

**THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF WORKS**



**SECTORAL
ENVIRONMENTAL ACTION PLAN
2011 – 2016**

2011

ACKNOWLEDGEMENT

We wish to express our gratitude to the team of local experts who were involved at different stages in the course of developing the Sectoral Environmental Action Plan (SEAP), for their invaluable time and input. Experts were mainly drawn from Vice President's Office-Division of Environment, National Environment Management Council (NEMC), Ministry of Works, Ministry of Lands Housing and Human Settlements Development (MLHSD), Ministry of Natural Resources and Tourism (MNRT), Ministry of Energy and Minerals (MEM), Ministry of Agriculture, Food Security and Co-operatives (MAFSC Ministry of Water , Ministry of Health and Social Welfare (MoHSW), Dar es Salaam Rapid Transport (DART), Dar Es Salaam City Council (DCC), Ilala Municipal Council (IMC), Kinondoni Municipal Council (KMC), Tanzania Bureau of Standards (TBS), Tanzania Electrical Mechanical and Electronics Services Agency (TEMESA), Contractors Registration Board (CRB), National Construction Council (NCC), Tanzania Buildings Agency (TBA), Tanzania National Roads Agency (TANROADS), Architect Quantity Surveyors Registration Board (AQRB), and Road Fund Board (RFB). Also, experts were drawn from Non-Governmental Organisations (NGO's) including Tanzania Vertiver Network (TAVEN).

We are particularly indebted to the members of The Draft Team, chaired by Eng. Melania Sangeu from Department of Safety and Environment, Ministry of Works, for their useful advice and guidance during the SEAP development process.

We are grateful to the Royal Danish Government through the International Development Agency (DANIDA) for financial support and technical guidance.

PREFACE

The Ministry of Works being one of the sector ministries stipulated in EMA (Cap 191) sections (30, 31, 40) has prepared Sectoral Environmental Action Plan (**SEAP**) for guiding implementation functions of institutions responsible for environmental matters. This will enable integrating the relevant policies, regulations, standards, norms and code of conducts to environmental protection management and development in the infrastructures.

Tanzania is highly dependent on the utilization of natural resources to service the construction sector given that construction activities consists of construction, renovation, and demolition of buildings and other engineering structures. In response to increasing awareness of the environmental impacts of infrastructure development, "green construction" is a growing trend. Green construction seeks to minimize the impact of construction activities on the environment. This is achieved among other things, through materials selection, recycling and sustainably designed energy efficiency. The need to monitor these activities has led to the development of this **Sector Environmental Action Plan (SEAP)** of the Ministry to serve as a framework for coordinating and integrating existing and new activities in the protection of the environment from daily construction activities. It identifies priority actions, activities, and programmes in relation to specific environmental targets and associated actions. The implementation of the **SEAP** will therefore complement existing national efforts to address environmental issues in the construction sector environment.

The focus of **SEAP** is in line with the National Strategy for Growth and Reduction of Poverty (or popularly known in Kiswahili as "*Mkakati wa Kukuza Uchumi na Kupunguza Umasikini*" - *MKUKUTA*) and Tanzania's Development Vision 2025, National Environmental Action Plan, and the MDG's which call for improvement of quality of life and social well-being. The implementation of **SEAP** will therefore contribute to national efforts of combating poverty and improving environmental quality within the construction sector.

As the link between construction sector environmental degradation and anthropogenic activities has become obvious, taking necessary steps and actions to avert environmental degradation is a key target. Cognizant of this fact, the Ministry of Works shall make every effort to mobilize resources and encourage stakeholders participation in addressing the challenges faced by the construction sector environment and the surrounding community. The Ministry welcomes the support of all stakeholders in this endeavor for maintaining an environmentally friendly construction sector. While this is the challenge ahead for all, it is the hope of the Ministry that **SEAP** as a tool will enable the Ministry and other stakeholders achieve this noble objective. Let all play their part.


Ambassador Herbert E. Mrango
PERMANENT SECRETARY
MINISTRY OF WORKS

TABLE OF CONTENTS

ACKNOWLEDGEMENT	i
PREFACE	ii
LIST OF ABBREVIATIONS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
CHAPTER ONE	1
1.0 Introduction.....	1
1.1 Background.....	1
1.2 Major Stakeholders Involved in Implementation of SEAP	2
1.3 Objectives of the SEAP.....	4
1.3.1 Main objective	4
1.3.2 Specific objectives.....	4
1.4 Vision and Mission	4
1.4.1 Vision	4
1.4.2 Mission	4
1.5 Rationale	4
1.6 Methodology used to develop the SEAP	6
1.6.1 Desk reviews of relevant documents.....	6
1.6.2 Inception Workshop	6
1.6.3 Field visits and observations.....	7
1.7 SEAP Structure	7
CHAPTER TWO	8
2.0 Policy, Institutional Legislative and Administrative Framework.....	8
2.1 National Policies	8
2.2 Legislation	12
2.3 Regulations	16
2.4 Environmental Guidelines	18

2.5	International Convention and Treaties.....	18
2.6	Institutional Framework	21
CHAPTER THREE		27
3.0	Construction sector state of environment.....	27
3.1	Environmental aspects.....	27
3.2	Major Environmental challenges facing construction industry	28
3.3	Main impacts of the construction sector on the environment.....	28
3.4	Major Environmental Issues	33
3.5	Analysis of mitigation measures of environmental Impacts/problems.....	34
CHAPTER FOUR.....		38
4.0	Environmental Action Plan.....	38
4.1	SWOT Analysis of MoW Capacity	38
4.1.1	STRENGTH.....	38
4.1.2	WEAKNESSES	39
4.1.3	OPPORTUNITIES	40
4.1.4	THREATS	41
5.0 REFERENCE.....		53

LIST OF ABBREVIATIONS

ACET	-	Association of Consulting Engineers
AIDs	-	Acquire Immune Deficiency Syndromes
AIDS	-	Acquired Immune Deficiency Syndrome or Acquired Immuno Deficiency Syndrome
AQRB	-	Architect Quantity Surveyors Registration Board
ATTI	-	Appropriate Technology Training Institute - Mbeya
CBD	-	Convention Biological Diversity
CBO	-	Community Based Organisation
CFCs	-	ChlorofluoroCarbons
CRB	-	Contractors Regulation Board
DANIDA	-	Danish International Development Agency
DART	-	Dar es salaam Rapid Transit
DCC	-	Dar es salaam City Council
DOE	-	Directorate of Environment
EA	-	Environmental Audit
EAP	-	Environmental Action Plan
EIA	-	Environmental Impact Assessment
EIMS	-	Environmental Information Management System
EMA	-	Environmental Management Act
EMPS	-	Environmental Management Plans
EMS	-	Environmental Management System
GHG	-	Green House Gases
HIV	-	Human Immuno deficiency Virus
ILO	-	International Labour Organisation
IMC	-	Ilala Municipal Council
KMC	-	Kinondoni Municipal Council
LGAs	-	Local Governmental Authorities
MAFC	-	Ministry of Agriculture, Food Security and Cooperatives
MDGs	-	Millenium Development Goals
MEAs	-	Multilateral Environmental Agreements
MEM	-	Ministry of Energy and Minerals
MKUKUTA	-	Mkakakati wa Kukuza Uchumi na Kupunguza Umaskini
MLHHS	-	Ministry of Lands Housing and Human Settlements Development
MNRT	-	Ministry of Natural Resources and Tourism
MoHSW	-	Ministry of Health and Social Welfare
MoW	-	Ministry of Works
MWTI	-	Morogoro Works Training Institute
NACP	-	National HIV/AIDS Control Programme

NCC	-	National Construction Council
NEAP	-	National Environmental and Action Plan
NEMC	-	National Environmental Management Council
NEP	-	National Environmental Policy
NGOs	-	Non Governmental Organisations
NSGRP	-	National Strategy for Growth and Reduction of Poverty
PFCs	-	PerfluoroCarbons
PMO-RALG	-	Prime Minister's Office Regional Administration and Local Government
RFB	-	Road Fund Board
SEAP	-	Sectoral Environmental Action Plan
SMTL	-	Standard Materials Testing Laboratories
SUMATRA	-	Surface and Marine Transport Regulatory Authority
TACAIDS	-	Tanzania Commission for AIDS
TACECA	-	Tanzania Civil Engineers Contractors Association
TANROADS	-	Tanzania National Roads Agency
TARA	-	Tanzania Roads Users Association
TAVEN	-	Tanzania Vertiver Network
TBA	-	Tanzania Building Agency
TBS	-	Tanzania Bureau of Standards
TCCIA	-	Tanzania Chambers of Commerce and Industry
TEMESA	-	Tanzania Electrical Mechanical and Electronics Services Agency
TFA	-	Tanzania Farmers Association
TFG	-	Tanzania Forum Group
UNCCC	-	United Nations Framework Convention on Climate Change
VPO	-	Vice President Office
WHO-GPA	-	World Health Organisation Global Programme on AIDS

LIST OF TABLES

Table 3.1: Measures to Address Negative Environmental Impacts.....	35
Table 3.2: Detailed Action Plan.....	42

LIST OF FIGURES

Figure 1.1: Freight distribution in the transportation sector in Tanzania	2
Figure 1.2: Passengers distribution in the transport sector in Tanzania.....	2
Figure 1.3: Tanzanian road networks	1
Figure 2.1: Institutional Framework for Environmental Management in Tanzania.....	22
Figure 2.2: Organisation Structure of Directorate of Safety and Environment	26
Figure 3.1: Approximation of recycled wastes in the country	32
Figure 3.2: Dumping of wastes in the Dar Es Salaam city	33

CHAPTER ONE

1.0 Introduction

The Ministry of Works has many operations which if not controlled will lead to environmental degradation. The Sectoral Environmental Action Plan (SEAP) has been prepared as a tool to safeguard the environment in The Construction Industry.

1.1 Background

The Construction sector consists of establishments engaged in constructing, renovating, and demolishing buildings and other engineering structures. The sector includes contractors in commercial and residential structures, highways, heavy industrial structures (e.g., tunnels, airports, and dams) and municipal utility construction (e.g. wastewater treatment plants). Since trades within the sector including works are commonly Contracted or subcontracted, SEAP will enable the Ministry to ascertain that the works are done as per pertinent policies, laws and regulations.

In response to increasing awareness of the environmental impacts of infrastructure development, "green construction" is a growing trend. Green construction seeks to minimize the impacts of construction activities on the environment. This is achieved among other things, through materials selection, recycling, sustainable design and energy efficiency. On the other hand however, the construction sector is important in the whole process of development and poverty alleviation. Its effectiveness appropriateness and adequacy contribute a lot to the successful implementation of socioeconomic activities. The impact of having such a sector is lowering domestic production cost through timely delivery, enhancing economic scale in production process and creating economic opportunities.

