involvement and absence of community institutions to manage water resources.

The banks of Simiyu River are threatened by human activities like farming of vegetable, sugar canes, potatoes, maize, and fruits as well as using it as the nursery for potato seedlings. The communities around the river banks use the water for all domestic activities like washing, bathing and fishing. The banks are further degraded by massive livestock grazing. Pebble, sand and stone mining are additional activities that add more silt to the river. The project therefore aims at setting the 60m buffer zone on both sides of the river catchment and planting indigenous trees within the buffer zone in a 52-km stretch of the river. Communities that depend on the river will be given other alternative ways of life such as boreholes as water source for domestic and livestock, power tillers, bee keeping projects and milling machine. All these will be managed under the established Water User Associations (WUAs) that will be supported by by-laws.

#### 2.2 Justification of the Project

Sediment load studies conducted in the Simiyu river catchment reveal that there is silt being carried by the Simiyu River to the lake from upstream including Maswa district. Most of the deposition of silt found at the Simiyu river estuary results is a consequence of erosion of riverbanks by such reasons as livestock trampling, vegetation clearance and gullies development. The Simiyu catchment is considered to be one of the main contributors to the deterioration of Lake Victoria, because it is relatively large (10,800 km<sup>2</sup>), with many agricultural activities using agrochemicals (Ningu, 2000), and generating high yields of sediments (Lugomela and Machiwa, 2002). In addition to sediment loading, high chemical concentrations also pose a threat to the catchment and subsequently, Lake Victoria. Hence, the proposed project is likely to bring positive impacts with regards to the conservation of the Simiyu water resources management. Maswa district is aware that the above identified threats have social and economic negative impacts to the water users in the district and the Lake Victoria basin at large. Table 2.1

summarizes threats and strategies that were compiled from the O&OD survey done in all Maswa villages and as identified by the Maswa district council professionals.

Table 2.1: Simiyu River threats and strategies in Maswa District (Source: MDC 2013)

Threat	Strategy
Soil erosion and expansion of Simiyu River banks (within 60 m)	<ul style="list-style-type: none"> <li>≈ Promoting sustainable agriculture practices for soil and by using contour method</li> <li>≈ Trees planting and promotion of natural regeneration (Ngitili)</li> <li>≈ Improve water availability for livestock to reduce trampling</li> <li>≈ Promote sustainable conservation of River banks</li> <li>≈ Promote environmental friendly income generating activities along Simiyu river</li> <li>≈ Identify alternative sites for excavation of building materials (Sand, Stones)</li> </ul>
Deteriorating water quality	<ul style="list-style-type: none"> <li>≈ Promote proper and correct use of pesticides</li> <li>≈ Improve water availability for domestic uses to reduce water pollution resulting from direct use of Simiyu River</li> <li>≈ Raise awareness on importance of tree planting and conservation of natural vegetation along Simiyu River</li> </ul>
Deforestation and Forest Degradation	<ul style="list-style-type: none"> <li>≈ Raise awareness on importance of tree planting and conservation of natural vegetation along Simiyu River</li> <li>≈ Promote afforestation and reforestation</li> <li>≈ Promote forest conservation through natural regeneration ( Ngitili)</li> <li>≈ Enforcement of Laws and By-laws for environmental conservation</li> <li>≈ Promote alternative energy sources and energy efficient technologies</li> </ul>
Lack of local institutions to manage water resources	<ul style="list-style-type: none"> <li>≈ Establishment of local level water resources management institutions</li> </ul>

Protecting of Simiyu river banks is viewed to be a long term solution in taking care of the above identified threats facing the Simiyu catchment in 14 villages within Maswa district. The conservation and protection efforts will contribute to improve and increase the quality and quantity of water into Lake Victoria. The initiative will have positive impacts to the community as well as to the environment. The positive impacts include:

- ≈ Increased regeneration of natural vegetation and biodiversity on land and in the water
- ≈ Improved water quality
- ≈ Increased water quantity for the community, livestock, and ultimately flows to lake Victoria in the downstream
- ≈ Reduced pollution to Lake Victoria that is contributed by Simiyu River.

### 2.3 Location of the Project

The proposed project is located in Maswa District, Simiyu region, Tanzania. Simiyu River catchment covers an area of about 11,000 Km<sup>2</sup> to the outfall into the Lake Victoria and is located between 33° 50' - 35° 00'E and 2° 40' - 3° 30'S. The river drains from the Serengeti National Park plains to Lake Victoria. In Maswa district, the project will cover a stretch of 52 km and will pass through three divisions of Nughu, Mwagala and Sengerema, seven wards of Mwamashamba, Buchambi, Zanzui, Nguliguli, Ipililo, Kadito and Shishiyu. It will cover fourteen villages of Kizungu, Bushashi, Mwashegeshi, Ipililo, Dodoma, Malita, Mwang'anda, Mwabujiku, Mwamitumai, Mwabulegi, Chugambuli, Malekano, Jija and Mwatumbe.



Figure 2.1: Map highlighting Maswa wherein the project area is located

## 2.4 Size and Capacities

Basically the project is an environmental and water resource conservation initiative. It will involve demarcation of Simiyu River boundaries (60m on both sides of the river) using concrete beacons. The beacons are of 1m height and will be established in spaces of 100m apart. The project will also plant trees and grasses (sisals) in the demarcated buffer zone to cover a river stretch of 52km.

## 2.5 Project Activities

The project will be implemented in two main phase; Mobilization and Execution Phase and Maintenance and Monitoring Phase. Each phase is characterized by its activities as briefly described in the following sections.

