MALAWI GOVERNMENT

NATIONAL WASTE MANAGEMENT STRATEGY

2019–2023

Foreword

Malawi Government is committed to achieving the universal 2030 Agenda for Sustainable Development which is a plan of action for people, planet and prosperity. The Agenda seeks to, among other things, protect the planet from degradation, including through sustainable consumption and production, sustainably manage its natural resources, ensure human beings can live in a healthy environment and that economic, social and technological progress occurs in harmony with nature.

The Agenda has 17 Sustainable Development Goals with 169 targets including those on waste management such as; Goal 3 which seeks to ensure health and well-being for all, at every stage of life, Goal 11 on sustainable cities and communities and Goal 12 on responsible production and consumption. Member States are encouraged to develop as soon as practicable ambitious national responses to the overall implementation of the Agenda to support the transition to the Sustainable development Goals.

The National Waste Management Strategy is one way of demonstrating Malawi's commitment to effective waste management in accordance with the 2030 Agenda. The Strategy sets out the priorities to be pursued in Malawi to minimize the detrimental impact on human health and the environment arising from poor waste management and to improve the management of waste.

The National Waste Management Strategy provides information on the regulatory and institutional infrastructure, status of waste management in Malawi, and different types of wastes as well as tools to enable regulatory bodies, generators of hazardous waste, including the public, and recyclers and operators of facilities to minimize, recycle, treat and dispose of waste in an environmentally sound manner for the sustainable development of Malawi.

I would like to express my appreciation to the Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (SBC) which is administered by the United Nations Environment (UN Environment) and to the Government of Switzerland for the financial and technical support for the development of the National Waste Management Strategy. I would also like to thank all institutions and individuals who contributed to the development of this strategy.

Malawi is our home and therefore let out premises and surroundings be beautiful and clean by good waste management of all places.

Aggrey Masi
Minister of Natural Resources, Energy and Mining

Executive Summary

The National Waste Management Strategy sets out the priorities to be pursued to minimize the detrimental impact on human health and the environment associated with waste and to improve the management of waste in the country taking into consideration the 2030 Agenda for Sustainable Development.

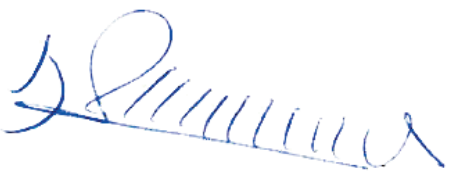
The Strategy outlines the multilateral environmental agreements relating to waste management to which Malawi is a Party and discusses the policy and legal framework for waste management. It outlines the roles and responsibilities that have been assigned by legislation to various government Ministries, Departments and Agencies, the private sector and the general public for waste management. This is followed by an analysis of the Strengths, Weaknesses, Opportunities and Threats in the area of waste management.

The Strategy describes the current situation in Malawi with regards to waste generation, segregation, collection, transportation, treatment and disposal. It also considers the types of wastes in the country which are divided into municipal, industrial and hazardous waste.

The key priority areas of the Strategy are to: (a) formulate policies and enact legislation to reduce waste generation; (b) promote responsible public behavior on-waste management; (c) promote waste segregation at source; (d) Reduce, Reuse, Recycle, and Recover energy from the waste; promote waste treatment; and 9e) establish environmentally sound infrastructure and systems for waste management.

An implementation matrix is included in the Strategy which outlines how the priority areas should be implemented to enable Malawi to attain its Sustainable Development Goals on waste management for the protection of public health and the environment.

The call is to all Malawians to effectively manage waste.



Patrick Matanda
Secretary for Natural Resources, Energy and Mining

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Definitions

Chemical	a chemical substance in any form whether by itself or in a mixture or preparation whether manufactured or obtained from nature and includes such substances used as industrial chemicals, for consumer use but excludes pesticides and fertilizers, medicines and drugs and includes toxic chemicals.
Hazardous substances	any chemical, waste, gas or gaseous matter, medicines, drugs, plant, animal or microorganism which is injurious to human health or the environment.
Hazardous wastes	waste which is poisonous, corrosive, noxious, explosive, inflammable, radioactive, toxic or harmful to the environment.
Pollutants	any substance whether in a liquid, solid or gaseous form which directly or indirectly adversely alters or destroys the quality of the environment; or is dangerous or potentially dangerous to public health, plant or animal life, and includes objectionable odours, radioactive substances or particles, noise, vibration, or any substance or panicle that causes temperature change or physical, chemical or biological change to the environment.
Waste	domestic, commercial or industrial waste whether in a liquid, solid, gaseous or radioactive form which is discharged, emitted or deposited into the environment in such volume, composition or manner as to cause pollution.

List of Acronyms and Abbreviations

CBD	Central Business District
CBOs	Community Based Organizations
EAD	Environmental Affairs Department*
EEE	Electrical and Electronic Equipment
EMA	Environment Management Act
EPR	Extended Producer Responsibility
ESCOM	Electricity Supply Corporation of Malawi
E-Waste	Electrical and electronic wastes
FBOs	Faith Based Organizations
ICT	Information and communication technology
MACRA	Malawi Communications Regulatory Authority
MBS	Malawi Bureau of Standards
MEA	Multilateral Environmental Agreement
MLGRD	Ministry of Local Government and Rural Development
MNREM	Ministry of Natural Resources, Energy and Mining
NEP	National Environmental Policy
NGO	Non-Governmental Organisation
NWMS	National Waste Management Strategy
POPs	Persistent Organic Pollutants
PPP	Public Private Partnership
SAICM	Strategic Approach to International Chemicals Management
SDGs	Sustainable Development Goals
UN	United Nations

**Take notice that at the commencement of the Environmental Management Act, Act No. 19 of 2017, any reference to EAD shall be meant to be reference to Malawi Environmental Protection Authority* (*MEPA*).

1 Background and objectives

Population growth, rapid urbanization, increasing industrialisation, rising incomes and a more sophisticated form of consumerism are leading to an increase in the amount and toxicity of waste, especially in the cities. Malawi faces challenges in managing this waste due to inadequate and poor infrastructure, low awareness, limited human and financial resources as well as poor coordination among stakeholders.

Poor waste management poses a threat to public health and the environment. The uncontrolled burning of waste creates particulate and persistent organic pollutant emissions that are highly damaging locally and globally. Accumulated waste and blocked drains encourage vectors to breed, resulting in the spread of malaria, cholera and other infectious diseases and are a major contributing factor to flooding. Uncontrolled dumpsites, and, in particular, the mixing of hazardous and other wastes, can cause disease in neighbouring settlements as well as among waste workers. Poorly managed waste can pollute both surface and groundwater causing toxicity of drinking water and contamination of the ecosystem.

The National Waste Management Strategy (NWMS) sets out the priorities to be pursued to minimize the detrimental impact on human health and the environment associated with waste and to improve the management of waste in the country.

The purpose of the Strategy is to guide overall management of waste with reference to the current, projected waste situation, and local and global trends. The strategy provides information and tools to regulatory bodies, generators of waste (including the general public), its recyclers and operators of facilities on how to minimize, recycle, treat and dispose of waste in an environmentally sound manner.

The NWMS has been aligned with the MGDS II and 2030 Agenda for Sustainable Development together with its 17 Sustainable Development Goals (SDGs) and 169 targets which Malawi, as part of the global community, signed in 2015. The SDGs entered into force in 2016. The SDGs which are relevant to waste management include:

Goal 3 seeks to ensure health and well-being for all at every stage of life. One of the targets of this goal is to substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by 2030.

Goal 11 on sustainable cities and communities acknowledges that managing solid waste is often problematic in densely populated areas and that in many developing regions, less than half of solid waste is safely disposed of. As per capita waste generation continues to rise, the collection and safe disposal of solid waste will continue to require serious attention. One of the targets of the Goal is to reduce the adverse per capita environmental impact of cities by 2030, including by paying special attention to air quality and municipal and other waste management.

Goal 12 of the SDGs is on responsible production and consumption. The targets of this goal include achieving the environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks, and significantly reducing their release to air, water and soil in order to minimize their adverse impacts on human health and the environment by 2030 and substantially reducing waste generation through prevention, reduction, recycling and reuse by 2030.