In spite of the above, the construction sector in Tanzania is still characterized by high cost, and low quality of services due to various reasons including the existence of massive backlog of infrastructure maintenance and rehabilitation, inadequate capacity caused by low level of investment in resources and low level of enforcement, safety, environmental sustainability and gender issues.

In Tanzania, road transport plays a vital role in the movement of goods and passengers. It accounts for over 70% of the total freight and transports over 90% of passengers with the balance being carried mainly by rail, air and water transport. Tanzania has presently an estimated total road network length of 91,049km. Out of this, the urban, district and feeder roads with a total length of about 57,158 km are under jurisdiction of the PMO-RALG.

Figure 1.1: Freight distribution in the transportation sector in Tanzania

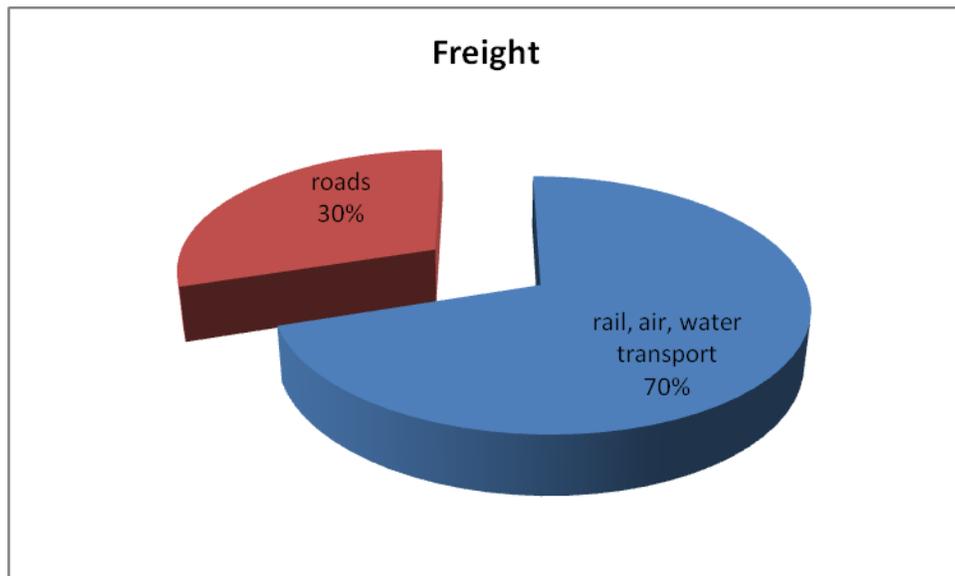
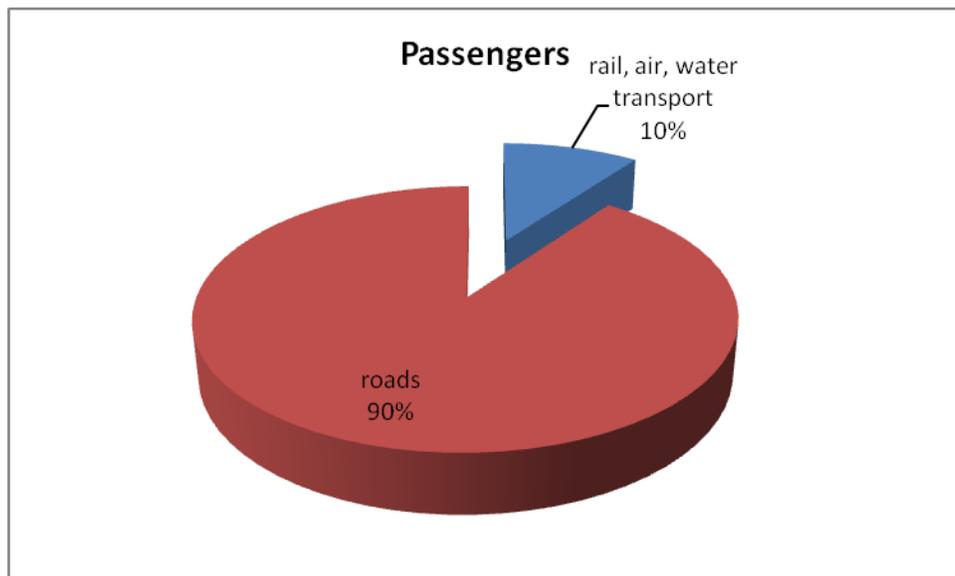
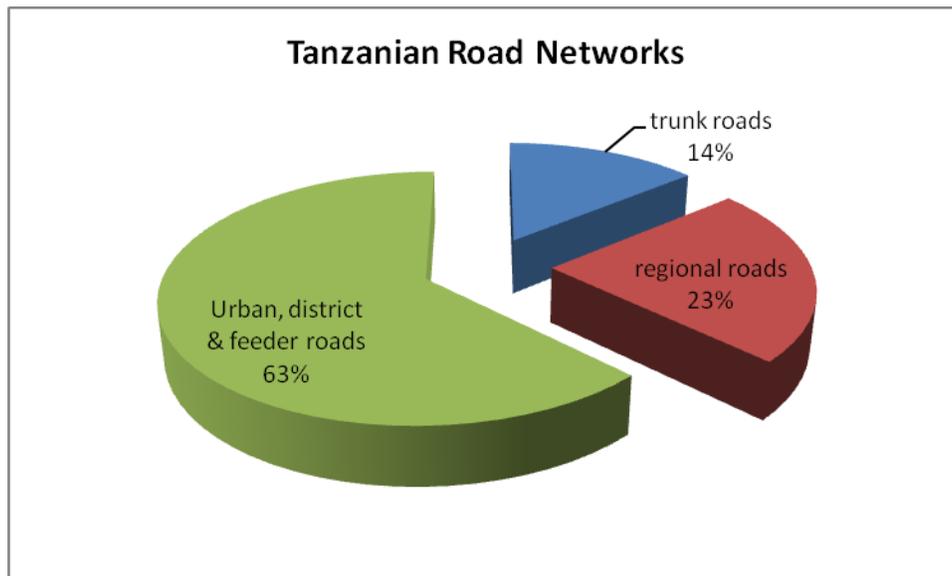


Figure 1.2: Passengers distribution in the transport sector in Tanzania



The Ministry of Works through TANROADS is responsible for administration and management of the trunk and regional roads network. The length of the road network under the jurisdiction of MoW is about 86,472 km., whereby trunk road network amounts to 12, 786 km, while that of regional road network is approximately 21,105 km?

Figure 1.3: Tanzanian road networks



The Ministry of Works through TBA has the role of constructing and maintaining government buildings, provision of building consultancy services to government and public as a whole on matters concerning building works, leasing of government houses on commercial basis and provision of project management services for building projects. The Agency owns 56 workshops, 37 state lodges, 103 rest houses, 1,069 rented business houses, 670 public servants rented houses and 420 leader houses.

Tanzania has undergone profound demographic change since its independence from Great Britain in 1961. The population has more than tripled in less than four decades from 12 million in 1967 to 38 million in 2005. The country's population is projected to reach 70 million by 2025. Population growth and its impact on renewable and non-renewable resources have brought irreversible damage to the environment.

Tanzania Electrical, Mechanical and Electronics Services Agency (TEMESA), is another autonomous body within the jurisdiction of the Ministry of Works; charged with the responsibility of operating and maintaining government ferries, manning and operating government workshops mainly for production and automotive maintenance works and undertaking consultancy services in fields of mechanical, electrical and ICT engineering. TEMESA also undertakes installation, repair and maintenance of refrigeration and air conditioning systems as well as street and traffic light in cities and municipalities countrywide.

Currently, TEMESA owns twelve (12) ferry stations countrywide and more others are in the offing, according to plans under implementation. In addition, TEMESA also, operates twenty one (21) Regional Workshops in the country. All these undertakings, involve a diverse spectrum of environmental concerns which need to be properly addressed by all stakeholders in the construction sector.

The demand for more land, water and more consumption has increased so much. Air and water pollution from industrial activities, conversion of forest land for agriculture, settlements and industry and unsustainable development also brings the same effect. The government of Tanzania realised the danger facing her resources including clean air, fossil fuels, wildlife, forests and endangered species by taking appropriate measures ranging from policy, legal framework and institutional arrangement which are conforming to socio-political and economic system.

1.2 Major Stakeholders Involved in Implementation of SEAP

The principal stakeholders involved in one form or another in the implementation of the SEAP include government ministries, departments, regulatory authorities and boards, operational agencies/parastatals, training institutions, financial institutions, development partners, private sector and NGOs.

a) Key Ministries

The key Ministries in the construction sector include:

- i) Ministry of Works (MoW) which is responsible for road related activities, government buildings, mechanical, electrical and electronic activities within the sector;
- ii) Prime Minister's Office - Regional Administration and Local Government responsible for district and urban roads;
- iii) Ministry of Finance responsible for budget allocations and overall financial regulations and;
- iv) Ministry of Transport, responsible for transportation activities.

b) Other Ministries

The other Ministries include:

- i) Ministry of Industry, Trade and Marketing Vice President's Office overseeing Ministry of Lands Housing and Human Settlements Development Ministry of Health and Social Welfare;
- ii) Ministry of Law and Constitutional Affairs;
- iii) Ministry of Science Technology and Communication Ministry of Education and Vocational Training Ministry of Agriculture Food Security and Cooperatives.
- iv) Ministry of Natural Resources and Tourism

c) Operational Agencies/Parastatal Organizations

Construction sector operation agencies and Parastatal organizations include: Tanzania National Roads Agency (TANROADS), Tanzania Buildings Agency (TBA) and Tanzania Electrical, Mechanical and Electronic Services Agency (TEMESA).

d) Regulatory Authorities and Boards

There are also specific regulatory boards including the Engineers Registration Board (ERB), Contractors Registration Board (CRB), National Construction Council (NCC) Architects and Quantity Surveyors Registration Board (AQRB) and the Roads Fund Board (RFB).

e) Training Institutions

Training institutions under MoW are playing a big role in capacity building of staff in the sector. Training Institutions under the MoW include Morogoro Works Training Institute (MWTI), and Appropriate Technology Training Institute (ATTI) - Mbeya.

f) Private Sector

The Private sector is an important stakeholder in service provision. Among the private sector operators are Association of Consulting Engineers Tanzania (ACET), Tanzania Civil Engineers Contractors Association (TACECA), Tanzania Roads Users Association (TARA), Tanzania Forum Group (TFG), Tanzania Farmers Association (TFA), Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA).

1.3 Objectives of the SEAP

1.3.1 Main objective

The main objective of Sectoral Environmental Action Plan is to safeguard the environment in the implementation of construction projects within the sector by the year 2016.