### 2.5.1 Mobilization and Development Phase

This phase constitute activities that entail an overall arrangement, setting and carrying out of restoration activities. The activities include:

- ≈ Sensitizing and building community capacity on the effects of river bank degradation, environmental laws and other related natural resource management and by-laws, proper use of agro-chemicals/organic pesticides and sanitation/use of latrines,
- ≈ Forming and training water user associations - create community awareness and capacity building on Integrated Water Resources Management (IWRM)
- ≈ Demarcation of Simiyu river bank boundaries in all 14 villages, estimated length is 52 km by setting the 60 meters buffer
- ≈ Mobilization of the workforce
- ≈ Mobilization of working tools and equipment
- ≈ Delivery of materials and equipment
- ≈ Restoration of vegetation cover within Simiyu River banks by planting trees, grasses and natural regeneration in the set buffer.

#### 2.5.1.1 Preparatory activities

At present a large section of the river banks accommodate a combination of natural but significantly degraded vegetation that include grass, scattered bushes and indigenous trees as well as bare land. Preparatory activities will include mobilization of resources (personnel, working tools and equipment as well as materials inputs).

#### 2.5.1.2 Materials inputs

Project implementation will require various types of inputs of various quantities including pre-casted concrete beacons, tree seedlings, water and grass. Most materials will be obtained locally but others will be purchased from licensed local suppliers in Maswa district. Table 2.2 shows approximate amount of materials that will be needed for the project.

Table 2.2: Materials requirement for buffer zone development activities

Type of Materials	Quantity	Potential Source	Distance from the Source, km
Pre-casted concrete beacons	520	Licensed manufacturers in Maswa district	50 - 100 km

Trees seedlings	To cover 200 ha	District and private nurseries in Maswa district	50 - 100 km
Natural grasses (sisals) to be planted to mark river bank boundaries	To be spaced at 20m	Locally available in Maswa district	0.5 - 10km
Lubricants for vehicles	Not established	Local suppliers in Maswa district v	50 - 100 km
Fuel for vehicles	Not established	Local suppliers in Maswa district	50 - 100 km
Water for trees planting	Not established	To be fetched from Simiyu River	Within 60m

### 2.5.1.3 Tools and Equipment requirements

The project will employ various types of working tools and equipment as provided in Table 2.3 below. As much as possible, these will be sourced locally in Maswa.

Table 2.3: Working tools and equipment requirement

S/N	Type	Quantity	Duration (Month)	Source
1	Hand tools (hoes, axes, wheel barrows, knives, canes, etc)	Various	3	Some purchased from local suppliers in Maswa district and others hired from local communities
2	Trucks for transportation of materials (tree seedlings and concrete beacons) and working tools	2	3	To be locally hired in Maswa District
3	Vehicles for transportation of personnel	3	12	LVEMP and Maswa District Council

### 2.5.1.4 Transportation

The materials to the specific sites will be transported by means of vehicles using local district and village road networks.

### 2.5.1.5 Storage of Materials and Working Tools

Working materials, tools and equipment will be stored at government offices in the village where the project will pass through. Besides, vehicles will be fuelled, maintained and repaired in Maswa town.

### 2.5.1.6 The Workforce

Workforce selection during the buffer zone development phase will give preference to local communities. Analysis of the project workforce requirement estimates that the activity will engage about 100 workers during the mobilization and buffer zone development phase. Tree and grass planting activities as well as installation of beacons will be done by local community members in the project

villages under the supervision of Maswa District Council and LVEMP staff. Given this scope of works, nature of the project and site location, there will be no need for camping.

**2.5.1.7 Local supplies and services**

Food supplies for the workforce will be obtained from the local vendors in the respective villages and nearby locations. Medical supply will be obtained from local registered medical facilities in Maswa district. Fuel will be supplied from licensed close-by petrol stations in the Maswa township. Water for irrigation during tree/grass planting will be sourced from Simiyu River.

**2.5.1.8 Waste Generation and Management**

The project through its workforce (people) and daily operational activities is expected to generate various types of wastes with different quantities. Waste generation associated with the project are shown in Table 2.4. Most and critical wastes are expected to be solid waste remains from the tree/grass planting.

Table 2.4: Wastes and Management Procedures during the operation phase

Type of waste	Source and characteristics	Management procedure
Overburden	Shall emanate from excavation works for trees/grasses planting and installation of beacons.	<ul style="list-style-type: none"> <li>• Stockpile and store overburden produced for site rehabilitation after the project construction phase</li> </ul>
Solid wastes	Shall include garbage (as a result of preparation and serving of food), rubbish (which includes papers, woods, tree leaves and branches, bottles, plastic materials, drums, containers, packaging materials etc) might be generated by the people who will be involved especially in the planting of the trees, overburden materials as a result of excavation works during setting of the beacons (mainly top soils), might be the only wastes to be generated.	<ul style="list-style-type: none"> <li>• Establish the normal and standard operational procedures to address the impacts of wastes</li> <li>• Segregate generated wastes, recycling and reuse of waste products where possible and carry out appropriate disposal of waste products.</li> <li>• The various disposal methods will be undertaken in accordance with legislation and standards, Local Government Authority by-laws, and international agreements. Specifically:               <ul style="list-style-type: none"> <li>- Domestic solid wastes i.e. garbage, paper, cans will be segregated using clearly marked bins and disposed off appropriately</li> <li>- Maintenance and packaging wastes (bottles, plastic materials, drums, containers) will be collected, compacted (if possible), segregated using clearly marked skips, labelled, stored in designated areas prior to disposal or recycling.</li> <li>- Combustible solid wastes will be incinerated and the ashes collected and disposed in accordance with legal requirements.</li> </ul> </li> </ul>
Waste oils	Shall include leaking fuels and lubricants from poorly maintained and serviced trucks and vehicles that reaches the project area	No truck/vehicles will be allowed to reach the water course. They will be parked away (>100m) from the water sources. In addition, neither maintenance nor repair shall be allowed in the project area. Only well serviced trucks and vehicles will serve the project.