The Agenda for SDGs provides that governments are expected to take ownership and establish national frameworks for the achievement of the 17 Goals. The NWMS represents Government's commitment to achieving SDG goals and targets on waste management in order to contribute to the sustainable development of Malawi.

2 Overall Strategy Goal

Protection of public health and the environment.

3 Key priority areas

The key priority areas of the NWMS are:

(i) Formulate policies, legislation and economic instruments on waste management;

(ii) Capacity building at all levels of planning and decision making to promote transformative leadership;

(iii) Teach responsible public behaviour on waste management;

(iv) Promote waste segregation at source;

(v) Promote public-private participation in waste management;

(vi) Reduce, reuse, recycle, and recover energy from the waste (4Rs);

(vii) Promote waste treatment; and

(viii) Establish environmentally sound infrastructure and systems for waste management.

4 Multilateral Environmental Agreements

Malawi is a party to the:

- Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal which was acceded to on 21st April 1994;
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade which it acceded to on 27th February 2009; and

- Stockholm Convention on Persistent Organic Pollutants signed on 22nd May 2002, and ratified on 27th February 2009.

Malawi also signed the Minamata Convention on Mercury on 10th October 2013 and is in the process of ratifying it. Additionally, the country subscribes to and is implementing the Strategic Approach to International Chemicals Management (SAICM).

5 Policy and Legal Framework

The policy and legal framework for waste management comprises the Constitution, various sectoral policies, Acts, regulations, by-laws, standards and guidelines. The following paragraphs highlight some of the policies and laws that are applicable to waste management.

5.1 The Constitution

The Constitution does not specifically mention waste. However, section 13(d) of the Constitution which deals with Principles of National Policy, provides a framework for environment and natural resources management. It states that the State shall actively promote the welfare and development of the people of Malawi by progressively adopting and implementing policies and legislation aimed at managing the environment responsibly in order to:

(i) prevent the degradation of the environment;

(ii) provide a healthy living and working environment for the people of Malawi;

(iii) accord full recognition to the rights of future generations by means of environmental protection and the sustainable development of natural resources; and

(iv) conserve and enhance the biological diversity of Malawi

The NWMS is one of the tools that will contribute to the practical realisation of the aspirations of section 13 (*d*).

5.2 National Environment Action Plan

The National Environment Action Plan (NEAP) provides the framework for integrating environmental protection and management in all national development programmes with the view to achieving sustainable socio-economic development. The key objectives of the NEAP include the following:

(i) To document and analyse all major environmental issues and identify measures to alleviate them; and

(ii) To promote sustainable use of natural resources.

The NEAP is broadly framed and can be applied to any area concerning the environment, including- waste management.

5.3 National Environmental Policy 2004

The 2004 revised National Environmental Policy (NEP) recognizes the importance of creating an enabling policy and legal framework for cross sector coordination, participation of non-state sectors, strengthening the enforcement machinery and decentralizing natural resources and environmental management and governance. The overall goal of the NEP is the promotion of sustainable, social and economic development through the sound management of the environment and natural resources.

The NEP has several provisions which provide policy directions for management of waste. For example, it calls on Government to provide training in specialized areas of environmental management including waste management and environmental pollution. The NEP provides for strategies for achieving the objective of promoting urban and rural housing planning services through: (*a*) solid waste disposal using appropriate technology as well as proper design, selection and licensing of disposal sites and routes; (*b*) sorting industrial, clinical, domestic and other types of waste at source to facilitate recycling of materials wherever possible; (*c*) facilitating the privatization of waste management; and (*d*) ensuring that all hospitals, clinics, public places and residential areas have appropriate sanitation and waste and effluent disposal systems.

The NEP imposes a duty on Government to develop master plans for the conservation and utilization of water resources including solid and liquid waste management on land and water bodies and develop plans for development/construction of industrial sites that have adequate and appropriate waste disposal systems.

The NEP provides and offers good guidance on the development of regulatory frameworks for waste management.

5.4 Environment Management Act, Cap. 60:02 of the Laws of Malawi

The objective of the Act is to make provision for the protection and management of the environment and the conservation and sustainable utilization of natural resources.

The Act contains provisions for pollution control and regulation of waste, including hazardous waste. It regulates the handling, storage, transportation, classification of wastes and the importation and exportation of hazardous waste. The Act subscribes to the polluter pays principle and places the responsibility of preventing discharge or emission of any pollutant into the environment, including the removal or disposal of any pollutant, on the polluter.

5.5 Environment Management (Waste Management and Sanitation) Regulations 2008

These Regulations specifically provide for waste management and sanitation. Part II places a duty on on local authorities to prepare waste management plans and to operate and maintain a municipal sewage collection system for their area of jurisdiction, and to promote integrated waste management systems. Part III deals with management of general or municipal solid waste including: (*a*) waste separation at source; (*b*) the collection of the general or municipal solid waste at such a frequency as to prevent the piling of waste; and (*c*) disposal of solid waste at a plant identified and maintained by a competent local authority.

Part IV deals with solid waste recycling and recycling facilities. It identifies which materials can be recycled and the procedure for obtaining authorization to operate a disposal site or plant. Part V focuses on management of municipal solid liquid waste including discharge of effluent and of municipal liquid waste into the environment.

Management of hazardous waste including: (*a*) labelling requirements and leaflets for containers or packages of hazardous wastes; and (*b*) treatment and disposal of hazardous waste and infectious wastes are dealt with under Part VI of the Regulations. Part VII of the Regulations deal with transporting and storage of waste and require any person intending to engage in the business of transportation, handling or storage of wastes to apply for a licence to do so. Further, the Part also provides for the conditions upon which such licences are to be granted.

Part VIII relates to waste disposal site or plants, these are required to be licenced and Part VIII provides the conditions attached to such licences. The transboundary movement of hazardous waste is dealt with in Part IX of the Regulations. This is based on the Basel Convention and sets out the requirement for a movement document, notification procedures and the prior informed consent.

5.6 Environment Management (Chemical and Toxic Substances Management) Regulations 2008

The Regulations apply to any person in Malawi whose undertaking involves or includes the manufacturing, repackaging, importation, exportation, transportation, distribution, sale or other mode of handling toxic substances and chemicals and in respect of any activity in relation to toxic substances and chemicals which involves a risk of harm to human health or the environment. This includes chemical wastes which are defined as any unwanted or waste chemical or chemical formulation generated from any process which can cause danger to both human health and the environment.

Local authorities are required to make by-laws for the management of chemicals and toxic substances and chemical wastes in their respective areas of jurisdiction.

Such by-laws should ensure that the disposal method of chemical wastes is environmentally sound. The Regulations also place a duty on industries or medical facilities not to discharge any chemical wastes in any state into the environment unless such wastes have been treated in accordance with acceptable international methods. There are also requirement in the Regulations on disposal or treatment of highly toxic or hazardous chemical wastes.

5.7 Atomic Energy Act, Cap. 61:03 of the Laws of Malawi

The Atomic Energy Act provides for the protection of the people and the environment in present and future generations against the harmful effects of ionizing radiation by controlling and regulating the importation, exportation, production, processing, handling, use, holding, storage, transportation and disposal of radiation sources, nuclear materials, and any other radioactive materials.

Part X of the Act provides for radioactive waste management. In that regard, it prohibits radioactive waste generated outside the territory of Malawi from being imported into the country and that radioactive waste may only be exported upon the issuance of a licence by the Atomic Energy Regulatory Authority. Further, the Act also provides for general principles of radioactive waste management including, minimization of waste. It is a legal requirement that any person or entity intending to operate a radioactive waste management facility to be licenced.

5.8 Atomic Energy Regulations of 2012

The Atomic Energy Regulations 2012 give effect to the Atomic Energy Act. Part XII comprehensively deals with radioactive waste management.

5.9 Water Resources Act, Cap. 72:03 of the Laws of Malawi

One of the objectives of the Act is to control pollution and to promote the safe storage, treatment, discharge and disposal of waste and effluents which may pollute water or otherwise harm the environment and human health. To that extent, the Act, in Part VIII comprehensively provides for the prevention and control of water pollution by, among other things, prohibiting the discharge of effluent directly or indirectly into water or polluting water. The Act requires any person who through any activity or process carried out on any land causes pollution of water resources from such activity or process to take necessary measures to prevent any pollution from happening or continuing to happen including complying with prescribed effluent standards or waste management practices.