1.3.2 Specific objectives

The SEAP has four objectives:

- a) Legal Basis on environment in Projects Planning, Management , Compliance and Enforcement , strengthened by June 2016;
- b) Ensure EMA compliance in all activities related to Construction Sector development by 2016;
- c) Develop Sector Capacity Building and Strengthen Institutions for Sustainable, Environment by 2016 and;

1.4 Vision and Mission

1.4.1 Vision

To have quality, efficient and cost effective construction industry that is capable of meeting the diverse needs for safe and environmentally friendly construction, rehabilitation and maintenance of Roads, Government Buildings, as well as electrical and mechanical works including other works that facilitate social economic development of Tanzania.

1.4.2 Mission

To facilitate provision of an economic, safe, environmentally friendly and reliable construction industry, electrical and Mechanical services, Government Buildings that meet the needs of the public through development and implementation of appropriate sector policies, strategies and standards.

1.5 Rationale

The Ministry of Works being one of sector Ministries intends to prepare Sector Environmental Action Plan (SEAP)that can be entrusted to implement functions of Sector Environmental section as stipulated in EMA (Cap. 191) section (30, 31,40). This will enable integrating the relevant policies, regulations, legislation standards, norms and code of

conducts for environmental protection, management and development in the construction sector.

However, Environmental management is complex and dynamic; it involves many players and issues which cannot be addressed by a single institution. Therefore in fulfilling this noble obligation, the Ministry faces a number of challenges but also recognizes the importance of addressing environmental issues in daily activities which affect the sustainable livelihoods of all Tanzanians. However there are several challenges that need to be addressed to enable the country to have efficiency and sound environmental sustainable construction sector development. These challenges include:

- a) Low technological capacity to respond to environmental pollution, management, monitoring and evaluation with regard to construction and operation of projects within the sector;
- b) Limited internal capacity to fund construction sector environmental planned activities;
- c) Integration of various national policy documents and strategies such as NEP, NEAP, MKUKUTA, National Conservation Strategy for sustainable development, and the Biodiversity Action Plan and Strategy which identify roles and tasks to be implemented by the Ministry;
- d) Pollution control (air, soil, water, marine, noise and vibrations);
- e) Extreme poverty of the most vulnerable groups with regard to construction industry development activities;
- f) Poor infrastructure; especially poor rural roads making it difficult to access rural areas;
- g) Integrating green house gases (GHG) emission emanating from transport sector with climate change and;
- h) The impact of HIV/AIDS creating a major drain on family energy and national workforce.

1.6 Methodology used to develop the SEAP

The Ministry of Works, working together with relevant stakeholders has prepared the SEAP. The approach used to develop this document was participatory under which the following stages were involved;

1.6.1 Desk reviews of relevant documents

Review of documents was done to obtain available construction sector environmental aspects and pollution related information. Some of the documents used in the process of the document to mention a few include Road Act, 2007; Road Construction Policy, 2003; Environmental Management Assessment Guidelines 2001; Road Sector Environmental Protection Regulations 2009, Environmental Management Act, 2004; National Environment Policy 1997 Nation vision 2025; Mkukuta and National Transport Policy, 2003 and Environmental Impact Assessment and Audit Regulations, 2005

1.6.2 Inception Workshop

Inception workshop was conducted whereby forty participants drawn from government Ministries, Agencies, Regulatory boards, Private sectors and Media attended. Eight (8) technical papers were presented for interruption and discussion. The main objective of this workshop was to get relevant information from stakeholders which were very vital inputs on the preparation of the SEAP. The output of this workshop to mention a few includes;

- a) State of environmental management of the Ministry Agencies (TBA, TEMESA, TANROADS and NCC);
- b) The significant environmental aspects associated with transport infrastructure system in Tanzania during the construction and operations phases which includes, land degradation, physical alteration and destruction of habitats, water pollution, air pollution, waste management, marine pollution, climate change, noise and vibration pollution to mention a few;
- c) Mainstreaming the relevant policies, regulations, programmes to set out priority actions for addressing the above environmental challenges within the sector for five years and;
- d) Environmental Checklist for site visit verification.

1.6.3 Field visits and observations

The preparation of the action plans also involved visits to four (4) Zones namely Northern zone, Central zone, Southern Highland zone and Lake Zone to collect the data and information related to construction industry activities and project implementation with regard to environment. These zones were selected with the main focus of obtaining environmental aspect data and information on road construction activities (TANROADS), building activities (TBA), mechanical electric and electronic activities(TEMESA) with regard to environmental management, pollution control, land degradation, capacity building, environmental information awareness, compliance and enforcement of the environmental legislations, regulations guidelines and code of practices.

1.7 SEAP Structure

The document has been organized into 4 chapters. Chapter 1 presents an Introduction; while Chapter 2 deals with Policy, Legal, Institution and Administrative Framework; Chapter 3 highlights on Ministry of Works State of Environmental and Chapter 4 present the proposed Environmental Action Plan. Also, annexes are included which provide details of road network system in Tanzania.

CHAPTER TWO

2.0 Policy, Institutional Legislative and Administrative Framework

In order to come up with a comprehensive SEAP which will be in harmony with associated national policies, legislations, regulations and guidelines, it was found imperative to revisit such literatures to ensure the prepared SEAP is a reliable tool for the intended use. In addition, reference was also made to relevant international conventions and treaties which Tanzania is signatory to. Review of the literatures revealed the following salient features.

2.1 National Policies

a) National Environment Policy, 1997

The National Environment Policy (NEP, 1997) is the main policy document governing environmental management in country. The policy addresses environmental issues as both natural and social concerns, and adopts the key principle of sustainable development.

The Policy requires EIA to be mandatory for all development projects which are likely to have significant environmental impacts. The intention is to ensure that the development projects are implemented in an economically sustainable manner while safeguarding environment and social issues for the benefit of the present and future generations.

b) National Transport Policy, 2003

The Policy has seven objectives and goals, of which one is relevant to this project. The objective which is relevant to this EAP calls for sufficient emphasis on all aspect of environment protection and management at the design, development, and operation stages of infrastructure development, to ensure sustainability.

c) National Forest Policy, 1998

The goal of National Forest Policy is to enhance the contribution of the forest sector to the sustainable development of Tanzania. The policy aims to ensure:

- i) Sustainable supply of forest products and services by maintaining sufficient forest are under effective management and;

- ii) Ecosystem stability through conservation of forest biodiversity, water catchments and soil fertility.

d) National Policy on HIV/AIDS, 2001

The Policy formulation is the result of the Government's effort with technical support from the World Health Organization Global Programme on AIDS (WHO-GPA) that led to the establishment of National HIV/AIDS Control Programme (NACP) under the Ministry of Health. One of the government strategic initiatives is to establish Tanzania Commission for AIDS (TACAIDS) under the Prime Minister's Office. The Commission provides leadership and coordination of national multi-sectoral response to the HIV/AIDS epidemic. The management functions, institutional and organizational arrangement of TACAIDS are outlined in the National Policy.

e) National Human Settlements Development Policy, 2000

The overall goal of the policy is to promote development of sustainable human settlement and to facilitate provision of adequate affordable shelter to all people, including the poor. The policy outlines a number of objectives including the environmental protection within human settlement and protect natural ecosystem against pollution, degradation and destruction with the aim of attaining sustainable development.

The major issues in the policy include:

- i) Poor management of solid and liquid waste, leading into environmental deterioration;
- ii) Emission of noxious gases from vehicles and industrial activities as a major cause of air pollution in urban areas;
- iii) Encroachment into fragile and hazardous lands (river valleys, steep slopes, marshlands leading into land degradation, and pollution of water sources;
- iv) Increasing dependence on fuel wood and charcoal as a main source of energy in human settlements leading into depletion of forests, hence environmental deterioration and air pollution and;
- v) Unauthorized sand mining in river valleys leading into environmental hazards.

f) National Land Policy, 1995 (Revised in 1997)

National Land Policy recognizes the need for protecting environmentally sensitive areas. The policy emphasizes on the protection of environment and natural ecosystem from pollution, degradation, and physical destruction.

In addition, the policy recognizes the importance of social services such as water, roads, energy, and solid waste management for environmental protection. Finally, the policy identifies the need for conservation and preservation of prehistoric/historic sites and buildings.

g) Women and Gender Policy 2002

The policy:

- i) Calls for equal opportunity for all to participate and implement development activities without gender bias, including sex;
- ii) Identifies environmental degradation as one of the major factors that increase burden to women, especially in rural areas, where women walk long distances to fetch water and fuel wood.

h) National Water Policy, 2002

The Policy objective is to develop a comprehensive framework for sustainable management of the national water resources. In the case the policy recognizes the need to protect water sources against pollution and environmental degradation.

The policy recognizes the role of road transport system as one of the effective tool in the implementation of water resource management activities.

i) National Strategy for Growth and Reduction of Poverty, 2002

The National Strategy for Growth and Reduction of Poverty (NSGRP) is national organizing framework for putting the focus on poverty reduction on the country's development agenda. The strategy emphasis is on the growth momentum to fast tract the targets of vision 2025 for high and shared growth, high quality livelihood, piece, stability and unity, good governance, high quality education, and international competitiveness.

j) National Energy Policy, 1992

The National Energy policy was formulated in 1992. According to the policy, the

construction sector is the highest consumer of fuel, accounting for about 50 percent of petroleum consumption in the country. Since the sector account for a substantial amount of free external earnings, the foreign implications of this are very high. On the other hand, for the fuel to be timely delivered where it has to be consumed, reliable transportation system is required. The transport and energy sectors are therefore very closely correlated.

k) Construction Industry Policy,2003

The goal of the Construction Industry Development is to develop an internationally competitive industry that will be able to undertake most of the construction projects in Tanzania and export its services and products and ensure value for money to industry clients as well as environmental responsibility in the implementation of construction projects.

The main objectives of the Construction Industry Policy include; promoting application of cost effective and innovative technologies and practices to support socio-economic development activities such as road works, water supply, sanitation, shelter delivery and income generating activities. Also, Construction Industry Policy ensures application of practices, technologies and products which are not harmful to both the environment and human health.

Issues: According to the policy, the construction industry/sector activities affect the environment in many ways; through resource deterioration, physical disruption and chemical pollution. Large civil engineering projects can easily destabilize fragile hill slopes. Deforestation associated with construction can cause loss of land by soil erosion, silting of reservoirs and disruption ecosystems. Cement, lime and bitumen production pollutes the atmosphere.

Furthermore, it has long been recognized that many types of construction activities present serious health hazards. Health hazards in construction include heat, radiation, noise, dust, shock and vibrations, and toxic.

Policy directions;

- Promote and undertake research programs geared towards application of technologies, products, and practices, which are not harmful to the environment, human health and safety.

- Promote education and training programmes on environmental sustainability, sustainable construction practice and human health and safety issues.
- Establish procedures for Environmental Impact Assessment of all projects and enforce their application.

1) National Irrigation Policy 2010

The main objective of the National Irrigation Policy is to ensure sustainable availability of irrigation water and its efficient use for enhanced crop production, productivity and profitability that will contribute to food security and poverty reduction. However, there are specific objectives which address on particular sectors. Therefore, the policy ensures that irrigation development is technically feasible, economically viable, socially desirable and environmentally sustainable.