#### **2.5.1.9 Work Supervision**

Work supervision will be done by staff based at Maswa District Council and LVEMP II. Local government leaders will also assist in supervision of some activities. This arrangement will ensure smooth running of the facilities and adherence to the required and expected performance standards.

#### **2.5.1.10 Support Facilities and Services**

**Water Supply:** Potable water will be needed by workers during the mobilization and buffer zone development phase. About 200L/day will be required.

**Security:** The project will sensitize the local village government and community groups to act as watch dogs and assume a leading role protecting the project and its associated infrastructure. In this way, project sustainability will be guaranteed.

#### **2.4.2 Maintenance and Monitoring Phase**

Maintenance and monitoring phase will commence after the mobilization and buffer zone development phase have been completed. As such, this phase will involve the following activities:

- ≈ Project monitoring and evaluation - ensure regular project supportive supervision visits and follow ups are prepared and conducted
- ≈ Management of vegetation and erosion control
- ≈ Capacity building for the community groups
- ≈ Supervision and monitoring

#### **2.4.3 Project Funding**

The total budgeted cost for the proposed project is about Tshs: 453,352,049.00 where by LVEMPII contribution (WB funding) is Tshs. 364,860,049.00 and MDC is Tshs. 36,651,535.00.

## Chapter Three

### Identification of Environmental and Social Impacts

#### 3.1 Assessment Methodology

While identified potential environmental impacts have been classified in accordance with activities causing them, the impacts were considered to be adversely significant if:

- ≈ Are extensive over time and space;
- ≈ Are intensive in consideration or proportion to assimilative capacity;
- ≈ Exceed environmental standards or thresholds;
- ≈ Do not comply with environmental policies, land use plans and sustainability strategy;
- ≈ Adversely and seriously affects ecological sensitive areas; and
- ≈ Adversely and seriously affect heritage resources, other land uses, communities or indigenous people's traditions and values.

The significance criteria therefore have based on the magnitude scale and duration of the impact; exposure and probability of the impact; consequence of the impacts according to score/scale and colour code implication. Tables 3.1 - 3.3 describe in detail the significance criteria assigned for the various impacts of the project.

Based on these descriptions of the significance criteria, the analysis of the potential environmental impacts identified in this project are well described in Appendix 3.



Table 3.1: Assessment of significance in terms of impact's magnitude, scale and duration

Criterion	Description	Possible Results		
		Term	Description	Score
<b>Magnitude of the Impact</b>	An indication of the severity of the impact, either positive or negative.	Very High	Extreme effect - where natural, cultural or social functions or processes permanently cease	5
		High	Severe effect - where natural, cultural or social functions are altered to the extent that they temporarily cease	4
		Moderate	Moderate effect - the affected environment is altered but natural, cultural or social functions continue, albeit in a modified way	3
		Low	Minimal effect - affects the environment in such way that natural, cultural or social functions and processes are not affected	2
		Very Low	Minimal or negligible effect	1
		Unknown	Magnitude of the impact unknown	5
<b>Scale of the Impact</b>	An indication of geographical extent of the impact	National	Affects the resources of the country	5
		Regional	Affects the resources of the region	4
		District	Affects the resources of the district	3
		Local	Affects the project area and surrounding villages	2
		Site - specific	Localized, confined within the license area	1
		Unknown	Extent of the impact unknown	5
<b>Duration of the Impact</b>	An indication of duration or time over which the impact will be experienced.	Permanent	Will remain permanently	5
		Long term	Extends into the post- closure phase, but not Permanently	4
		Medium term	During the operational life of the project	3
		Short term	Shorter than the operational life of the project	2
		Transient	Very short duration	1
		Unknown	Duration of the impact is unknown	5

Table 3.2 Assessment of significance in terms of Exposure and Probability

Criterion	Description	Possible Results			Score
		Term	Description		
			Discrete Event	Prolonged Exposure	
Exposure to Impact	An indication of the frequency of the activity that may cause the impact, or the continuity of the exposure	Very High	Daily or continuous	Exposure in perpetuity	5
		High	Weekly	Continuous exposure into closure or post-closure phases	4
		Moderate	Monthly	Continuous exposure during construction and operations phases	3
		Low	Bi-annually	Continuous exposure throughout one phase	2
		Very low	Annually or less frequently	Prolonged exposure yet finishes before end of a phase	1
		Unknown	Frequently of activity unknown	Continuity of exposure unknown	5
Probability of the occurrence	An assessment of the degree of certainty associated with a potential impact	Highly likely	Very likely or certain to occur		5
		Likely	Likely to occur		4
		Possible	May possibly occur		3
		Unlikely	Unlikely to occur		2
		Highly unlikely	Very unlikely to occur, or almost impossible		1
		Unknown	Probability of the occurrence unknown		5

Table 3.3: Consequence assessment according to score/scale

Consequence	Magnitude + Scale + Duration	3-4	5-7	8-11	12-14	15
		Very Low	Low	Moderate	High	Very High
Likelihood	Exposure + Probability	2-3	4-5	6-7	8-9	10
		Very Low	Low	Moderate	High	Very High

In order to determine the overall significance of the impacts, a matrix of the scores of the “Consequence” and “Likelihood” was used as shown in Figure 7.1 below. The Colour codes in Figure 7.1 are used to show the significance of the impact in the following manner:

- ≈ White colour for “Very Low Significance”
- ≈ Green colour for “Low Significance”
- ≈ Orange colour for “Moderate Significance”
- ≈ Red colour for “High Significance”
- ≈ Black colour for “Very High Significance”.