In addition, the National Water Resources Authority is empowered to prescribe a list of substances prohibited from being discharged into water resources. Furthermore, the prevention and control of pollution is also possible through the issuance of a discharge permit upon application to a person who wishes to discharge effluent.

5.10 The Water Works Act, Cap.72:04 of the Laws of Malawi

The Water Works Act, 1995 provides for the establishment of Water Boards in each water area responsible for Water supply. Section 20 of the Act provides that the Board shall have power to install and operate waterborne sewerage sanitation schemes within the water-area.

Part 5 of the Act has extensive provisions on the operation of water-borne sewerage sanitation. Section 26 gives powers to water boards to construct and maintain a public sewer and construct water-borne sewage disposal works on any customary land or public land or land acquired or lawfully appropriated for the purpose. Section 30 provides for the right of owners and occupiers within the water area to drain into public sewers. It states that the owner or occupier and of any premises, or the owner of any private sewer, within the water-area of the Board shall be entitled to have his drains or private sewer made to communicate with any available public sewer of the Board and thereby to discharge soil and waste water and storm water from those premises or that private sewer.

5.11 The Public Health Act, Cap.34:01 of the Laws of Malawi

The Act creates the legal framework for the protection of public health in Malawi and broadly provides for powers of the administration to regulate and control issues such as animal and food production and handling, food and water supply and sewerage.

Part IX deals with sanitation and housing and contains provisions prohibiting nuisances. According to the Act a nuisance includes any noxious matter, or waste water, flowing or discharged from any premises, wherever situated, into any public street, or into the gutter or side channel of any street, or into any gully, swamp, or watercourse or irrigation channel not approved for the reception of such discharge. A nuisance also includes any collection of water, sewage, rubbish, refuse, odour, or other fluid or solid substances which are offensive or which are dangerous or injurious to health or which permit or facilitate the breeding or multiplication of animal or vegetable parasites of men or domestic animals, or of insects or of other agents which are known to carry such parasites or which may otherwise cause or facilitate the infection of men or domestic animals by such parasites.

While Part X of the Act provides for the conservation of water, drainage, and sewerage Sections 79-86 of the Public Health Act has extensive provisions on public sewers which are similar to the provisions of sections 26-33 of the Water Works Act, the only difference being that the Public Health Act refers to Local Authorities as being responsible in managing sewerage whereas the Water Works Act gives the same powers to water boards.

Part XIII deals with water and food supplies, and contains provisions placing a duty on local authorities to take measures for preventing any pollution dangerous to health, of any supply of water which the public within its district has right to use, and does use for drinking or domestic purposes; and to take measures against any person so polluting any such supply or polluting any stream so as to be a nuisance or danger to health.

5.12 Fisheries Conservation and Management Act, Cap. 66:05 of the Laws of Malawi

The purpose of the Act is to make provision for the regulation, conservation and management of the fisheries of Malawi and any other related matters.

In particular, the Act prohibits anyone from casting, discharging, introducing or allowing to fall, flow or percolate into fishing waters any sawdust, sawmill refuse, oil, chlorinated hydrocarbons, biocide, pesticide, toxic or any other substance or other material or rubbish which could lie on the bed of such waters with the intention to disturb, injure, poison, kill or detrimentally affect any fish, fish spawning ground including any aquatic plant life or food for fish.

513 The Pesticides Act, Cap. 35:03 of the Laws of Malawi

The main purpose of the Act is to minimise the potential adverse effects from pesticides to people or non-target species and the environment in general. It provides a comprehensive legal and administrative framework for the control and management of the importation, exportation, manufacture, distribution, storage, disposal, sales, repackaging and use of all pesticides in Malawi.

The Act prohibits the disposal of any pesticides container or packaging in a manner that is unduly hazardous to human or animal health or the environment or that is contrary to any written law.

5.14 The Occupational Safety, Health and Welfare Act, Cap. 55:07 of the Laws of Malawi

The Act contains provisions regulating the control, use, handling and processing of chemicals in the workplace. Invariably, some of the chemicals are waste arising from the manufacturing processes or indeed waste that is used as raw materials in the manufacturing process. As such, the Act places a duty on every employer to ensure the safety, health and welfare of all its employees.

5.15 The Mines and Minerals Act, Cap.61:01 of the Laws of Malawi

This Act governs a wide range of mining issues including the exploration for and exploitation of all minerals other than petroleum, water and soil. In Malawi, a person cannot carry out reconnaissance, prospecting or mining operations,

without a Mineral Right, a non-exclusive prospecting licence, a claim or a mineral permit.

Part VII of the Act deals with the protection of the environment in the course of granting a Mineral Right. The Minister is required to take into account the need to conserve the natural resources before he grants a Mineral Right. Some of the conditions that a mineral right may have, include, the prevention, limitation or treatment of pollution and the minimization of the effects of mining on adjoining or neighbouring areas and their inhabitants. The inclusion of such conditions is a realisation that mining generates waste through mining related by-products. Mining also involves the use of hazardous substances which may need regulation when they turn into waste.

5.16 National Decentralisation Policy, 1998

The Policy devolves administration and political authority to the district level; integrates governmental agencies at the district and local levels into one administrative unit, through the process of institutional integration, manpower absorption, composite budgeting and provision of funds for the decentralised services; diverts the centre of implementation responsibilities and transfers these to the districts; assigns, functions and responsibilities to the various levels of government; and promotes popular participation in the governance and development of districts.

Further, the Policy sets out the structure for the local government system which is made up of District Assemblies. Under this arrangement, Cities, Municipalities and Towns are considered districts. The District Assemblies have powers to create committees at Area, Ward or Village level for purpose of facilitating participation of the people in decision-making.

The functions of the District Assemblies include making policy decisions on local governance and development for the District. Some of the functions that have been assigned to District Assemblies include: (*a*) Environmental Services such as refuse collection and disposal; and Sewerage removal and disposal; (*b*) natural resources management (*c*) fisheries (*d*) water (*e*) agriculture and (*f*) land resources.

5.17 The Local Government Act, Cap. 22:01 of the Laws of Malawi

The Act implements the aspirations contained in the Decentralisation Policy. It provides that a District Council shall establish various service committees including a committee on Health and the Environment.

The Second Schedule sets out additional functions of a District Council. Every Council is expected to specifically establish, maintain and manage services for

the collection and removal and treatment of solid and liquid waste; and the disposal of such waste whether within or outside its area of jurisdiction. The Council may compel any person to use its services to whom those services have been made available. A Council is further required to assist Government to preserve the environment through protection of forests, wetlands, lake shores, streams and prevention of environmental degradation.

5.18 Control of Goods Act 1968, Cap 18:08 of the Laws of Malawi

The Act provides for the control of any goods imported into or exported from Malawi. It defines 'goods' as anything capable of being exported or imported into Malawi including waste. The Act requires any person wishing to be registered as an importer or an exporter under the Act to apply to the Minister for a Certificate of Registration and provides for de-registration when a registered person has acted in a manner harmful to the interests of the national economy or the security of the State.

5.19 Malawi Bureau of Standards Act, Cap 51:02 of the Laws of Malawi

The Ministry of Industry and Trade through the Malawi Bureau of Standards (MBS) is responsible for the administration of the Act. The MBS has the authority to establish and implement standards. The MBS may by General Notice published in the Gazette, declare any specification or code of practice framed, developed or prepared by the Bureau to be a Malawi Standard and shall in like manner give notice of any replacement or abolition of a Malawi Standard so declared. The Malawi Bureau of Standards has therefore the duty and obligation to develop standards including those relating to waste management.

6 Institutional Arrangements

Malawi has put in place institutional arrangements to deal with waste management. The Environmental Affairs Department (EAD) under the Environment Management Act is mandated to coordinate the management of the environment including issues relating to waste. However, specific responsibilities for waste management lie with various sectoral institutions which are mandated by sectoral legislation.

The table below summarizes the roles and responsibilities of the various stakeholders for waste management. These stakeholders include the Ministry of Natural Resources, Energy and Mining, the Environmental Affairs Department, Pesticides Control Board, Ministry of Industry and Trade, Ministry of Health, Ministry of Local Government and Rural Development through local government authorities and Malawi Bureau of Standards. The table also sets out the roles and responsibilities of businesses, industries, medical facilities, waste disposal sites or plants, employers and the public with respect to waste management.