2.2 Legislation

a) Environmental Management Act of 2004

The Environmental Management Act No 20, which was established in 2004, governs environmental management issues. The roles and responsibility of sector Ministry is stipulated in EMA (Cap. 191) section (30, 31, 40).

b) Local Government (District Act 1978 and Urban Authorities Act 1982),

The Act enables local authorities to enact by-laws regarding soil protection, agriculture, natural resource exploitation, etc.

c) Land Act, 1999

The Act regulates land allocation including village lands. It specifies that all lands continue to be public land. It is vested in the President as Trustee for and on behalf of all the citizens of Tanzania. The Acts also recognize land as a property and have a value.

Section 156 of the Land Act 1999 requires compensation to be paid to any person for the use of land of which he/she is in lawful or actual occupation as

a communal right of way and with respect to a way leave. These include:

- i) Any damage suffered in respect of trees, crops, and buildings as result of creation of way leave and;
- ii) Damage due to surveying or determining the route of that way leave.

d) Village Land Act, 1999

The Act regulates land allocation in village areas and provide for a land to be declared a village land.

e) Land Acquisition Act, 1967

Provide for the President to extinguish right of occupancy for the public interest. This is relevant to the construction projects since acquisition of land may be necessary and right by Law in some road sections due to possible expansion or realignment of the existing road corridor.

f) Rural Land Use (Planning and Utilization) Act, 1973?

The act empowers the President to establish areas for which the Minister responsible may issue regulations on construction activities, farming, mining, forestry, reservations or gardens, forests, parks, revocations of rights of occupancy, etc.

g) The Mining Act, 1998?

The act allows the holder of Mining License to stockpile or dump wastes in a manner approved by the Minister. Also is relevant to the construction projects because construction activities will involve borrowing of such construction materials.

h) Water Utilization and Control Act No.10, 1974?

The water utilization and control act of 1974 (amended by act No. 10 of 1981 and Act of 1997) regulates management of water resource. It vests ownership of all water in the United Republic of Tanzania and requires every person who seeks to divert, dam, store or abstract the water to seek permit (Water Right Grant) from the Government. The act:

- i) Controls the use and management of water quality;
- ii) Controls the discharge of effluents or liquid wastes into water bodies and;
- iii) The act forbids pollution of water supplies.

i) Occupational Health and Safety Act No. 5, 2003

Main items of legislation pertaining to health and safety are found in the following Regulations:

- i) The act deals with regulation of health, safety, and welfare of workers in factories and workplaces and;
- ii) The Act sets standards for health, safety, and Relevance to the construction projects.

The Act will require the contractor to:

- i) Appoint safety and health representative and committee;
- ii) Register their workplace (campsite, borrow pit and quarry sites) before operation;
- iii) Provide safety precautions;
- iv) Ensure health and welfare of workers and;
- v) Ensure proper handling of hazardous materials/chemicals and process.

j) Road Act, 2007

The following sections relevant to the proposed road project:

Section 16: Stipulates that where it becomes necessary for the road authority to acquire land owned by any person, the owner of such land shall be entitled to compensation in accordance with Land Acquisition Act, Land Act, Village Act, and any other written law

Section 29: Specifies that the road reserve is exclusive for the use of the road, development and expansion or any related activities. According to the Act, the road authority may permit any person or authority to temporarily place public

utilities such as lighting, telegraph, adverts, telephone, electric supplies and posts, drains, sewers, and mains only in such cases where such use do not hinder any future use of the road reserve by the road authority.

Section 30: Stipulates that road authority is responsible for the protection of environment as well as waste disposal.

k) Road Traffic (Amendment) Act, 1990

The Road Traffic (Amendment) Act No. 4 of 1990 amended Section 28 of The Road Traffic Act of 1973, which is the principal Act. The Act deals, among others, with damage or destruction of traffic signs, electric poles or any other structures erected along the road. It requires individuals to pay sum equal to the cost of repairing any damage or destruction so caused.

l) HIV and AIDS (Prevention and Control) Act, 2008

According to the Act, it is the duty of every person, institution and organization living, registered, or operating in Tanzania to (among others);

- i) Promotes public awareness on causes, modes of transmission, consequences and control of HIV and AIDS and;
- ii) Reduce; The spread of HIV and AIDS, Prevalence of STIS in the populations, and Adverse effects of HIV and AIDS.

The Act also gives the duty to employers and private sectors to;

- i) Integrate or prioritize HIV and AIDS in their proceedings and public appearances and;
- ii) Advocate against stigma and discrimination of people living with HIV/AIDS.

m) Urban Planning Act, 2007

The act provides for the orderly and sustainable development of lands in urban areas, to preserve and improve amenities, the grant of consent to develop land and powers of control over the use of land and for other matters.

Section 29(3) is relevant to the proposed development. The section requires that an EIA be carried out for any development proposal that is likely to have adverse impact on the environment.

2.3 Regulations

a) Environmental Impact Assessment and Audit Regulations, 2005

Environmental Impact Assessment and Audit Regulations provide rules relative to the procedures for and carrying out of environmental impact studies and environmental audits as provided for under the Environmental Management Act (2004). They prohibit the carrying out of projects without an environmental impact assessment required under the Environmental Management Act and define the contents and form of an environmental impact assessment and the basic principles of an environmental audit. A developer shall apply for an environmental impact assessment certificate in the form as prescribed by these Regulations. The final decision on an environmental impact assessment shall be taken by the Minister. The Regulations also provide for public hearings in relation with environmental impact assessments and appeal against decisions of the Minister.

b) The Land Regulations, 2001

According to The Land (Compensation Claims) Regulation 2001, made under the Land Act No.4 of 1999, the following are eligible for compensation / resettlement;

- i) Holder of right of occupancy (Section 22 of the Land Act of 1999) and;
- ii) Urban or Peri-urban land acquired by the President under Section 60 of the Land Act, 1999.

Sub-section 2 of Section 9 applies to all applications or claims for compensation against government or Local Government authority, public body, or institution According to Section 10(1) compensation shall take the form of:

- i) Monetary compensation;
- ii) Plot of land of comparable quality, extent and productive potential to the land lost;

- iii) A building or buildings of comparable quality, extent and use comparable to the building or buildings lost;
- iv) Plants and seedlings;
- v) Regular supplies of grain and other basic foodstuffs for a specified time.

c) The Land (Assessment of Value for Compensation) Regulation, 2001

The regulation applies to any application or claims for compensation by any person occupying land and shall include:

- i) The value of un-exhausted improvements on the occupied land;
- ii) Grazing land.

The regulation states: "basis for assessment of the value of any land and un-exhausted improvement shall be the market value of such land". The market value is arrived at by the use of comparative method proved by actual recent, sales of similar properties or by use of income approach or replacement cost method, in case the property is of special nature and not saleable.

d) The Mining (Environmental Management and Protection) Regulation, 1999

The Mining (Environmental Management and Protection) Regulation of 1999 was established under the Mining Act of 1998.

Relevant sections of the regulations are those that require the contractor to:

- i) Restore borrow pits and quarry sites before abandonment and;
- ii) Follow environmental Standards (noise, air and water quality).

e) The Road Sector Environmental Protection Regulation, 2009

The Road Sector Environmental Protection Regulation, 2009 was established under the Road Act Number 13 of 2007.

Relevant sections of the regulations are those that require the road authority/contractor/consultant to:

- Adhered on general environmental codes and standards

- Road development and maintenance conducted in such a manner as to facilitate the growing of natural vegetation and accommodate proper drainage and prevent soil erosion,

2.4 Environmental Guidelines

a) Environmental Assessment and Management Guidelines for Road Sector, 2004 (not yet accepted)

The Guidelines outline the procedures for carrying out EA and Management for road construction projects and provide an institutional and legal framework for environmental management in the road sector. Thus, the guidelines outline the administrative and legal procedures that should be followed by project proponents.

b) Environmental Code of Practice for Road Works, 2009

The Environmental Code of Practice for Road Works has been prepared to guide the intervention of road engineers and technicians during the planning, design, construction, and operation phases, so that direct adverse environmental impacts of the project can be avoided or minimized.

2.5 International Convention and Treaties

a) Convention on Biological Diversity (CBD)

Tanzania signed the Convention on Biological Diversity (CBD) on June 1992 and has prepared a Country Study on Biodiversity, which describes the state of biodiversity in Tanzania, forces affecting it and proposes measures to ensure conservation and use of these resources in judicious ways. The report stresses the need to ensure proper biodiversity conservation measures are taken before any development is undertaken (UNEP, 1998). This EIA will address need to conserve biodiversity as part of the CBD requirement.

b) Other Relevant MEAs

- i) Rio Declaration on Environmental and Development Rio de Janeiro, Brazil – 1992 (Adopted in Stockholm on 16 June 1972) (1992);
- ii) United Nations Framework Convention on Climate Change (UNCCC)- Rio de

- Janeiro, Brazil – 1992 (UNEP) (12 June 1992) (01 March 1996);
- iii) Kyoto Protocol on the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Japan (Adopted 11 Dec. 1997) (26 Aug. 2002);
 - iv) United Nations Convention on Biological Diversity – Rio de Janeiro 1992 (Adopted 22 May 1992) in Force: 29 Dec. 1993) (12 June 1992) (01 March 1996);
 - v) Convention on the Protection of workers against Occupational Hazards in the Working Environment due to Air pollution, Noise and Vibration (ILO No. 148). (Adopted: 1977) (30 May 1984) (30 May 1984);
 - vi) Lusaka Agreement on Cooperative Enforcement Operations Directed at illegal Trade in Wild Flora and Fauna Adopted: 08 August 1994) (08 Sept. 1994) (10 Dec. 1996);
 - vii) Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Washington DC (Adopted: 03 March 1973) (In Force: 01 Jul. 1975) (In Force: 01 Jul. 1975) (30 April 1973) (29 Nov. 1979) (27 Feb. 1980);
 - viii) Cartagena Protocol on Bio-safety-Montreal, Canada (Adopted: 29 Jan. 2000) in Force: Sept. 2003 (24 April 2003) (11 Sept 2003);
 - ix) Agreement on the Preparation of a Tripartite Environmental Management Programme for Lake Victoria-Dar es Salaam. (Adopted: 05 Aug. 1994) (In Force: 05 Aug. 1994);
 - x) Convention for the Protection, Management and development of the Marine and Coastal Environment of the East African Region and Related Protocols (01 March 1996);
 - xi) Stockholm Convention on Persistent organic Pollutants – Stockholm 22 May 2001 (23 May 2001) (17 May 2004);
 - xii) Vienna Convention on the Protection of Ozone Layer – Vienna, Austria (Adopted 22 March 1985; in Force: 22 Sept. 1988);
 - xiii) Basel Protocol on Liability and Compensation. (Adopted: 10 Dec. 1999) (14 Oct. 1994) (26 Dec. 1996);