The implications of these descriptions are shown in Table 3.4. Based on these implications, the mitigation measures and hence the ESMP were drafted as presented in sections 4 and 5 respectively.

		CONSEQUENCE OF IMPACT (Aggregate: Magnitude + Duration + Scale)				
		Very Low	Low	Moderate	High	Very High
LIKELIHOOD OF IMPACT (Compound: Exposure x Probability)	Very Low	VL	VL	L	L	M
	Low	VL	L	L	M	H
	Moderate	L	L	M	H	H
	High	L	M	H	H	VH
	Very High	M	H	H	VH	VH

Figure 3.1: Colour codes for Impact Significance

Table 3.4: Colour Code Implications

Colour Code	Significance of the Residual Impact	Implications for Project	
		Positive Impacts	Negative Impacts
VL	Very low significance	Negligible effects	Negligible effects
L	Low significance	Some Benefits	Acceptable effect
M	Moderate Significance	Appreciable improvements to, or will sustain, existing resources	Effect is serious enough to cause concern. Changes to project design should be considered.
H	High Significance	Very substantial improvement to existing resources	Unacceptable effect. The project should not proceed unless the design is changed so that the significance of this impact is reduced to acceptable levels
VH	Very high significance	Extremely beneficial and enduring effect	An automatic fatal flaw. The project should not proceed unless the design is changed so that this impact is eliminated or its significance is reduced to acceptable levels.

### 3.3 Potential Environmental Impacts

#### 3.3.1 Mobilization and Development Phase Impacts

##### 3.3.1.1 Deterioration of ambient air quality by fumes

Pollution of ambient air by emissions (in the form of CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub>) will arise from trucks and vehicles that transport materials, working tools and personnel. Even with well-maintained equipment, gases will be emitted from engine of vehicles transporting equipment, materials and personnel to the project area. Production of emissions by transport trucks and vehicles within the project site and near settlements along the existing public roads is likely to affect local climatic conditions. The impact is negative, short-term and of low significance

### **3.3.1.2 Disturbance to local fauna due to noise and vibration**

Noise and vibrations are expected to be generated from vehicles transporting equipments and materials such as trees seedlings and concrete beacons. This will cause disturbance to surface, subsurface and aquatic organisms. However, because mobilization activities will be of short-term and trees/grasses planting will move relatively rapidly, noise and vibrations impacts will be more or less negligible. As such the impact is gauged to be negative, short- term, low significance

### **3.3.1.3 Enhancement of soil erosion**

Tree planting and vegetation activities along the banks of Simiyu River in Maswa will involve digging of holes and ground excavations. Poor planning and improper management of excavation activities might accelerate soil erosion especially if the activities are to be carried out during the rainy and windy seasons. This environmental problem becomes serious when the topsoil is left bare and agents of erosion become active. Soil erosion is likely to interfere with water quality in Simiyu River directly through increasing turbidity levels, siltation and indirectly from contaminants carried with or attached to eroded soil particles. The impact is negative, short-term, moderate significance

### **3.3.1.4 Environmental Pollution from Waste Management**

During tree planting and vegetation activities along Simiyu River banks, potential impacts on the environment may be associated with the handling, storage and disposal of solid waste materials which include garbage (from onsite food serving), rubbish (i.e. woods, tree leaves and branches, bottles, plastic materials, drums, containers, polyethylene bags, packaging materials etc) and overburden materials. If not managed and disposed properly, solid wastes would pollute the soil. In addition, leaking fuel and lubricants from poorly maintained vehicles that reaches the riverbanks are also a potential source of environmental pollution especially water and soil pollution. This pollution is potentially very detrimental to surface, sub-surface and aquatic organisms in the locality. This impact is negative, short-term and of moderate significance.

## **3.3.2 Maintenance and Monitoring Phase**

### **3.3.2.1 Environmental and water conservation**

The project intends to establish a 60m buffer zone on the sides of Simiyu River in 14 villages with an estimated length of 52km. the buffer zone will be planted with indigenous trees and grasses. Natural regeneration of vegetation cover will also be enhanced. In so doing the project is expected to conserve the riverbanks thereby enhancing vegetation hence erosion control and improved water quality over the long run. This impact is considered to be positive, long-term and of high significance.

### **3.3.2.2 Improved landscape and local climate**

The project will accomplish trees and grasses planting in the 60m buffer zone on both sides of Simiyu River. This accomplishment is expected to improve the aesthetics, scenery outlook and increase the landscape value in the rivers' banks. It will also nourish the local climate which will favor local people residing in the locality. This impact is negative, short-term, high significance.

## **3.4 Potential Socio-economic Impacts**

### **3.4.1 Mobilization and Development Phase Impacts**

#### **3.4.1.1 Creation of employment**

The project will create short term employment opportunities for both women and men. Employment opportunities will involve those people who will be engaged in raising tree seedlings, demarcation of the river buffer zone with concrete beacons as well as trees and grasses plating activities along the river. The opportunities will engage skilled labour (botanists, civil engineers, drivers, etc) and unskilled labour. As such people will earn income to sustain themselves and their families. The impact is positive, short-term, high significance

#### **3.4.1.2 Nuisance due to poor waste management**

Much waste is expected during the buffer zone development phase as a result of trees and grasses planting as well as during the buffer zone demarcation. The major wastes are expected to be solid wastes which include garbage (from onsite food serving), rubbish (i.e. woods, tree leaves and branches, bottles, plastic materials, drums, containers, polyethylene bags, packaging materials etc) and overburden materials. Potential impacts on the environment may be associated with the handling, storage and disposal of the wastes and materials containing them. Poor waste management will create nuisance thereby impairing the aesthetic and hygienic status and may lead to eruption of diseases including cholera, malaria, stomach ache, etc. The impact is negative, short-term, low significance.