Table 1: Roles and Responsibilities for Waste Management

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
Ministry of Natural Resources, Energy and Mining	Provide policy guidance and direction on all matters concerning Malawi's natural resources, energy, and environmental management through the Environmental Affairs Department Coordinate the management of the environment including issues relating to waste management	Environment Management Act	• Provide Policy Direction on Waste Management
Environment Affairs Department		Environment Management Act, Environment Management (Waste Management and Sanitation) Regulations	• Develop and review legislation on waste management, including regulations • Issue licences for storage, transportation, classification or destruction of waste and for operating a waste disposal site or plant, or generating waste • Issue licences for importation and exportation of hazardous waste

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
Pesticides Control Board	Protection against particular hazards arising from the use of pesticides	Pesticides Act	• Publish in the Government Gazette and in at least one (1) of the local newspapers of daily circulation a list of wastes which are hazardous and need to be controlled. • Ensure that pesticides containers or packaging are not disposed of in a manner that is unduly hazardous to human or animal health or the environment or that is contrary to any written law.
Ministry of Industry and Trade	Promotion of both internal and external trade	Control of Goods Act,	• Issue certificates of registration for import and export of goods
Ministry of Health	Provision of preventive health and medical services	Public Health Act	• De-register registered persons for acting in a manner harmful to the interests of the national economy or the security of the State. • Manage health care waste including clinical waste.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Prohibit and monitor nuisances which include: - any noxious matter, or waste water, flowing or discharged from any premises, wherever situated, into any public street, or into the gutter or side channel of any street, or into any gully, swamp, or watercourse or irrigation channel not approved for the reception of such discharge. - any collection of water, sewage, rubbish, refuse, odour, or other fluid or solid substances which are offensive or which are dangerous or injurious to health or which permit or facilitate the breeding or multiplication of animal

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			or vegetable parasites of men or domestic animals, or of insects or of other agents which are known to carry such parasites or which may otherwise cause or facilitate the infection of men or domestic animals by such parasites.
Ministry of Local Government and Rural Development	To further the constitutional order based on democratic principles, accountability, objectives of local transparency and participation of the people in decision-making and development processes	Local Government Act, and waste bylaws - Environment Management (Hazardous Waste) Regulations: Environment Management (Chemicals and Toxic Substances Management) Regulations, Public Health Act,	Local Authorities • Prepare waste management plans for area of jurisdiction on: (*a*) types of waste generated by area; (*b*) management of each type of waste generated; and (*c*) resources required for managing each type of waste in terms of budget and equipment. • Keep records of waste management services in its area of jurisdiction from the point of generation to the point of disposal.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Promote an integrated waste management system and adopt the waste management hierarchy. • Keep records of waste management services in its area of jurisdiction from the point of generation to the point of disposal. • Progressively upgrade landfills from dump sites to sanitary or engineered landfills. • Promote waste composting at source as the only way to reduce the amount of waste to be disposed at landfills. • Operate and maintain municipal sewage collection system for their area of jurisdiction.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Promote colour coding of waste containers by waste type to ensure and promote waste segregation. • Collect or ensure collection of general or municipal solid waste in its area of jurisdiction which should be done at such a frequency as to prevent the piling of waste. • Identify and maintain plants for disposal of general or municipal solid waste • Promote integrated waste management systems. • Take measures for preventing any pollution dangerous to health, of any supply of water which the public within its district has right to use, and does use for drinking or domestic purposes; and to take measures against any

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			person so polluting any such supply or polluting any stream so as to be a nuisance or danger to health. • Establish, maintain and manage services for the collection and removal and protection treatment of solid and liquid waste, and the disposal thereof whether within or without it its area. • Enter into public private partnerships with private contractors to collect general or municipal waste to ensure effective and efficient collection services. • Ensure that general or municipal solid waste is disposed of at any waste disposal site or plant identified and maintained by a competent local authority.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Prohibit or control any noxious or offensive trade within the meaning of the Public Health Act and the use of premises which may be a source of nuisance, danger, discomfort or annoyance to the neighbourhood. • Ensure drainage, cleansing and sanitation of its area and the prohibition and control of pollution of any water in any river or stream and for this purpose may prohibit or regulate the use of such river or stream and any river bank or steam bank. • Develop by-laws for management of chemicals and toxic substances and chemical wastes in their respective area of jurisdiction. Such by-laws should ensure that the disposal method of chemical wastes is in an environmentally sound manner.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
Malawi Bureau of Standards	Promote standardization of commodities and of their manufacture, production, processing or treatment; and further to provide for matters incidental to, or connected with standardization	Malawi Bureau of Standards Act	• Provide facilities for the examination and testing of commodities and any material or substance from or with which they may be manufactured, produced processed or treated, and of the way this may be done. • Provide facilities for the testing of locally manufactured or imported commodities. • Develop standards in coordination with relevant stakeholders on waste management.
Businesses/Industry		Environment Management Act, Environment Management (Waste Management and Sanitation) Regulations Environment Management (Chemicals and Toxic Substances Management) Regulations, Public Health Act	**Business** • Comply with legislation governing waste management. • Obtain a licence from the EAD to own or operate a recycling facility including recycling of hazardous wastes.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Obtain approval and licence from the EAD to dispose of hazardous waste in a waste disposal site or plant. • Obtain licence from the EAD for transportation, handling or storage of wastes. • Prepare and submit to the EAD annually a wastes reduction and recycling plan demonstrating how the business shall recycle or reduce the amount of solid wastes going to a disposal site or plant with the goal of reducing solid waste disposal by at least fifty per cent (50%) annually, by volume or weight. • Not discharge hazardous wastes whether treated or not into an unlicensed disposal site or plant.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			Industry • Develop a compliance code which shall outline the industry goals for: (*a*) waste reduction and minimization; (*b*) waste treatment on site; and (*c*) disposal plans. • Treat hazardous wastes in accordance with acceptable international methods that are approved by a competent local authority in consultation with the EAD prior to discharge or disposal of hazardous waste in any state into the environment. • Invest in waste management • Consider Corporate Social Responsibilities in waste management.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
Medical facilities		Environment Management Act, Environment Management (Waste Management and Sanitation) Regulations Environment Management (Chemicals and Toxic Substances Management) Regulations, Public Health Act Council by-laws	**Medical Facilities;** • Adopt and implement policies aimed at; (*a*) waste reduction; (*b*) prevention of mixing of infectious wastes with not non-infectious waste; (*c*) promoting alternatives to disposable items; and (*d*) maintaining effective waste reduction programs. • Prepare medical waste reduction plans and conduct waste audits every 3 years. • Treat hazardous wastes or medical wastes or chemical wastes in accordance with acceptable international methods that are approved by a competent local authority in consultation with the EAD prior to discharge or disposal of hazardous waste or medical waste in any state into the environment

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			Facilities dealing with Infectious Waste • Not mix infectious waste in the same bag or waste receptacle with solid waste which is not infectious, unless mixing the wastes is necessary to protect the health or safety of patients, employees or other persons. • Not transport general solid waste and infectious waste on the same vehicle or conveyance unless the wastes are in separate and identifiable containers or bags. • Put in place measures to protect waste handlers and other persons from exposure when separating infectious wastes from solid waste that is not infectious.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Ensure that no person shall handle, load, unload, process or treat infectious waste unless adequate measures are taken to protect waste handlers and other persons from exposure to the infectious waste. • Keep records of the amounts of infectious wastes generated and sent off-site for treatment and disposal.
Waste Disposal Sites/Plants		Environment Management Act, Environment Management (Waste Management and Sanitation) Regulations Environment Management (Chemicals and Toxic Substances Management) Regulations,	• Comply with legislation governing waste management. • Consider Corporate Social Responsibilities in waste management. • Conduct an environmental impact assessment prior to applying for licensing as a waste disposal site or plant.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
		Public Health Act, Council by-laws	• Keep the following records in respect of any waste disposed at the site or plant: (*a*) the source; (*b*) weight of the wastes; and (*c*) type of wastes. • Comply with requirements on methods of disposal of wastes, requirements for personnel working at such sites including personal protective equipment and steps to prevent pollution from such site or plant. • Ensure that highly toxic or hazardous chemical wastes are disposed of or treated in accordance with conditions specified in the licence or in accordance with any general guidelines issued by the EAD in consultation with the Director responsible for local government.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
Employers		Occupational Safety and Health Act, Environment Management Act, Environment Management (Waste Management and Sanitation) Regulations Environment Management (Chemicals and Toxic Substances Management) Regulations, Pesticides Act	• Ensure the safety, health and welfare of all employees. • Make arrangements for ensuring safety, and absence of risks to health, in connection with the use, handling, storage and transportation of articles and substances which may include wastes. • Provide sufficient information on such substances as well as the precautions to be taken (applies to manufacturers, importers and suppliers of hazardous substances used at workplaces, including those in the agricultural sector).