- xiv) Ban Amendment to Basel Convention. (Adopted: 22 Sept. 1995) (26 Aug. 2002)
- xv) Montréal Protocol on substances that Deplete the Ozone Layer- Montreal, Canada (Adopted 16 Sept. 1987) in Force: 01 Jan. 1989) (16 April 1993) (16 Jul. 1993);
- xvi) London Amendment to Montreal Protocol (1990) – London (16 Aug. 1993);
- xvii) Copenhagen amendment to Montréal Protocol (1992) – Copenhagen, Denmark (06 Dec. 2002);
- xviii) Montreal Amendment to Montreal Protocol (1997) Montréal (06 Dec.2002);
- xix) Beijing Amendment to Montreal protocol (30 Dec. 1999)- Beijing, China (06 Dec 2002);
- xx) Basel Convention on the Control of Trans-boundary movements of Hazardous Wastes and their Disposal- Budapest, Hungary (Adopted: 22March 1999) (in Force: 05 May 1992) (07 April 1993);
- xxi) Basel Protocol on Liability and Compensation on Damage Resulting from Transboundary Movements of Hazardous Wastes and Their Disposal (Adopted 10 Dec.1999 (14 Oct. 1994) (26 Dec.1996);
- xxii) African Convention on the Conservation of Nature and Natural Resource (Adopted 10 Dec. Sept. 1968) (In Force: 16 June 1969) (15 Sept.1968) (15 Nov. 1974) (22 Dec.1974);
- xxiii) International Convention to combat Desertification in those Countries Experiencing Serious and /or Desertification, particularly Africa (14/10/94) (26/12/96);
- xxiv) Rotterdam Convention on the Prior informed Consent (PIC) procedure for Certain Hazardous Chemicals and Pesticides in International Trade- Rotterdam, 10 September 1998) (26 August 2002);
- xxv) United Nations Convention on the Law of the Sea 1982 (16 November 1994);
- xxvi) Agreement relating to the Implementation of Part XI of the Convention on the Law of the Sea -28 July 1994 (28 July 1998);

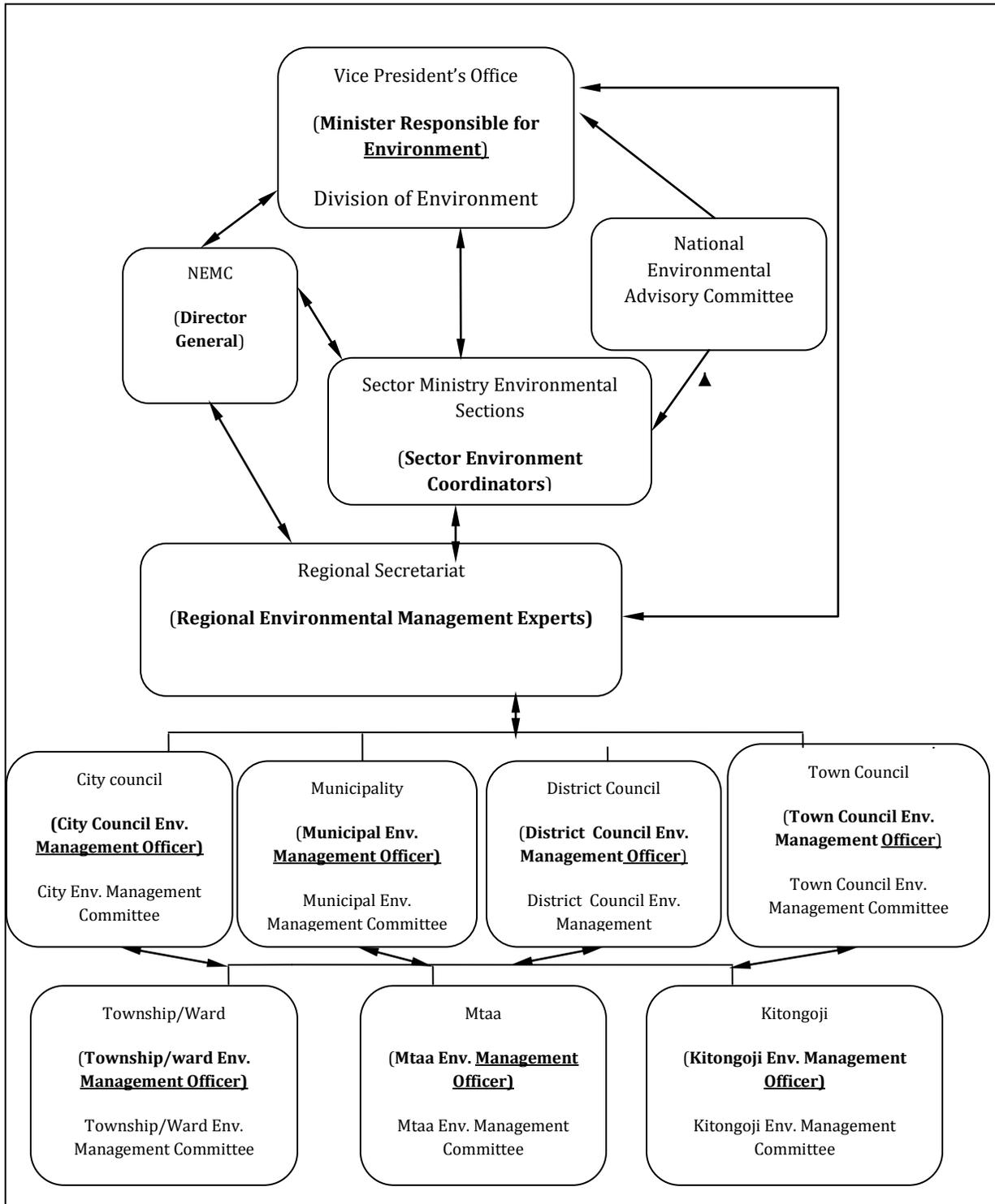
- xxvii) Agreement for the implementation of the provisions of the Convention relating to the conservation and Management of stranding Fish stocks (11 December 2001) (Not signed by the Country as at 16 January 2004);
- xxviii) United National Convention to Combat Desertification- Paris (Adopted 17th June 1994) (26th December 1996) (April 1997);
- xxix) Convention for the Protection, Management and development of the Marine and Coastal Environmental of the East African Region and Related Protocols-Nairobi (Adopted 25 June 1985) (1996) (01 March 1996) and;
- xxx) Bamako Convention on the Ban of the import into Africa and the Control of Trans-boundary movement of hazardous Wastes within Africa-(Bamako Convention)-Bamako. Mail (Adopted: 30 January 1991). (7th April 1993) (22nd April 198).

2.6 Institutional Framework

The institutional set-up for environmental management from national level to village level includes;

- a) National Environmental Advisory Committee;
- b) Ministry responsible for Environment;
- c) Directorate of Environment (DOE);
- d) National Environmental Management Council (NEMC);
- e) Sectoral Ministries;
- f) Regional Secretariats;
- g) Local Government Authorities [City, Municipal, District, and Town Councils, Township];
- h) Ward; and Village].

Figure 2.1: Institutional Framework for Environmental Management in Tanzania



The DOE and NEMC are the main regulatory bodies for environmental management in Tanzania. However, other sectoral ministries and agencies/institutions, have an important role in implementing environmental policy objectives. The environmental management functions of each institution are as outlined in the Environmental Management Act of 2004.

a) National Environment Advisory Committee

The National Environment Advisory Committee is the top advisory body to Minister or any Sector Ministry on any matter concerning environment. It is comprised of member from various fields of environmental management in the public, private sector and civil society. The members are specified in the First Schedule of the Environment Management Act of 2004. The Permanent Secretary chairs the body. Other members include;

- i) Director of Environment- Secretary;
- ii) Director General of NEMC;
- iii) Commissioners for Minerals, and Energy;
- iv) Representatives from Attorney General, Ministry of Community Development;
- v) Directors of Sector Ministries, including Local Government, Disaster Management, Roads, Human Settlement, and Ministry of Health (Preventive Services);
- vi) Chief Government Chemist and;
- vii) Representative from Higher Learning Institution, Civil Societies Organizations and Private Sector.

Linkage to the proposed project: The National Advisory committee is not directly linked to the proposed project, but through the Ministry of Works.

b) Ministry Responsible for Environment

The Ministry has the overall responsibility for environmental matters, including policy articulation for promotion, protection and sustainable management of environment in the country. Other duties include issuing policy guidelines to Sector Ministries, Government Departments, NEMC, National Environment Advisory Committee, City, and Municipal, District or Town Environment Management Committees, agencies or

any other public or private institutions.

Linkage to the construction sector proposed projects: The ministry responsible for environment is responsible to approve this EIA statement.

c) Directorate of Environment

The directorate of environment is responsible for coordination and monitoring/assessment of various environmental activities and giving early warning on impending environmental emergencies. The director is responsible for advising the Government on policy/legislative matters and international agreements / conventions.

Linkage to the proposed project The link between the project proposed and the Directorate of Environment project is from the fact that the Directorate of Environment is under the Minister responsible for environment, who is responsible for the approval of EIA statement.

d) National Environment Management Council (NEMC)

It is corporate body capable of suing and being sued as well as capable of holding, purchasing or acquiring and disposing of movable and immovable property. The body is responsible for undertaking enforcement; compliance, review and monitoring of environmental impact assessment (EIA). It prepares and submits bi-annual report on the implementation of the provisions given in the National Environment Management Act of 2004, and how it has fulfilled the objectives and purpose for which it has been established.

The Director General appointed by the President heads the Council and the Board of Directors, which consists of;

- i) Chairperson appointed by the President;
- ii) Director General-as the Secretary to the Council
- iii) Director of Environment
- iv) Seven members appointed by the Minister

Linkage to the proposed project: NEMC will be responsible for reviewing of this ESIA statement, as well as monitoring, and enforcement of on environmental compliance of

the proposed project.