#### **3.4.1.3 Occupational health and safety risks**

During project implementation (tree planting, grasses planting and demarcation of the river buffer zone), injuries to workers may be promoted by ineffective management of various activities of the project including negligence at work, fatigue due to understaffing and long working hours, lack or non-use of protective gears, low morale, etc. This impact is negative, short-term, medium significance

### **3.4.2 Maintenance and Monitoring Phase**

#### **3.4.2.1 Improved health of local people in Maswa district**

This project is expected to address land degradation and enhance conservation of Simiyu river catchment areas. In so doing the project will increase and improve the quantity and quality of water in Simiyu river over the long run. This will have positive health impacts to local people in the locality and downstream who entirely depend on these rivers for domestic use of water. This impact is negative, short-term, moderate significance.

## Chapter Four

### Environmental and Social Impacts Mitigation Measures

#### 4.1 Environmental Mitigation Measures

##### 4.1.1 Deterioration of ambient air quality by fumes

Fumes will emanate from trucks and vehicles that transport input materials, working tools and personnel to the project area. LVEMP II and all other project stakeholders will minimize fumes from trucks and vehicles by ensuring proper and adequate maintenance and switching off when not in use.

##### 4.1.2 Disturbance to local fauna due to noise and vibration

LVEMP II will implement the following mitigation measures:

- ≈ Low-noise equipment will be selected for project activities wherever possible and feasible
- ≈ Trucks will be well maintained and serviced to minimize noise
- ≈ Locating stationery trucks and vehicles near sensitive areas will be avoided

##### 4.1.3 Enhancement of Soil Erosion

Project developer will implement the following measures to address the impacts:

- ≈ Avoid unnecessary excavation of the land for trees and grasses planting as well as for installation of concrete beacons
- ≈ Implement point excavation for trees and grasses planting as well as for establishment of concrete beacons
- ≈ Eliminate loose soil on the ground thereby ensuring proper backfilling of overburden materials after trees planting and beacons installation
- ≈ Avoid to leave the bare land thereby mulching the planted trees with grasses
- ≈ Monitor areas of exposed soil during periods of heavy rainfall

##### 4.1.4 Environmental Pollution from Poor Waste Management

LVEMP II and all its partners shall follow the normal and standard operational procedures to address the impacts of wastes. The procedure shall involve segregation of waste generated, recycling and reuse of waste products where possible and carry out appropriate disposal of waste products. The various disposal methods will be undertaken in accordance with legislation and standards, Local Government Authority by-laws, and international agreements. The bullets hereunder highlight some of the management measures especially solid wastes which are the major stream expected from the project:



- ≈ Domestic solid wastes i.e. glass, paper, cans will be segregated using clearly marked bins and disposed off appropriately
- ≈ Maintenance and packaging wastes (bottles, plastic materials, drums, containers) will be collected, compacted (if possible), segregated using clearly marked skips, labelled, stored in designated areas prior to disposal or recycling.
- ≈ Combustible solid wastes may be incinerated and the ashes collected and disposed in accordance with legal requirements.
- ≈ To address the impacts of waste oils no truck/vehicles will be allowed to reach the water course. They will be parked away (>100m) from the sources. In addition, neither maintenance nor repair shall be allowed in the project area. Only well serviced trucks and vehicles will serve the project.

#### **4.1.5 Enhancement of environment and water conservation**

#### **4.1.6 Improved landscape and local climate**

This impact will be enhanced by implementing the following measures:

- ≈ Plant only indigenous trees (i.e. *acacia* tree species) and grasses in the proposed Simiyu River buffer zone
- ≈ Establish and implement replacement programme for dry and dead trees and grasses
- ≈ Establish and implement an effective maintenance and monitoring programme to better care for planted trees and grasses as well as established beacons
- ≈ Mobilize, facilitate and motivate local community based groups for participatory management of the proposed Simiyu River buffer zone and the water resources in general

### **4.2 Socio-economic Mitigation Measures**

#### **4.2.1 Creation of employment**

LVEMP II and its partners will implement the following enhancement measures:

- ≈ Recruitment of work force especially unskilled labour will be dominated by local people in the villages where the project will be implemented
- ≈ Local employment will be optimized by offering skills and literacy training to especially youth
- ≈ Project implementation shall observe national and international labour standards and regulations
- ≈ Allocate job fairly among women and men by working with LGA in villages where the project will be implemented in Maswa district
- ≈ Maximize procurement of supplies at local level e.g. tree seedlings, concrete beacons, simple working tools and equipment, etc.
- ≈ Establish a system to manage local expectations

#### **4.2.2 Nuisance due to poor waste management**

This impact will be mitigated as described in section 4.1.4

#### **4.2.3 Occupational health and safety risks**

LVEMP and its partners will implement the following mitigation measures to tackle occupation, health and safety hazards:

- ≈ Provision and use of working equipment and tools
  - Observe local and international standards, operations and requirements for lifting, mobile equipment, working at heights, manual handling, fitness for work, hand tools and vehicle and driving
  - Provide required human resource by recruiting competent personnel as well as supervisors on site at all times during specific activity;
  - Implement measures to minimise sources for health and safety hazards and disturbances (noise, air emissions).
  