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Clearly label hazardous substances giving their relevant characteristics and instruction on their use. • Ensure containers of hazardous substances carry, or are accompanied by instructions for the safe handling of the contents and procedures to be followed in case of spillage.
The public		Environment Management Act Environment Management (Hazardous Waste) Regulations Environment Management (Chemicals and Toxic Substances Management) Regulations Water Resources Act	**The Public as Generators of Waste** • Reduce generation of waste. • Separate waste at source. • Reuse and recycle. • Dispose waste in an environmentally sound manner. • Store general or municipal solid waste accumulated on your property so as not to promote the propagation, harborage or attraction of vectors or the creation of nuisances.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
		Fisheries Conservation and Management Act Pesticides Act Council by-laws	• Obtain special permission from the local authority to dispose of general or municipal solid waste which is non-hazardous in an environmentally sound manner in accordance with by–laws made by a local authority. • Sort out solid waste by separating hazardous waste from the general or municipal solid waste. • Take such measures as may be necessary to prevent any pollution from occurring, continuing or recurring through activities or processes on land owned, controlled, occupied or used by any person which have caused or are likely to cause pollution of a water resources.

Institution/Sector/Entity	*Mandate*	*Legislation*	*Role and Responsibilities*
			• Not discharge, cause or permit to placed or discharged any waste which may injure, poison or kill fish. • Not dispose of any pesticides container or packaging in a manner that is unduly hazardous to human or animal health or the environment or that is contrary to any written law. • Not discharge effluent or provide reclaimed water that exceeds the effluent quality limits for use as reclaimed water or for discharge to the environment as specified. • Not discharge effluent into the environment unless it meets prescribed environmental standards

In addition to the stakeholders and entities mentioned above, other stakeholders include Malawi Police Services, the Ministry of Justice and Constitutional Affairs, the Ministry of Home Affairs who all play a role in compliance and enforcement of the law.

In as much as Malawi has robust institutional arrangements for waste management in place, there is, however, still duplication and confusion of some mandates, denial of responsibilities, non-compliance and limited enforcement, resulting in poor waste segregation, waste collection and transportation as well haphazard waste disposal. Consequently, there is laxity in the business sector, industry and the public with regards to their responsibilities in waste management.

7 Status of waste management in Malawi

7.1 Overview of current status

Malawi, as many other developing countries, faces challenges in the management of waste from generation, collection, transportation, treatment to disposal. In order to come up with successful interventions to address waste management problems, it is imperative to understand the current situation on waste management in the country. Below is an overview of the current status of waste management.

7.1.1 Waste Generation

It is estimated that on average, waste generation is at 0.5 kilogrammes per capita per day (NCST, 2015). The cities of Malawi are challenged by the accumulation of waste due to the rapid increase in the urban population and the limited resources for public service delivery. For example, Lilongwe which has an annual growth rate of 4.8% (NSO, 2010), generates 500 metric tonnes of waste per day of which 40% is from residential areas, 40% from commercial areas, 15% from industries and 20% from hospitals. Similarly, in Blantyre, about 450 metric tonnes of wastes are produced per day. Most of the waste is generated at household, market places, cities, towns, institutions and industrial zones. However, there are inadequate statistics on waste generation generally.

7.1.2 Waste Segregation

There is minimal waste segregation at source within the CBD areas, industries, institutions and at household level. This has resulted in mixing of different types of wastes, including hazardous waste. However, there is considerable segregation of healthcare waste.

7.1.3 Waste Collection

Local authorities are responsible for the collection of waste. Currently, waste collection is very low at about 30% (LCC Interview) due to factors such as inadequate collection vehicles and financial constraints. In some cities such as

Lilongwe, the Council has privatized waste collection and transportation through informal public- private partnership arrangements and the private waste operators dominate collection in residential areas at a fee. Waste collectors obtain consent from city councils to collect waste from designated areas. However, formal licensing system of these operators has not yet commenced as councils are currently developing by-laws to regulate waste management that will also govern waste collection and transportation.

7.1.4 Waste Transportation

Waste transportation is largely rudimentary using open trucks and hand carts, among other methods. These poor transportation modes have led to littering, making wastes such as plastics an eye-sore at the same time a health and environmental hazard. However, there are a few appropriate transportation trucks that operate mainly in the cities.

7.1.5 Waste Treatment

There are very few waste treatment methods used in the country with the main method being composting for solid waste. Other treatment methods include incineration, biogas and recycling of materials such as paper, polythene, plastics, glass, scrap metals, used oil, e-waste and waste tyres. Waste water is mainly treated using stabilization ponds although a few mechanical processes exist. Notable wastewater treatment plants include Kauma, Lumbadzi, and Kanengo in the Central Region; Blantyre, Limbe, Soche, Chirimba, Zomba and Chancellor College in the Southern Region; and Mzuzu Central Hospital and Moyale Barracks in the Northern Region. Annex 1 provides detailed information on waste treatment options that Malawi can consider adopting and implementing.

7.1.6 Waste Disposal

Disposal of wastes remains a major challenge as there is a lack of proper and adequate disposal sites. The sites for waste disposal are located at 5 miles in Zomba City, Area 38 in Lilongwe City, Mzedi in Blantyre City, Nsilo in Mzuzu City and Katili in Karonga among others. Due to poor or lack of management of the sites, no proper records are kept. For example, information or records on matters such as type and weight of waste are non-existent. In addition, most of the workforce operating these disposal sites have minimal or no training on how to safely manage these facilities. Only Katili in Karonga and Nsilo in Mzuzu are fenced and protected, the rest give access to scavengers who normally disrupt the sound management of the sites.

Only about 30% of all waste is collected for disposal and the rest is disposed of indiscriminately. Most households dispose of their waste in rubbish pits. In most cases, households from the selected locations in the cities of Lilongwe, Blantyre and Mzuzu dump waste in a pit within the plot or by throwing waste on roadside. 42% dispose in rubbish pits, 11.9% dump on the roadside and 25.4% dump in, empty spaces (EAD 2010). Some private operators who collect waste in residential areas dispose of the waste in areas specifically designated for that purpose by local government authorities; while others dump the waste in open fields or river banks.

There are a few existing incineration facilities such as at St Gabriel Hospital in Namitete. Medical waste is largely disposed through incineration and rudimentary kilns. Condemned, damaged or expired goods are disposed of through incineration or open burning.

7.2 Types of waste streams and their management

There are various waste streams generated in Malawi. These waste streams can be categorized as municipal, industrial and hazardous wastes. Other emerging waste streams, such as e-waste and tyres are growing due to increasing industrialization and growth of information and communication technologies (ICT) and large imports of second hand vehicles respectively. The composition of general waste varies considerably between households, businesses and industries.

7.2.1 Municipal waste

Municipal solid waste is a type of waste that includes predominantly domestic waste with sometimes the addition of commercial waste collected by municipalities. They are in either solid or semi-solid form and generally exclude industrial waste. Domestic waste is a subset of municipal waste and consists mainly of biodegradable waste (food and kitchen waste, garden trimmings, waste paper) and non-biodegradables (plastics, glass bottles, cans, metals and wrapping materials).

7.2.3 Industrial waste

Industrial waste is the waste produced by industrial activity which includes any material that is rendered of no use during a manufacturing process. Industries produce both hazardous and non-hazardous waste. These wastes include chemical solvents, paints, sand paper, paper products, industrial by-products, metals, municipal solid waste and radio-active waste.