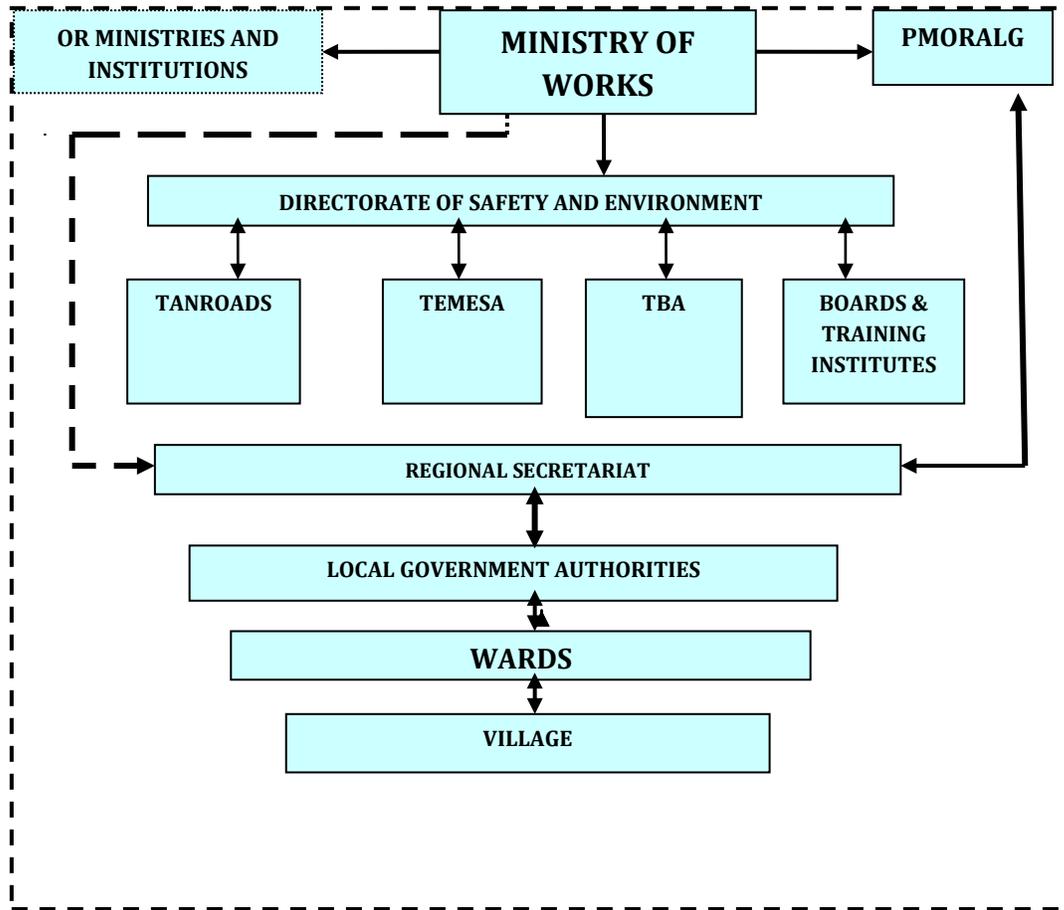
e) Sector Ministries

The Sector Environment Sections in Sector Ministries are responsible for ensuring: Compliance by the Sector Ministry with the requirements of the Act and ensuring all environmental matters are implemented and reports to the Director of Environment. It is also responsible for liaising with the Director of Environment and NEMC on matters involving environment.

The Sector Environment Coordinator, who is appointed from within the Sector Ministry heads the Sector Environment Section. The Coordinator is responsible for:

- i) Coordination of all activities and performance of the functions relating to environment
- ii) Prevention and control of any activity likely to cause or bring out environmental degradation;
- iii) Report on the implementation and enforcement of environmental provisions of laws falling under the jurisdiction of the sector
- iv) The Sector Environment Coordinator submits to the Director of Environment:
- v) Bi-annual reports on the state of the environment, including other reports as may be required by the Director of Environment;
- vi) Review environmental law under the Ministry and the extent of their implementation

Figure 2.2: Organisation Structure of Directorate of Safety and Environment



CHAPTER THREE

3.0 Construction sector state of environment

The word “environment” refers to our surroundings - the context within which we exist. All things, living or non-living, exist surrounded by other things, and therefore all have an environment. For humankind, the environment means, on a broad scale, the biosphere. The biosphere is that portion of the earth atmosphere system which supports life, and is characterized by its existence. It includes the oceans, the continental landmasses, and the lower atmosphere. The basic structural unit of the biosphere is the ecosystem. Each ecosystem occupies a space in which homogeneous conditions prevail, regardless of scale.

On the other hand, the construction industry encompasses a wide range of firms, including large multinational building contracting and service companies, manufacturers of building related products and materials, consulting engineers, architects and providers of building management services. The output of the construction sector in the form of roads, commercial and public buildings, infrastructural projects and domestic dwellings has a major impact on our ability to maintain a sustainable economy.

3.1 Environmental aspects

The Environmental aspects of construction sector are concerned with sustainability. For example, currently, negative impacts of construction have significant detrimental effects on the environment (both built and natural) and hence individuals’ lives, making construction unsustainable in the long term without mitigation measures. **Sustainable construction** can be defined as a system with associated construction patterns that can meet sector needs efficiently, whilst minimizing avoidable or unnecessary adverse impacts and their associated costs over relevant space and time scales. The environmental aspects of construction sustainability are concerned with local atmospheric pollution, more global impacts such as the contribution to global warming, noise pollution, land take, impacts on flora and fauna, the effects of waste disposal (both scrapped equipments and construction material wastes) on the natural environment and safety implications. These environmental aspects affect the lives of individuals through health impacts and nuisance.

Construction of infrastructure facilities such as buildings and roads are useful to the society. However, there are externalities that we need to consider in the construction of these facilities. There are major environmental impacts which result from construction

activities. For example, damage to sensitive ecosystems, loss of productive agricultural lands, resettlement of large numbers of people, permanent disruption of local economic activities, demographic change, accelerated urbanization, introduction of diseases and pollution (air, water and soil).

With the growing construction industry, environmental burdens are not far behind because of the use of resources and the emission of pollutants, which affect the society in general. Building construction as used here are the construction of wooden and non-wooden structures. The highest carbon dioxide (CO₂) sources relevant to the construction industry are crude petroleum, coal products, hot rolled steel, petroleum refinery products, cement and metal products.

Industries which use more energy in construction sector are; ready mixed concrete industry, transport services, iron and steel industry and petroleum industry.

3.2 Major Environmental challenges facing construction industry

- a) Poor urban land-use planning;
- b) Inadequate water management at various management levels;
- c) Inadequate financial and human resources;
- d) Inequitable terms of international trade;
- e) Vulnerable nature of local environments;
- f) Rapid growth of population and inadequate institutional coordination;
- g) Inadequate monitoring and evaluation;
- h) Inadequate information systems;
- i) Rapid growth of science and technology;
- j) Inadequate integration of conservation measures in the planning and implementation of programmes.

3.3 Main impacts of the construction sector on the environment

a) Climate Change

Although the construction industry is a vital part of the economy and is essential for everyday activities, it is also a significant source of greenhouse gas (GHG) emissions. This is due to gases released into the atmosphere by various construction equipments. These emissions are composed of Lead (Pb), Carbon monoxides (CO), Methane (CH₄), nitrogen Oxides (NO_x), Nitrous Oxide (N₂O), Chlorofluorocarbons

(CFCs), and Perfluorocarbons (PFCs). Some of the gases eg N_2O are associated with depletion of the Stratospheric Ozone (O_3) layer which naturally protects the earth's surface from Ultraviolet radiations. Looking forward, GHGs from the construction sector are forecast to continue increasing rapidly, reflecting the anticipated impact of factors such as economic growth and continuing rise in construction needs.

b) Air quality

Construction activities pollute in the form of gaseous and particulate matters emissions that affects air quality resulting into damage to human health. With these pollutants living organisms are affected. For example, the emissions of Sulphur Dioxide (SO_2) and Nitrogen Oxides (NO_x) in the atmosphere form various acid compounds when mixed with atmospheric vapour create acidic rain. As acidic rain precipitate affects the built environment, reduces agricultural crop yields and causes forest decline which might result into desertification.

c) Noise

This represents the general effect of irregular and chaotic sounds. In the construction sector, blasting of rocks and noise from equipment contribute to noise pollution. In the long run exposure to high noise levels seriously hampers hearing and affects the physical and psychological well being of living organisms.

d) Water Quality

The main effects due to construction operations on water quality predominantly arise from dredging, waste and oil spills, construction of highways and bridges, canals, ramps for ferries, dams, tunnels and other structures are constructed to cross rivers/seas and some under water using equipment which have effect on water quality. Dredging is the process of deepening harbor channels by removing sediments from the bed of the body of water to create and maintain sufficient water depth for shipping operations and port accessibility. This has two main negative impacts on marine environment; they modify the hydrology by creating turbidity that affect the marine biological diversity. The contaminated sediments and water raised by dredging require spoil disposal sites and decontamination techniques. Waste generated by operations of ferries in short distances of water ways may cause serious environmental problems, since they can contain a very high level of bacteria that can

be hazardous for public health as well as marine ecosystems when discharged in water.

e) Soil Quality

In this aspect, environmental impacts due to construction activities are soil erosion and contamination. The removal of top soil (earth surface) during construction of highways and bridges, or lessening grades for ports and airport developments lead to loss of fertile and productive soils. Meanwhile, construction activities which involve blasting of rocks or excavation of soil cause instability resulting into earth movement like landslides and weathering by breaking up rocks/soil. Also, through use of toxic materials in the construction industry contaminates the soil. Fuel and Oil spills from construction equipment are washed on roadside and enter the soil.

f) Biodiversity

Construction industry has influence on natural vegetations. The need for construction materials and the development of land has led to deforestation. Many construction activities have required draining land, thus reducing wetland areas and driving out various species of living organisms. In maintenance of roads and rails right-of-way, it is sometimes demanding to produce changes in plants in the area by growing new species as per specifications. As a result, animals are affected due to change of their natural habitats which lead them to death or shifting to other habitats and reduction of ranges.

g) Land Acquisition/Take

Establishment of construction activities has impact on rural and urban landscape. Due to introduction of such a facility, a piece of land should be acquired, which due to survey data may be required to cut across a habitable land area. This will finally affect the quality of life by increasing noise levels, generating odors, creating physical barriers and affect natural heritage. Due to this also some of the existing settlements and other facilities will be relocated, causing disturbance and the new places they will acquire, deforestation and pollution will be enhanced. Also during construction, some materials are borrowed from other areas, to get the suitable materials for construction. The borrow pits used are left uncovered, and the area cannot regain its natural state, so cannot be used for vegetation or agricultural activities thus affecting the nature and aesthetics of the area.

h) Health and Safety Issues

During construction phase, there is normally a population flux which is concentrated in a small area. Though there may be enough flagmen, road signs and barricades at site for traffic management; there is always a possibility of accidents occurring, resulting in loss of life and environmental catastrophe. In addition, interaction of people at site may cause spread of communicable diseases such as Sexual Transmitted Diseases (STDs) and HIV/AIDS. Also, without proper Personal Protective Equipment (PPE) occurrence of occupational diseases will be inevitable.

i) Solid Waste

Solid waste or litter is any solid material remains solid at 20°C that is discarded, disposed of, or abandoned in the environment. During construction solid waste is generated through disposal of scrap woods, piece of concrete and masonry, chunks of pavements and non reusable excavated materials. Solid waste may be categorized by source into mining, agricultural, industrial and urban waste. Also it may be categorized further into hazardous solid waste and low-hazard solid waste. Solid waste management is a growing challenge in the country particularly in urban areas. Consequently, indiscriminate dumping of solid waste is an almost ubiquitous problem. It is estimated that the total amount of solid waste generated in the country is in the range of 10,000 - 12,500 metric tonnes per day. However, 80-90% of this amount is left uncollected. It is further indicated that 40-60% of the solid waste generated is either buried or burnt (**State of the Environment Report, 2007**).