- ≈ Provision and use of proper Personal Protective Equipment (PPE), reasonable working hours, conditions and facilities
  - Provision of appropriate and enforcement of use of PPEs
  - Establish fall prevention systems
  - Proper design of undercover or shaded work areas
  - Provide safe and clean portable water for drinking
  - Establishment of appropriate and understandable signage: post warning signs with appropriate text (local language) and graphics
  - Provide for adequate storage of working tools and materials
  - Secure equipment and demarcate any hazardous areas
  
- ≈ Establish a code of practices at the work place
  - Comply with relevant Tanzania (OSHA, 2003) Performance Standards on health and safety requirements.
  - Observe standards procedures and guidelines regarding specific site operations, certified operation equipment, work procedures, inspections and maintenance systems, traffic management
  - Prepare & implement Emergency Response Equipment and Procedures
  
- ≈ Observe for water and sanitation provisions
  - Make a proper assessment of water needs
  - Increase existing water extraction and storage capacity
  - Establish water saving measures including an Education, Information, and Communication (EIC) package with “DOs and DON'Ts”.

#### **4.2.4 Improved health of local people in Maswa district**

The positive impact will be mitigated as described in section 4.1.5 and 4.1.6

## Chapter Five

### Environmental and Social Management Plan

#### 5.1 Introduction

Environmental and Social Management Plan (ESMP) sets the “environmental and social conditions” that will be abided by LVEMP II in the course of implementing this project. It aims at ensuring effective implementation of the proposed mitigation measures. The objective of the ESMP is to set out clearly the key components of environmental and socio-economic management for the project and ensure that the basic concepts are realized throughout the mobilization, development, maintenance and monitoring phases of the Project. The basic concepts for consideration are:

- ≈ Negative impacts on physical, biological and socio-economic setting are mitigated;
- ≈ Benefits that will arise from the development of the Project are enhanced;
- ≈ Compliance with Tanzanian legislation and consistency with international guidelines and best practice is achieved;
- ≈ Development programs are identified and implemented with the active involvement of the community and sustainable outcomes are achieved; and
- ≈ Good will and good relations with communities, civil society and governments at local and national levels are maintained;
- ≈ The project will endeavour to ensure that resources are available to implement the ESMP throughout all phases of project development and closure.

#### 5.2 Management of the project

The project will be implemented within 14 villages along the Simiyu River in Maswa district under the management of the Maswa District Council supported by the District LVEMP II Facilitation Team (DLFT) in collaboration with the community leaders in the project area. The Maswa District Executive Director will be supported by the DLFT made up by multi disciplinary professionals who will take the management roles on behalf of the district council. The DLFT will lead and will be the over seer of the project planning, sensitizations, supportive supervisions of the activities as well as the monitoring and evaluation activities.

There will be established a Co-Management Intervention Committee(CMIC) consisting of twelve (12) people which will manage, report the progress of the sub project to DED and LVEMP II and supervise the project implementation. The composition of CMIC will include the following members:-

- ≈ District Planning Officer (DPLO) - Chairman
- ≈ District Focal Point Officer (DFPO) - Secretary
- ≈ District Environmental Management Officer (DEMO)
- ≈ District Forest Officer (DFO)
- ≈ District Community Development Officer (DCDO)
- ≈ Ward Executive Officer (WEO)
- ≈ Ward Extension Staff
- ≈ Two ( village chairpersons)
- ≈ One Civil Society
- ≈ Two (Implementing Institutions)

At ward levels the WDCs will assist the project to make sure the agreed plans are implemented by respective villages as agreed. The WDC will also participate in the capacity building sessions and in M&E activities on their respective wards. At the village levels the project will be under the village councils with the assistance of village environment committee on some issues which need their interventions. The formed WUAs will also participate in the project management by making sure that the water resources governance and management are planned and implemented at their respective village. The project management will be done by all responsible parties from the district to the sub village levels.

Table 5.1 provides for the ESMP for the proposed project. Note that estimated costs for implementing the mitigation measures are just indicative. Appropriate bills of quantities should clearly give the actual figures. In any case the consultant used informed judgement to come up with these figures.

**Table 5.1: Environmental and Social Management Plan**

Potential Impact	Management Measure	Target Level/Standard	Responsibility	Estimated Cost (TZS)
<b>Mobilization and Development Phase</b>				
Deterioration of ambient air quality by fumes	<ul style="list-style-type: none"> <li>• Ensure proper and adequate maintenance of trucks and vehicles that serve the project</li> <li>• Switch off trucks and vehicles when not in use</li> </ul>	As minimum as possible TBS & WHO	LVEMP II Maswa District Council	5,000,000
Disturbance to local fauna due to noise and vibration	<ul style="list-style-type: none"> <li>• Select low-noise trucks and vehicles wherever possible and feasible</li> <li>• Ensure proper and adequate maintenance of trucks and vehicles that serve the project</li> <li>• Avoid locating stationery trucks and vehicles near sensitive areas</li> </ul>	<60DbA (Noise) 2 - 14 mm/s (vibrations)  WHO OSHA TBS	LVEMP II Maswa District Council	5,000,000
Enhancement of soil erosion	<ul style="list-style-type: none"> <li>• Avoid unnecessary excavation of the land for trees/grasses planting and for installation of concrete beacons</li> <li>• Implement point excavation for trees/grasses planting and establishment of concrete beacons</li> <li>• Eliminate exposed soil on ground by ensuring proper backfilling of overburden materials after trees planting and beacons installation</li> <li>• Avoid bare land by mulching the planted trees with grasses</li> <li>• Monitor areas of exposed soil during periods of heavy rainfall</li> </ul>	As minimum as possible	LVEMP II  Maswa District Council	10,000,000
Environmental	The developer shall follow the normal and	No exposed soil	LVEMP II	10,000,000