Currently, most of the hazardous industrial waste is not pre-treated before reuse, recycling or disposal. This poses health risks to the handlers and causes damage to the environment. Illegal disposal of hazardous industrial waste occurs at the municipal dumpsites. A few companies have embraced best practices in disposing industrial waste by seeking guidance from the EAD on appropriate disposal methods. However, Malawi can encourage voluntary compliance of certain industries or introduce the concept of Extended Producer Responsibility (EPR) in terms of which

Producers or industries accept significant responsibility-financial and/or physical-for the treatment or disposal of post-consumer products, especially products that have toxic constituents or pose waste management challenges such as WEEE. Assigning such responsibility to producers could provide incentives to prevent wastes at the source, promote product design for the environment and support the achievement of public recycling and materials management goals.

7.2.4 Hazardous Waste

Hazardous wastes falls into many categories as elaborated on in the Seventh Schedule of the Environment Management (Waste Management and Sanitation) Regulations. Some wastes are specifically listed in the Environment Management (Waste Management and Sanitation) Regulations as hazardous. Other wastes may be regulated because they exhibit certain hazardous waste characteristics (ignitability, corrosivity, reactivity, toxicity and radioactivity) or because they are waste mixtures which meet the criteria of toxicity or persistence), in accordance with the definition of hazardous waste in the Environment Management Act. Even unused chemical products can be hazardous wastes if not disposed in accordance with the Environment Management (Chemicals and Toxic Substances) Regulations.

The table below provides the list of hazardous characteristics specifically mentioned in the 8th Schedule of the Environment Management (Waste Management and Sanitation) Regulations.

Table 3: List of Hazardous Characteristics

Hazardous Waste	*Description*	*Examples*
Listed Waste		
Discarded Chemical Products	An unused, discarded, pure substance that has only one active ingredient, if listed on the Discarded Chemical Products List.	• Many pesticides. • Formaldehyde. • Unrinsed containers.
Dangerous Waste Sources	Hazardous wastes from specific industry sources (such as plating) and generic activities (such as degreasing operations) are listed in the Hazardous Waste Source.	• Spent solvents used in degreasing. • Plating wastes. • Many wastewater treatment sludge.
Characteristic Wastes		
Ignitable	Liquids with a flash point less than 60°C, solids that are capable of causing a fire (through friction, absorption of moisture, or spontaneous chemical change), or any ignitable compressed gas.	• Spent solvents. • Solvent still bottoms. • Ignitable paint wastes. • Dry cleaning wastes. • Waste inks containing flammable solvents.
Corrosive	Aqueous substances with a pH less than or equal to 2, or greater than or equal to 12.5. Liquids that corrode steel at a rate greater than 0.25 inches per year are also considered corrosive.	• Acid from lead-acid batteries. • Plating wastes.
Reactive	Substances that are very unstable and rapidly, or violently change when mixed with or exposed to water, heat, pressure, or other materials. These substances, especially cyanide or sulfide compounds, may generate	• Chromic acids • Cyanide wastes • Perchlorates • Peroxides

Hazardous Waste	*Description*	*Examples*
	toxic gases under mildly acidic or alkaline conditions.	
Toxic	Wastes which, after testing through the Toxicity Characteristic Leaching Procedure (TCLP) by a professional laboratory, are found to contain high concentrations of certain pesticides, organic chemicals or heavy metals.	• Photographic processing wastes (containing silver). • Ink sludges. • Discarded pesticide products. • Paint sludge from the recycling of spent solvents.
Criteria Wastes		
Toxic	Contains chemical constituents that are toxic to fish and other animals	• Paint booth wash water. • Oil and transmission fluid. • Asphalt
Persistent	Contains organic compounds, usually with fluorine, chlorine, bromine or iodine, that are persistent in the environment	• Metal cutting oil. • Methylene chloride and 1,1,1 trichloroethane. • Pesticides • Electricity transformer oil.

Other specific examples of hazardous wastes include the following:

7.2.4.1 *Waste Tyres*

Waste tyres are an emerging waste stream. Waste tyres are defined as those tyres that have reached the end of their life due to wear or damage and cannot be recycled or reused. There are no established formal systems for collection and recycling of tyres with the exception of retreading. As such, the bulk of the tyres are informally collected and often illegally burnt in the open to recover steel for reuse or recycling. This emits harmful gases causing air pollution and soil contamination arising from the residues.

7.2.4.2 *Construction and demolition waste*

This is waste that is generated because of new construction works, remodelling or demolition. Construction waste comprises debris, steel, timber, iron sheets, tiles and ceramics among others. Although construction and demolition waste is not classified as hazardous, it is a mixed waste source that requires separation into component parts for the purposes of recycling. Construction waste poses risks on human health and the environment as some hazardous materials such as asbestos are included mainly from replacement of old pipes and roofing materials. This type of waste currently ends up in disposal sites or is used for backfilling in road construction or maintenance; or for erecting foundations of houses, buildings and other structures.

7.2.4.3 *Clinical Waste*

Clinical waste refers to waste generated in health facilities, research institutions or during immunization of human beings and animals. It is classified into: infectious waste, sharps, pharmaceutical wastes, chemical waste and pathological waste. Clinical wastes pose risks to human health due to its pathogenic characteristics and hence require prior treatment before disposal.

Currently, segregation is fully embraced in most hospitals and clinics based on the guidelines issued by the Ministry of Health. Although clinical waste is expected to be disposed of through incineration, some find its way to the municipal dumpsites while some is handled through rudimentary facilities such as kilns. In Malawi, there are a few hospitals that have functional incinerators. The major challenge remains with all other hospitals including the major Government hospitals and small clinics which practice illegal disposal and inefficient treatment of these wastes.

7.2.4.4 *E-waste*

Electrical and electronic waste (e-waste) is an emerging waste stream arising from Electrical and Electronic Equipment (EEEs) becoming obsolete at the end of life. E- waste comes from a broad range of electronic products such as computers, printers, televisions or mobile phones as well as all kinds of electrical equipment, often divided into large equipment (such as washing machines, air-conditioners, freezers) and small equipment (such as hairdryers and vacuum cleaners). Malawi has experienced a rapid increase of e-waste due to adoption of ICT across all sectors and an influx of low quality EEEs. E-waste poses a particular risk as it may contain heavy metal components and hazardous materials used in the manufacture of electronic goods. Such heavy metal components or hazardous materials include mercury, brominated flame retardants and cadmium which are considered dangerous and harmful if not managed in a sound manner during dismantling or recycling. Consequently, they can become harmful to human health and the environment.

Like most African countries the challenges facing Malawi include: lack of specific policy and legal framework on EEE-waste management (i.e. with provisions on; re-use or recycling of EEE-waste, end of life product take back; and implementation of extended producer responsibility), lack of laws on import of EEE-waste products (i.e. governing standards, certification, testing, labelling of second hand EEE-waste products import to prevent the country from being used as a dumping site); lack of public awareness on EEE-waste; lack of EEE-waste and environmental expertise and institutional capacity, lack of infrastructure for appropriate EEE-waste management and lack of financial resources to implement even the basic interventions needed to manage e-waste. (MACRA 2016). However, MACRA, EAD and other key stakeholders are currently undertaking a project to review the current situation and recommend actions and areas of interventions necessary to address the EE-waste management in the country.

7.2.4.5 *Waste Batteries*

Waste batteries can either be alkaline (dry cells) or acid based which support domestic and industrial applications. The acid based (rechargeable and silver oxide) batteries contain heavy metals such as mercury and cadmium, which are classified as hazardous substances. This type of hazardous waste if not properly handled and when disposed of, presents a risk to human health and the environment. Currently, there are no recycling or disposal facilities for alkaline, rechargeable and silver oxide batteries. As such, the batteries are disposed of in open dumpsites alongside domestic waste. A few battery outlets in the country have an exchange policy where clients are encouraged to exchange their old batteries for new ones at an incentive.

7.2.4.6 *Waste Fluorescent Lamps*

Fluorescent lamps are used for illumination and contain a small amount of mercury. The mercury is a neurotoxin and can be harmful even in small quantities. Waste fluorescent lamps can be successfully recycled and the mercury recovered. However, if poorly handled at any stage this raises the risk of release of mercury. Increasingly, the population in Malawi is adopting florescent lamps within energy saving devices across the country, a consumption pattern that is likely to compound the challenge of their disposal. The Electricity Supply Corporation of Malawi (ESCOM) is currently undertaking a project to replace fluorescent lamps and ordinary bulbs with energy-saving bulbs across the country with an aim of saving energy and reducing exposure to mercury.