Some of the illegal waste dumps are located adjacent to roads, rivers and coastal areas. Such a situation is found in all road networks in rural and urban areas. Wastes from such dumps enter the marine environment through the action of blowing winds, leaching by municipal storm water systems and rivers which cause flooding during the rain season.

Degradable organic solids constitute the major component of solid waste stream together with plastics and electronic wastes. It should also be noted that segregation or sorting of solid waste at source is almost not existing. Worse still, mixing of hazardous solid waste (for instance hospital waste and industrial waste) with non-hazardous solid waste presents potential risks to public health and the environment.

With regard to solid waste, the collection, storage, and disposal of this increasing volume of waste have become a major environmental issue for the urban centres.

Solid wastes generated by municipal, industrial, and commercial activities are not properly managed.

The amount of waste recovery and recycling in Dar es Salaam City represent about 7% of the total waste generated in a day (DCC, 2004). However, Mbuligwe *et. al* (2002) estimated that potential for recycling could be expanded to about 55% of the total solid waste generated in the City. Paper is recycled by most scavengers (40.1%) followed by metal (28.5%), plastics (12.8%), glass (17%) and textiles (9.1%). In general, there are minimal waste material recovery and recycling. It is also estimated that only 30% of the total plastic waste generated in Dar es Salaam is collected and disposed of at the crude dumpsite while the remaining 70% is illegally dumped. Notably, there is no formal sorting of any type of plastic waste. As such, this situation creates a great nuisance along the road reserves and storm water systems.

Figure 3.1: Approximation of recycled wastes in the country

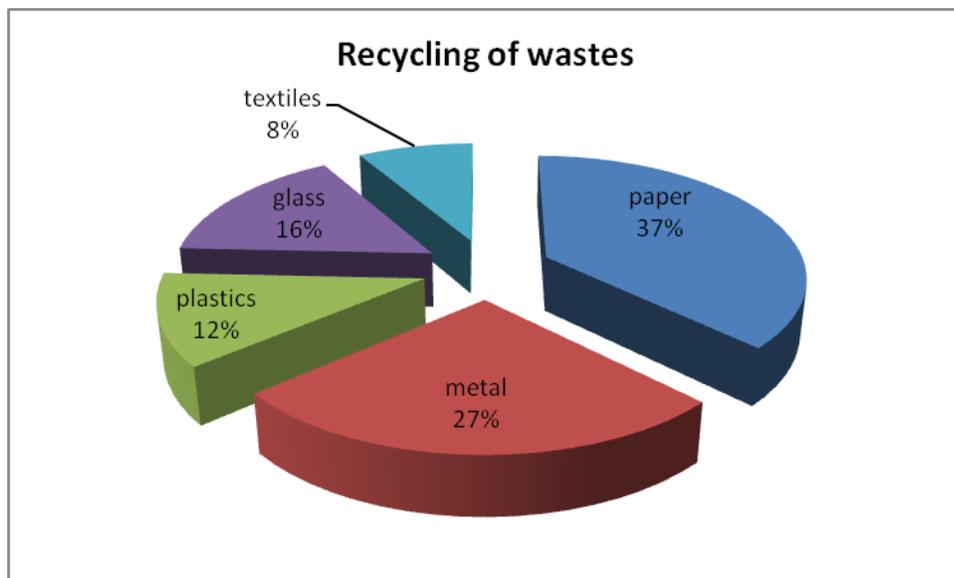


Figure 3.2: Dumping of wastes in the Dar Es Salaam city



Litter entering the road reserve environment has multiple sources. These include poorly managed or illegal waste dumps along the roads furniture, windblown litter from communities settled along the roads. Significant amount of litter also enter the marine environment through rivers and storm water system. Litter threatens marine life through entanglement, suffocation and ingestion and is widely recognized to degrade the visual amenities of marine and coastal areas with negative effects on tourism and general aesthetics (UNEP, 1995). Litter cause mortality to marine organisms, notably sea turtles, marine mammals and sea birds. Its impacts on the marine environment include the destruction of coastal habitats and in some situations interfere with biological production in coastal areas.

3.4 Major Environmental Issues

In order to comply with environmental requirements, the contractor, consultants and other stakeholders are required to adhere to environmental management principles in addressing to both short-term and long term, negative and positive spatial and non-spatial environmental impacts. Some of these issues include the following:-

- a) Direct impacts: Short term Negative
 - i) destruction of vegetation;
 - ii) water pollution;
 - iii) reduced air quality due to dust emission;

- iv) vibrations due to compactions;
- v) noise (from construction vehicles and plants);
- vi) labour importation;
- vii) disturbance on the cultural heritage;
- viii) waste generation;
- ix) accidental spills/contamination;
- x) poor sanitation;
- xi) occupational hazards/ accidents and;
- xii) loss of land.

b) Direct Impacts: Long-term negative

- i) landscape deterioration;
- ii) littering of wastes;
- iii) Soil erosion and sediment transport;
- iv) noise, vibration and deterioration of air quality due to increased traffic volume;
- v) accidents due to traffic volume and speed increase;
- vi) induced development of business activities along the built environment;
- vii) Involuntary dislocation of people and resettlement due to roads and buildings construction and;
- viii) Land take.

3.5 Analysis of mitigation measures of environmental Impacts/problems

The effects of environmental pollutants such as carbon dioxide (CO₂), nitrogen oxides (NO_x) and sulfur oxides (SO_x) are known to be detrimental to human, health, nature and to the air. It is, therefore, important to appraise the environmental loads of these pollutants brought about by the manufacture of a product, process and of systems. Compared to road

construction, the building construction industry spewed off lower pollutant emissions. With the detrimental effects of pollutants to urban areas, tradeoffs are necessary to balance the amount of emissions and construction of new facilities.

The reduction of nitrogen oxides is very important especially in urban areas where the concentration of this pollutant is high. Sulfur oxide emissions were highest for bridge works, which is mainly caused by transport activities, and heavy use of steel. A huge amount of carbon dioxide pollutants are emitted as well for road and building construction therefore it should be controlled/minimized by conservation of forests which easily absorb this gas. It is very important to focus on this pollutant for it contributes to the phenomena called global warming.

There is a need for recycling to mitigate waste disposal impacts, for the development of alternative fuels to reduce reliance on non-renewable resources and to reduce pollution from the burning of fossil fuels.

There are mitigation measures which are proposed to address some of the negative environmental impacts in the respects as shown in table 1 below.

Table 3.1: Measures to Address Negative Environmental Impacts

S/No.	Impact Category	Mitigation Measures
a) Direct Impacts: Short-term Negative		
i)	Destruction of vegetation	Re-vegetation of disturbed areas and protect existing trees
ii)	Loss of land	Locate quarries, dump sites in areas that have poor economic value
iii)	Lack of independent water sources for road and building construction	Avoid interference with public water supplies, identify independent water sources for construction
iv)	Water pollution	Control sediment transport; provide adequate drainage system; disposal of wastes in proper fashion; avoid spills and have a contingency plan

		for emergency
v)	Reduced air quality due to dust emission	Water sprinkling as frequent as may be required, cover surfaces and materials during transporting, netting high raising buildings, wetting of construction materials such as aggregates
vi)	Noise (from construction vehicles and plants)	Maintain mufflers on equipment, restrict use of dilapidated equipment
vii)	Vibrations due to compactions	Make a pre-construction survey of structural cracks to ensure safety and serviceability of adjacent structures, and ensure availability of adequate construction corridor
viii)	Labour importation	Employment of local labour be encouraged
ix)	Disturbance on the cultural heritage	Avoid encroaching archaeological sites
x)	Waste generation	Reduce, Collect, Re-use or Recycle waste such as lubricants; provide refuse storage; establish storage sites for cleared top soils for reuse in cleared areas; dispose of all waste in approved disposal sites
xi)	Accidental spills/contamination	Have a contingent plan for cleanup of accidental spills
xii)	Occupational health hazards/accidents	Provide first Aid Kits, fire extinguishers, safety training, provision of safety gears
b) Direct Impacts: Long-term Negative		

i)	Landscape deterioration	Backfilling, landscaping and re-vegetation to blend with natural features
ii)	Littering of waste	Provide anti-littering signage along the road; waste collection bins; provide rest stations along highways; promote public awareness; encourage anti-littering enforcement regulations/laws
iii)	Soil erosion and sediment transport	Provide adequate and appropriate drainage structures; stabilize slopes by structures and /or grasses
iv)	Noise, vibration and deterioration of air quality due to increased traffic volume	Enhance traffic management measures such as erection of sound barriers especially in urban residential areas.
v)	Accidents due to traffic volume and speed increase	Enhance traffic management measures such as signs, road markings, humps and provision of parking facilities along the highways (pass bay), provision of climbing lane.
vi)	Induced development of business activities along the built environment	Involve the land use planning authorities to plan controlled developments - Enforce Land use Development Control
vii)	Involuntary dislocation of people and resettlement due to roads and buildings construction	Effect adequate payment of justifiable compensations (Effect fair and prompt compensations according to the Land Act of 1999 section 3(1) (g))
viii)	Land take	Effect adequate payment of justifiable compensations

CHAPTER FOUR

4.0 Environmental Action Plan

4.1 SWOT Analysis of MoW Capacity

The analysis of strengths, weaknesses, opportunities, and threats (SWOT) was a key tool used in assessing internal and external environment. Strengths and weaknesses were reviewed as factors, which can be controlled by MoW and were based on core area of service delivery, internal management - effectiveness, efficiency and accountability and capacity of MoW to deliver services.

Opportunities and threats (challenges) are factors, which are external to MoW and were examined by critically considering;

- a) Social, political and economic changes that will have an impact in the demand for MoW services and ability to provide;
- b) External changes that would have an impact on service delivery;
- c) Acceptance or resistance of changes in policies and methods of service delivery and;
- d) New technologies and methodologies and their effects.