Potential Impact	Management Measure	Target Level/Standard	Responsibility	Estimated Cost (TZS)
Pollution and Nuisance from Poor Waste Management	<p>standard operational procedures to address the impacts of wastes. The procedure shall involve segregation of waste generated, recycling and reuse of waste products where possible and carry out appropriate disposal of waste products. The various disposal methods will be undertaken in accordance with legislation and standards, Local Government Authority by-laws, and international agreements. Specifically:</p> <ul style="list-style-type: none"> <li>• Domestic solid wastes i.e. garbage, paper, cans will be segregated using clearly marked bins and disposed off appropriately</li> <li>• Maintenance and packaging wastes (bottles, plastic materials, drums, containers) will be collected, compacted (if possible), segregated using clearly marked skips, labelled, stored in designated areas prior to disposal or recycling.</li> <li>• Combustible solid wastes will be burnt and the ashes collected and disposed in accordance with regulatory requirements.</li> <li>• To address the impacts of waste oils no truck/vehicles will be allowed to reach the water course and only well serviced trucks and vehicles will serve the project.</li> </ul>	and waste materials remain on the land after tree planting and beacons installation	Maswa District Council	
Creation of Employment	<ul style="list-style-type: none"> <li>• Recruitment of work force especially unskilled labour will be dominated by local people in the villages where the project will be implemented</li> <li>• Local employment will be optimized by offering skills and literacy training to especially youth</li> </ul>	All unskilled labourers are local	LVEMP II Maswa District Council	

Potential Impact	Management Measure	Target Level/Standard	Responsibility	Estimated Cost (TZS)
	<ul style="list-style-type: none"> <li>Project implementation shall observe national and international labour standards and regulations</li> <li>Allocate job fairly among women and men by working with local government in villages where the project will be implemented in Maswa district</li> <li>Maximize procurement of supplies at local level e.g. tree seedlings, concrete beacons, simple working tools and equipment, etc.</li> <li>Establish a system to manage local expectations</li> </ul>			
Occupational health and safety risks	<ul style="list-style-type: none"> <li>Provide appropriate working equipment and tools and ensure proper use</li> <li>Provide appropriate PPEs and ensure proper use</li> <li>Provide for reasonable working hours, conditions and facilities</li> <li>Establish a code of practices at the work place</li> <li>Observe for water and sanitation provisions</li> </ul>	OSHA Guidelines ILO	LVEMP II	10,000,000 (PPEs) 5,000,000 (First Aid Facilities)
<b>Maintenance and Monitoring Phase</b>				
Enhancement of environment and water conservation	This impact will be enhanced by: <ul style="list-style-type: none"> <li>Planting indigenous trees (i.e. <i>acacia</i> tree species) and grasses on the proposed Simiyu River buffer zone</li> </ul>	The whole buffer zone is fully covered with trees and grasses	LVEMP II Maswa District Council	10,000,000

Potential Impact	Management Measure	Target Level/Standard	Responsibility	Estimated Cost (TZS)
<p>Improved landscape and local climate</p> <p>Improved health of local people in Maswa district</p>	<ul style="list-style-type: none"> <li>• Establish and implement replacement programme for dry and dead trees and grasses</li> <li>• Establish and implement an effective maintenance and monitoring programme to care for planted trees and grasses and established beacons</li> <li>• Mobilize, facilitate and motivate local community based groups for participatory management of the proposed Simiyu River buffer zone and the water resources in general</li> </ul>	<p>and well demarcated all the time</p>		



# Chapter Six

## Environmental Monitoring Plan

### 6.1 Introduction

The Environmental Monitoring Plan (EMP) is a vehicle for the effective implementation of the mitigation measures to ensure successful execution of the Project in an environmentally sound manner. It provides mechanisms to address the adverse environmental as well as social impacts of the proposed project during its execution, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. For each expected impact, the EMP provides the following information:

- ≈ A specific description and technical details of monitoring measures that include the parameters to be measured, the methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions.
- ≈ Monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and to furnish information on the progress and results of mitigation, e.g. by annual audits and surveys to monitor overall effectiveness of the EMP.
- ≈ The EMP also provides a specific description of institutional arrangements, i.e. who is responsible for carrying out the monitoring measures. Additionally, the EMP includes an estimate of the costs of the measures and activities recommended so that the project proponent (LVEMP II in this case) can allocate the necessary resources.

### 6.2 Objectives and rationale of EMP

The objectives and rationale of project's EMP are:

- ≈ To define the responsibilities of project players
- ≈ To identify the monitoring parameters
- ≈ To design the monitoring mechanism
- ≈ To facilitate the implementation of mitigation and enhancement measures
- ≈ To take timely action in case of an unexpected situation
- ≈ To support smooth implementation of project with minimum losses to environmental and social infrastructure
- ≈ To ensure compliance with national and international requirements

In this project, the details of environmental issues, environmental impacts, proposed parameter to be monitored and timing agencies responsible for execution of proposed actions during project execution are presented in Tables 6.1.