7.2.4.7 *Pesticide Waste*

Pesticides are chemicals used to control pests. Pesticide waste consists of expired and contaminated pesticides as well as the used containers. Due to their toxicity, potential to pollute and threat to human health, pesticide wastes are extremely hazardous and must be transported, treated and disposed of in an environmentally sound manner in accordance with the stipulations of the relevant laws. Invariably, some of these pesticides contain persistent organic pollutants (POPs) which can accumulate in the food chain if not well managed. At the moment, no pesticide waste has been exported for disposal except through the African Stockpiles Project in which 70 cylinders of methyl bromide containing 15 tonnes of Bromomethane gas located in three plants around Malawi were exported for disposal.

7.2.4.8 *Used Oil and Sludge Waste*

Used oil and sludge waste arises from the use of petroleum products. It contains potentially hazardous compounds such as poly-aromatic hydrocarbons that have carcinogenic and mutagenic properties. Used oil and sludge have a slow rate of decomposition and hence any spillage can accumulate in the environment causing soil and water pollution. This waste is currently recycled to produce lubricants and industrial oil used in furnaces and boilers. Though illegal, used oil is also largely applied in the treatment of timber and dust suppression.

7.2.4.9 *Sewage Sludge*

Sewage sludge is a sediment material that accumulates over time in the sewage treatment plants and ponds. The widespread disposal of industrial effluent via sewage treatment works results in contamination of sewage sludge with hazardous chemicals, thereby posing challenges for its disposal. Sewage sludge that is contaminated by heavy metals from industrial effluent can severely contaminate agricultural land to which it is applied. However, a high proportion of the contaminated sewage sludge continues to be disposed of in undesignated places. In this regard, there needs to be pre-treatment of contaminated sewage sludge before disposal. Uncontaminated sewage sludge has a variety of

commercial uses and can be recycled.

7.2.4.10 *Disaster Waste*

Disaster waste means solid and liquid waste generated from a disaster. Common examples of disaster waste include: concrete, steel, wood, clay and tar elements from damaged buildings and infrastructures; household furnishings; parts from the power and telephone grids such as electrical poles, wire, electronic equipment, transformers; parts from water and sewage distribution systems; natural debris such as clay, mud, trees, branches, bushes, palm tree leaves; chemicals, dyes and other raw materials from industries and workshops; waste from relief operations; damaged boats, cars, buses, bicycles; unexploded ordnance (e.g. landmines); waste from disaster settlements and camps including food waste, packaging materials, excreta and other wastes from relief supplies; pesticides and fertilizers; household cleaners; paint, varnish and solvents; and healthcare waste. Malawi has a framework Disaster Preparedness and Relief Cap.33:05 which provides the institutional and coordination arrangements for disasters but will also enable Malawi to manage disaster waste for the protection of human health and the environment.

8 SWOT Analysis

Table 2: SWOT Analysis on Waste Management in Malawi

Strengths	*Weaknesses*
• Legislation on waste management. • Institutional arrangements for waste management. • Some districts have designated waste disposal sites. • Increasing investment in waste management systems and equipment. • General public awareness on existing environmental laws. • By-laws governing waste management at local government level. • Licensing of waste management activities such as transportation, storage, export and disposal. • Most councils have health and environment committees and departments within the structural set up.	• Duplication and confusion of mandates among Government institutions. • Denial of responsibilities for waste management by public and private sector and the public. • Non-compliance with legislation on waste management. • Limited enforcement. • Poor waste segregation, waste collection and transportation. • Haphazard waste disposal. • Low priority to waste management leading to low budgetary allocations • Inadequate infrastructure. • Inadequate trained personnel. • Poorly managed disposal sites. • Inadequate/ poor maintenance of machinery and equipment. • Inadequate disposal sites. • Poor public perceptions/ attitude on individual responsibility towards waste management. • Acceptance tolerance of dirty environment. • Poor infrastructure in informal settlements hindering waste collection. • No modern waste management facility developed to date e.g. Sanitary landfill.

Opportunities	*Threats*
• Increased involvement of the private sector in environmental management. • Employment opportunities in waste management through diverse waste based enterprises (waste as a resource by recovery). • External financial resources from development partners and investors. • Investment opportunities in recycling, energy recovery, composting, incineration. • Policy alternatives to reduce, re-sue and recycle waste including EPR, voluntary compliance and economic instruments • Adoption of emerging technologies in waste management. • Increased public awareness on waste management and related opportunities. • Increasing public awareness on environment. • Public agitation for social services.	• Encroachment of land allocated for waste disposal • Land use conflicts between waste management and other competing uses • Insecurity at disposal sites due to scavengers

9 Implementation of the Strategy

EAD will spearhead and coordinate the implementation of the strategy in collaboration with MNREM and MLGRD and other relevant stakeholders such as academia and NGOs. The implementation will include development of specific work plans from the broader targets provided within this Strategy and taking into consideration the time frames. The following table provides details on the implementation arrangements of the Strategy.

Table 4: Implementation Matrix for the Waste Management Strategy for Malawi

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI									
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*				*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*		
Strategic Objective 1: To formulate policies, legislation and economic instruments to reduce waste quantities										
Policies and economic instruments on waste reduction	Develop and harmonise policies and economic instruments	Harmonized policies and economic instruments	Policies and economic instruments developed						Reduced quantities of waste	MNREM, EAD, MBS, MLGRD, Local Authorities, Private sector
	Implement policies and economic instruments	Implementation of policies and economic instruments	Policies and economic instruments implemented							MNREM, EAD, MLGRD, Local Authorities 100,000,000
Uptake of efficient technologies	Undertake benchmarking on best practices of appropriate technologies	Best practices of appropriate technologies benchmarked	Appropriate technologies adopted							EAD, Local Authorities, Industry, NGOs, CBOs 50,000,000
Compliance and Enforcement of waste management laws and standards	Monitor good environmental practices, conduct Compliance inspections and take enforcement actions	Good environmental practices monitored, Compliance inspections conducted, and enforcement actions taken	Practices monitored, Level of compliance and enforcement							EAD, Local Authorities 200,000,000

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI											
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*					*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*			
Strategic Objective 2: To inculcate responsible public behaviour on waste management											
Capacity building in waste management	Sensitize the public on responsible waste management	A sensitized public on responsible waste management	No. of people sensitized						Public perception and behaviour changed on waste management	MNREM, , MLGRD, Local Authorities, Academia, Water resources Department, Schools, NGOs, FBOs, Ministry of Education, Media	250,000,000
Informed public on waste management	Create awareness on suitable waste management options	Awareness created on suitable waste management options	No. of campaigns							MNREM, EAD, MLGRD, Local Authorities	100,000,000
	Educate the public on integrated waste management	Educated public on integrated waste management	No. of people educated							MNREM, EAD, MLGRD, Local Authorities	50,000,000
	Undertake clean-ups campaigns	Number of clean-ups campaigns	No. of clean-ups							MNREM, EAD, MLGRD, Local Authorities	100,000,000

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI											
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*					*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*			
Strategic Objective 2: To inculcate responsible public behaviour on waste management											
	Develop sensitization materials	Sensitization materials developed	No. of Sensitization materials developed							EAD, Local Authorities, Ministry of Information and Civic Education	10,000,000
Strategic Objective 3: To promote waste segregation at source											
Waste segregation	Provide equipment for waste segregation at public places	Equipment for waste segregation provided	No. of equipment provided						Segregated wastes	EAD, Local Authorities, Industry, NGOs	200,000,000
	Provide transport systems for segregated waste	Segregated waste transport systems provided	No. of transport system provided							MNREM, EAD, MLGRD, Local Authorities	200,000,000
	Intensified waste segregation	Campaigns on Segregation undertaken	No. of campaigns							EAD, Local Authorities, Ministry of Information, NGOs, Media	150,000,000

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI										
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*					*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*			
Strategic Objective 2: To inculcate responsible public behaviour on waste management											
	Pilot waste segregation	Waste segregation pilot schemes	No of pilot schemes initiated							MNREM, Local Authorities	50,000,000
Strategic Objective 4: To promote resource recovery for materials and energy generation											
Waste recycling	Introduce/ upscale best practices/ technologies for waste recycling	Best practices introduced/ upscaled	Increased proportion of waste recycled						Materials recovered, recycled and energy generated	EAD, Local Authorities, Industry, NGOs	20,000,000
Energy generation	Generate energy from waste	Energy generated from waste	Units of energy generated							EAD, Local Authorities, Industry	1,000,000,000
Collaboration on recycling and energy recovery	Establish collaboration working groups	Working groups established	No. of Collaborations							EAD, Local Authorities, industries, NGOs, Academia, Media, FBOs	20,000,000