4.1.1 STRENGTH

Strengths are internal factors that give MoW an advantage in providing services and help to achieve the mission. These are;

- a) Capacity building and Institutional Support Program;
- b) Training of Road Engineers and Road Technicians on Environmental Management Assessment Program;
- c) Presence of Full Environmental Management Section lead by Assistant Director;
- d) Presence of Environment Unit in TANROADS;
- e) Environmental Management tools for Road Sector in place (Regulations, Guidelines, EIMS, & Code of Conduct);

- f) Collaboration with some Ministries NGO,s Private Sectors CBO,s and Development Partners on matters dealing with environmental matters within the sector;
- g) Presence of Environmental Management Act Implementation Support Program (EMA - ISP);
- h) Presence of ROAD FUND Support on Environment Management Activities. Environmental Impact Assessment for new projects as a legal requirement under EMA, Cap 191;
- i) Environmental issues are addressed in NSGRP, The Tanzania 5 years development plan 2011 – 2016 and MDGs and;
- j) Availability of MOW owned training institutions.
- k) Establishment of the scheme of service for environmental management officers

4.1.2 WEAKNESSES

Weaknesses are internal factors which hinder performance of the Ministry. These are;

- a) Weak Institutional and legal frame work;
- b) In adequate funding (from Government & development partners);
- c) Lack of Environmental Management Units in some of the Ministerial Agencies; Tanzania building Agency, TEMESA and NCC;
- d) Inadequate capacity with regard to addressing environment issues within the sector;
- e) Lack of environmental awareness within the sector during the implementation of the construction projects;
- f) Low budget allocation for environmental management issues in the sectoral budget lines;
- g) Low compliance and enforcement of sectoral legislations and regulations;
- h) Non adherence of contractors and consultants to EMPs and conditions attached to the EIA certificates ;

- i) Lack of monitoring and evaluation capacity of construction activities;
- j) Indiscriminate dumping of solid waste alongside the roads and into the storm water drains;
- k) Invasion of petty traders and businesses within the road reserves;
- l) Lack of rest stations along the trunk roads and highways;
- m) Use of props (*mirunda*) as scaffoldings and timber formwork in construction of high buildings;
- n) Land degradation and deforestation occurring during construction and maintenance activities;
- o) Lack of alternative materials for scaffolding and formwork
- p) Lack of monitoring capacity
- q) Lack of coordination among the various institutions dealing with permitting construction activities
- r) Insufficient motivation to staff.

4.1.3 OPPORTUNITIES

These are external factors that provide an opportunity for MoW and which if capitalized would improve MoWs chances in achieving the mission and objectives. These include;

- a) Political will to support the construction sector;
- b) High demand of construction works from the public;
- c) There are existing training programs in various institutions with regard to environmental management;

4.1.4 THREATS

These are external factors, which if ignored, could inhibit the chances of MOW achieving its mission. These are;

- a) Climate Change and environmental disasters;
- b) Unreliable sources of funding (e.g. withdrawal of development partners' support);
- c) Unreliable, incompetent, under capacitated or unfaithful contractors and consultants;
- d) Change of leadership;
- e) International communities pressure;

Table 3.2: Detailed Action Plan

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
Target : 1 Strengthen Sector Legal Basis, Planning, Management , Compliance and Enforcement by June 2016										
Inadequate policy and legal framework addressing environmental issues in the Sector	To review existing policies and legal framework to incorporate environmental management issues	Policies and legal framework reviewed to address environmental issues in the sector adequately	Number of policies and legislations reviewed						MOW, Trade and Professional Bodies, Regulatory, Advisory Council and Agencies	100
		Environmental issues well addressed as per policies and regulations								
Inadequate Institutional Capacity to address sectoral environmental concerns/issues	To Develop sectoral environmental management guidelines	Environmental Management issues addressed adequately in a uniform and systematic manner	Number of guidelines prepared and in place						MOW, Trade and Professional Bodies, Regulatory, Advisory Council and Agencies.	200
	To Establish Environmental Management Units in all agencies	Environmental Management issues adequately addressed in each agency	Number of agencies with environmental management units.							

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
	Attending to in country technical meetings and seminars	MOW staff gets opportunities to share information and experience with professionals from other sectors and networking.	Number of staff attending such meetings and seminars.							
	Attending to International Conventions, workshops and Seminars	Addressing country's interests into international agreements	Number of staff attending to such international conventions, treaties, etc. per annum.							
	To identify and procure required tools and equipment for environmental monitoring and auditing	Monitoring and auditing activities enhanced	The number of tools and equipment procured							
	To strengthen the capacity of environmental section in the MoW	The capacity of environmental section in the MoW to oversee environmental	The number of progress reports produced							

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
		activities in the sector enhanced								
	To train staff on sectoral environmental management issues	The capacity sectoral staff to address sectoral environmental issues enhanced	Number of staff trained							
Compliance of construction industry to environmental standards	To encourage construction agencies and firms to actively engage into the development of the EMS in their firms	Construction agencies and firms adhere and comply to environmental requirements	Number of Agencies and firms having EMS in place.						MOW TANROADS, TBA & TEMESA NCC PMORALG	200
	To Prepare monitoring protocols and reporting formats and reviewed periodically	Standard methods for monitoring and reporting on performance of construction agencies and firms established	Monitoring protocols and reporting formants in place						MOW, Trade and Professional Bodies, Regulatory, Advisory Council and Agencies	150

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y 2	Y 3	Y 4	Y 5		
Sub-total										750
2. Ensure Environmental Mainstreaming in all activities related to construction sector development										
Lack of budget for environmental monitoring in projects funding	To ensure that funds for environmental monitoring and auditing are allocated in budgets for all projects	Environmental monitoring and auditing conducted to all projects	Number of projects with budgets allocated for each project						MOW, Trade and Professional Bodies, Regulatory, Advisory Council and Agencies	200
	To ensure there are funds allocated in the sectoral for environmental audit	All completed projects are subjected to periodic environmental audit	Budget allocated for environment annually							
Waste Management	To encourage and supervise, in collaboration with other sectors, the proper management of waste along the national and districts roads	Appropriate waste collection and disposal practices along the roads established.	Number of transporters adhering to the advocated solid waste management practices.						MOW TANROADS, TBA PMORALG & TRANSPORTERS	200

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
		Reduced number of illegal waste dumps along the Right Of Way (ROW) capacities.	Number of violators apprehended and prosecuted/penalized. ,.						MOW, TBA, TEMESA, Min. of Water, Higher learning Institution & NCC	100
			Number of roads with reduced waste dumps along their ROWs							
			Number of clean /maintained storm water drainage systems							
	To conduct inventory on the government buildings to assess the status of	Improved wastewater management systems within the	Number of government buildings with						MOW, TBA, TEMESA, Min. of Water,	

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
	wastewater management system and advise accordingly and take appropriate actions	government buildings	improved/well maintained waste water management systems						Higher learning Institution & NCC	
	To conduct Environmental Inspections in the TEMESA Workshops to Identify source and types of pollution and advise or take appropriate measures	Sources of pollution in TEMESA workshops reduced signifiant/The environmental status of TEMESA workshops signifiant improved	Number of TEMESA workshops inspected						MOW, TBA, TEMESA, Higher learning Institution & NCC	
Air, Noise and Vibration Pollution.	To conduct regular inspections to construction activities to determine levels of air, noise and vibration pollution and issue instructions on measures to be taken	Air, noise and vibration pollution mitigated activities	Number of inspected projects and mitigation measures put in place.						MOW, OSHA, TANROADS, TBS & Higher Learning Institution.	200
Sub-total										850

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
3. Develop Sector Capacity Building and Strengthen Institutions for Sustainable Development										
Lack of proper waste management from material TEST Laboratories	To prepare guidelines for management of hazardous waste from Material Test Laboratories	Establishment of hazardous waste from Material Test Laboratories managed in the appropriate manner	Guidelines in place						TANROADS , NCC PMORALG TBS, TBA, GCLA & MoW	200
Inadequate Chemical Management	To conduct training to the laboratory staffs on the proper handling of chemicals, laboratory procedures, health impacts and chemical pollution	To have Laboratory Staffs that are well trained and competent in Chemical Management	Number of staffs in the sector ministry trained on the principles and methods of chemical handling and management						MoW, Regulatory Bodies, Trade and Professional Associations, Advisory Bodies and Agencies	100
Land degradation resulting from frequent demolition and	To organize stakeholders workshop to discuss and deliberate on the course of action	The problem discussed and solution and measures proposed	Workshop proceedings in place						MoW, Regulatory Bodies, Trade and	150

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
maintenance of roads and buildings									Professional Associations, Advisory Bodies and Agencies	
Inadequate Capacity in environmental monitoring and auditing	Training of MoW staffs on Environmental Monitoring and Auditing	MOW and Its agencies Staffs equipped with Environment Monitoring and Auditing knowledge and Skills	Number of staffs trained						MoW, Regulatory Bodies, Trade and Professional Associations, Advisory Bodies and Agencies	150
	Advocacy and Awareness Raising to i) formulate bylaws on the protection of environment by empowering the community	Bylaws will create sense of accountability and responsibility towards protection of their own environment	Bylaws in place						MoW, Regulatory Bodies, Trade and Professional Associations,	100

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
	ii) In collaboration with CBOs and other private partners to sensitize and promote community participation in issues related to the protection of environment from adverse effects of the construction industry	The Community made aware and responsible for undertaking protection of environment.	Number of communities participating in the protection of the environment voluntarily						Advisory Bodies and Agencies	
	iii) To organize campaigns design to enhance stakeholders' awareness on the issues and actions required to protect the environment (relate with number (ii) above)	Awareness of other stakeholders on issues related to the environmental protection in the road sector enhanced/raised.	Number of stakeholders attending awareness campaigns Number of awareness campaigns carried out.							100
Lack of Monitoring and Evaluation System (relate to capacity)	Researching and Establishing environmental objectives, standards and monitoring and evaluation indicators	Monitoring and Evaluation conducted regularly and effectively.	Existence of Research, Standards, Monitoring and Evaluation, indicators and information						MOW, TBA TANROADS, TEMESA	

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
building above)			management framework							
			Agreement on and implementation of a list of core M&E indicators and data sources							
			Monitoring and evaluation reports in place							
	Establishing data sources and reporting systems									
	Establishing, and implementing of a reporting system for stakeholders on their EMP activities	All stakeholders report on the implementation of their EMPs in a standardized format	Agreement on and implementation of a reporting system for stakeholders on their EMP activities						MOW, TBA TANROADS, TEMESA	

Environmental Issues/ Challenges	Priority Action/ Activities	Expected Output	Indicators	Time Frame					Implementer	Estimated Cost M(Tsh.)
				Y1	Y2	Y3	Y4	Y5		
	Identify and Conduct Research in priority areas on Environmental Threats from construction activities	Priority research areas in the construction industry identified and researched on environmental threats	Number of threats and research priority areas in the construction activities identified Number of research conducted						MOW, TBA TANROADS, TEMESA	
Sub-total										950
GRAND TOTAL										2550

5.0 REFERENCE

1. URT 1997, National Environment Policy Government Printers, DSM
2. URT 2004, ACT SUPPLEMENT Environmental Management Act, 2004
3. URT, 1999, Tanzania Development Vision 2025 Government Printers, DSM
4. URT - Vice President's Office, 2005 National Strategy for Growth and Reduction of Poverty
5. URT - Vice President's Office 2006, A Strategy for Urgent Actions on Land degradation and Water Catchments
6. URT - Vice President's Office. 2006, Interim State of Environment Report for Tanzania.
7. URT- National Land Policy (1997)-Second Edition
8. URT- Mineral Policy of Tanzania, 2009