Table 6.1: Environmental Monitoring Plan

Phase	Potential Impact	Parameter to be Monitored	Monitoring Frequency	Monitoring Area	Measurement Unit	Target Level / Standard	Responsibility	Estimated Cost Tshs
Mobilization and Development Phases	Enhancement of soil erosion	Soil erosion tendencies	Every month	The project area	None	No erosion tendencies	LVEMP II	7,000,000
	Environmental Pollution and Nuisance from Poor Waste Management	Hygienic and aesthetic status of the area	Every work day	The project area	N/A	As clean as possible	LVEMP II Maswa District Council	7,000,000
	Creation of Employment	Number of local people employed	Continuously during execution	Project records	Number	As maximum as possible	LVEMP II, MDC & Village Governments	Project running costs
	Occupational health and safety risks	PPEs; working tools and conditions	continuously during execution	Project area	Incidence	No or minimum accidents	LVEMP II, MDC & Village Governments	14,000,000

Phase	Potential Impact	Parameter to be Monitored	Monitoring Frequency	Monitoring Area	Measurement Unit	Target Level / Standard	Responsibility	Estimated Cost Tshs
Monitoring Phase	Enhancement of environment and water conservation	Types of trees and grasses planted	continuously during execution and monitoring	Project area	Types and number	No foreign trees/grasses planted	LVEMP II, MDC & Village Governments	7,000,000
	Improved landscape and local climate	Involvement of local groups				Local groups care for the buffer zone		
	Improved health of local people in Maswa district							

## Chapter Seven

### Conclusion

The project has potentially numerous positive significant impacts from both environmental and socio economic points of view. Implementation of the project will be of major benefit to the river catchment as well as the Lake Victoria Basin. The methods that will be deployed are viewed to be free from causing any detrimental effects to the environment and the communities that are of significant extent. As such, the project doesn't exude adverse impacts of considerable significance to the environment and communities.

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## Appendices

### Appendix 1: NEMC Screening and Reviewed Decision



#### NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

**BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA**

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Regent Estate Plot No. 29/30,  
P.O.Box 63154,  
DAR ES SALAAM  
TANZANIA

In reply please quote:

Ref:..... **NEMC/HQ/EIA/0001/V.I/02** .....

Date:..... **08/01/2014** .....

National Project Coordinator,  
Lake Victoria Environmental Management Project (LVEMP II),  
P.O. BOX 211,  
**MWANZA.**

**RE: SCREENING DECISION ON THE PROPOSED PROTECTION OF SIMIYU RIVER BANKS IN MASWA DISTRICT, SIMIYU REGION**

We acknowledge receipt your letter of **6<sup>th</sup> December, 2013** attached with three copies of duly-filled Registration Forms and ten copies of Project Brief for the above mentioned project.

Following the review of the Project Brief and Registration Forms, it has been noted that the scope of the project may not pose significant adverse environmental impacts. However, you are required to prepare a Project Brief for the proposed project, with adequate description of the project activities to be undertaken and a comprehensive Environmental Management Plan.

To facilitate review processes, payments can be made through NMB, Bank House Branch. Account No. **2011100084** Account Name: **National Environment Management Council** or by cheque directly at our office at Regent Street Plot No.29/30 Mikocheni area, you are required to pay to the National Environment Management Council (NEMC) a total amount of **Tshs. 1,023,500/=**.

For further information or clarification on this matter please do not hesitate to contact us on Telephone No. +255 659 615 136.

K.C. Sengoe  
For: **Director General.**

**Cc:** Dr. William J.S. Mwegoha,  
P.O. Box 335176,  
Dar-es-Salaam.

Appendix 2: List of Expert who carried out the initial assessment

Name	Qualification	Role	Signature
<b>EIA Expert</b>			
Dr. William Mwegoha	BSc. Chemical and Process Engineering  M.Sc. Environmental Engineering  PhD - Environmental Science	<b>TEAM LEADER</b> Environmental issues	
Leonard Gastory Lugali	BSc - Civil and Water Resources Engineering  MSc - Integrated Environmental Management (MIEM)	Civil engineering, water resources and waste issues	
<b>Other Experts</b>			
Mathias Kabyemera	BA Geography and Environment	Socio-economic issues	
Vaileth Biphuye	B.Sc. Environmental Engineering	Environmental issues	
Rhoda Mutalemwa	B.Sc. Environmental Laboratory Science and Technology	Environmental issues	
Evody Ndumiwe	B.Sc. Environmental Engineering	Environmental issues	

Appendix 3: Detailed analysis of impacts' significance

Potential Impacts	Magnitude	Scale	Duration	Exposure	Probability	Consequence	Likelihood	Significance
<b>A. Environmental Impacts</b>								
<b>A.1 Mobilization and Development Phase</b>								
Deterioration of ambient air quality by fumes	2	2	1	1	4	5 (Low)	5 (Low)	Low
Disturbance to local fauna due to noise and vibration	2	1	2	2	4	5 (Low)	6 (Moderate)	Low
Enhancement of soil erosion	3	3	3	3	3	9 (Moderate)	6 (Moderate)	Moderate
Environmental pollution from poor waste management	3	2	3	2	4	8 (Moderate)	6 (Moderate)	Moderate
<b>A.2 Maintenance and Monitoring Phase</b>								
Conservation of Rivers Catchment Area	3	4	4	4	4	11 (Moderate)	8 (High)	High
Improved landscape and local climate	3	3	4	4	4	10 (Moderate)	8 (High)	High
<b>B Potential Socio-Economic Impacts</b>								
<b>B.1 Mobilization and Development Phase</b>								
Creation of employment directly and indirectly	3	2	2	3	5	7 (Low)	8 (High)	Moderate
Nuisance and health hazards due to poor waste management	3	2	3	2	4	8 (Moderate)	6 (Moderate)	Moderate



Potential Impacts	Magnitude	Scale	Duration	Exposure	Probability	Consequence	Likelihood	Significance
Occupational Health and Safety Hazards	2	2	2	2	3	6 (Low)	5 (Low)	Low
<b>B.2 Maintenance and Monitoring Phase</b>								
Improved health of local people in Maswa district	3	3	4	4	3	10 (Moderate)	7 (Moderate)	Moderate