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI										
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*					*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*			
Strategic Objective 5: To Promote Waste Treatment											
Waste treatment facilities and systems	Promote waste treatment before disposal	Waste treatment promoted	Number of companies, institutions and community groups who have embraced waste treatment						Minimal waste disposed without treatment	EAD, MLGRD, Local Authorities, Industry	50,000,000
	Establish waste treatment facilities	Waste treatment facilities established	Number of waste treatment facilities established						Existence of waste treatment facilities	EAD, MLGRD, Local Authorities, Industry	200,000,000

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI										
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*					*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*			
Strategic Objective 6: To establish environmentally sound infrastructure and systems for Waste Management (Including Hazardous Waste)											
Waste management facilities	Upgrade existing waste manageme nt facilities	Waste management facilities upgraded	No. of upgraded waste management facilities						Existence of environmentally sound waste management collection, transportation, transfer station, treatment and disposal facilities	EAD, MLGRD, Local Authorities, Industry	2,000,000,000
Waste collection and transportation systems	Provide adequate and appropriate collection facilities and services	Adequate and appropriate collection facilities provided	No. of appropriate facilities provided							MNREM, EAD, MLGRD, Local Authorities	1,000,000,000
	Provide adequate and appropriate transport systems for segregated waste	Appropriate transport systems provided	No. of appropriate transport systems provided							MNREM, EAD, MLGRD, Local Authorities	100,000,000

IMPLEMENTATION MATRIX FOR THE WASTE MANAGEMENT STRATEGY FOR MALAWI											
Component	*Activity*	*Key performance Targets*	*Key performance Indicators*	*Time frame (Years)*					*Outcomes*	*Actors*	*Estimated Budget (MK)*
				1st	*2nd*	*3rd*	*4th*	*5th*			
Strategic Objective 6: To establish environmentally sound infrastructure and systems for Waste Management (Including Hazardous Waste)											
Waste transfer stations	Build and operate transfer stations	Transfer stations established	No. of appropriate facilities provided							MNREM, EAD, MLGRD, Local Authorities	500,000,000
Waste treatment facilities	Establish recycling facilities	Recycling facilities established	No. of recycling facilities established							EAD, Local Authorities, Industry	500,000,000
	Establish composting facilities	Composting facilities established	No of composting facilities established							EAD, Local Authorities, NGOs, CBOs	100,000,000
Waste disposal facilities	Develop sanitary landfills	Sanitary landfills developed	No of Sanitary landfills developed							MNREM, EAD, MLGRD, Local Authorities	5,000,000,000
	Procure and install standard incinerators	Standard incinerators installed	No. of Standard incinerators with energy recovery facilities developed							MNREM, EAD, MLGRD, Local Authorities	1,000,000,000

10 Conclusion

The development of the National Waste Management Strategy has enabled Malawi to establish the priorities to be pursued to minimize the detrimental impact on human health and the environment associated with waste and to improve the management of waste in the country taking into consideration the 2030 Agenda for Sustainable Development.

The Strategy has also identified the functions and roles of different stakeholders including Ministries, Departments and Agencies, the private sector and the general public for effective waste management at all stages including; waste generation, segregation, collection, transportation, treatment and disposal.

The development of the Strategy involved extensive consultations with various stakeholders who provided constructive input to this process. The Government of Malawi wishes to thank all the stakeholders for the contribution they have made to the development of this Strategy and encourages all stakeholders to put in place measures to ensure that the Strategy can be implemented for the benefit of the country.

Annex 1 Waste Treatment

Waste treatment is a process that changes the physical, chemical or biological character of a waste to make it less of an environmental threat. Treatment neutralises the waste, recovers energy or material resources from waste, renders the waste less hazardous or makes the waste safer to transport, store, or dispose of. Below are major waste treatment and disposal methods which should be adopted and promoted in the country:

Thermal Treatment

Thermal waste treatment refers to the processes that use heat to treat waste materials. Following are some of the most commonly used thermal waste treatment techniques:

Incineration is one of the most common waste treatments. The technique involves the combustion of waste material in the presence of oxygen. The combustion process converts wastes into ash, flue gas, water vapour, and carbon dioxide. Thermal treatment method is commonly used as a means of recovering energy for electricity or heating. The approach has several advantages. It quickly reduces waste volume, lessens transportation costs and decreases harmful greenhouse gas emissions.

In Malawi, there are very few incinerators that operate at recommended pressure and temperature; most of the incinerators are just batch burners. Though incineration contributes to reduction of waste going to disposal sites, it has potential to pollute the environment. Nevertheless, adoption of incineration is slowly increasing among private companies as local authorities have challenges in waste collection on a regular basis. Incineration should be promoted by among other things, setting standards for incinerators, introducing waivers on some import taxes on incinerators and rewarding companies that comply with environmental requirements.

Gasification and Pyrolysis are two similar methods, both of which decompose organic waste materials by exposing waste to low amounts of oxygen and very high temperature. Pyrolysis uses absolutely no oxygen while gasification allows a very low amount of oxygen in the process. Gasification is more advantageous as it allows the burning process recover energy without causing air pollution.

Open Burning is a legacy thermal waste treatment that is environmentally harmful. It includes open burning of waste at disposal sites and using incinerators that have no pollution control devices. This practice releases substances such as hexachlorobenzene, dioxins, carbon monoxide, particulate matter, volatile organic compounds, polycyclic aromatic compounds, and ash. Unfortunately, this method is still practiced by all local authorities, as it offers a cheap solution to solid waste treatment. The situation is aggravated by scavengers who normally set dumpsites on fire for various reasons. It is a common practice at all city disposal sites to find waste heaps on fire. To curb this practice, proper landfills should be established so that all the waste is covered with soil and scavengers are prevented from accessing the sites. In addition, all incinerators should be regulated by developing standards for their installation and operation.

Dumps and Landfills

Sanitary landfills provide the most commonly used waste disposal solution. These landfills are desired to eliminate or reduce the risk of environmental or public health hazards due to waste disposal. These sites are situated where land features work as natural buffers between the environment and the landfill. For instance, the landfill area can be comprised of clay soil which is quite resistant to hazardous wastes or is characterized by an absence of surface water bodies or a low water table, preventing the risk of water pollution. The use of sanitary landfills presents the least health and environmental risk, but the cost of establishing such landfills is comparatively higher than other waste disposal methods.

Currently, Malawi has no municipal sanitary landfill. However, such a facility is present at one private company where leachate is also collected for treatment at a separate wastewater treatment facility. This is an indication that it is possible for some companies to adopt this approach thereby complementing Government efforts in good waste management.

Controlled dumps are the same as sanitary landfills. These dumps comply with many of the requirements for being a sanitary landfill but may lack one or two. Such dumps may have a well-planned capacity but no cell-planning. There may be no or partial gas management, basic record keeping, or regular cover. Since sanitary landfills are more costly than controlled dumps, the country should adopt the later especially for municipal solid waste management. Since waste disposed of at municipal disposal sites are usually in a comingled state, the risk associated with the hazardous waste component will be reduced when controlled dumps are adopted in all local authorities.

Biological Waste Treatment

Composting is another most frequently used waste disposal or treatment method which is the controlled aerobic decomposition of organic waste materials by the action of small invertebrates and microorganisms. The most common composting techniques include static pile composting, vermin-composting, windrow composting and in-vessel composting. Currently, there are several organizations and community groups that are involved in waste composting. This has proved to be a potential source of revenue besides reducing the amount of waste to be collected for disposal by local authorities. Promoting this approach is easier as minimal resources and training needs are required.

Anaerobic Digestion also uses biological processes to decompose organic materials. Anaerobic Digestion, however, uses an oxygen and bacteria-free environment to decompose the waste material where composting must have air to enable the growth of microbes. Anaerobic digesters are utilized for energy recovery since methane is generated. This technology has been in use although at a very small scale. The approach is feasible at both household and community levels.

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