



THE UNITED REPUBLIC OF TANZANIA



NATIONAL AUDIT OFFICE

**PERFORMANCE AUDIT REPORT ON THE CONTROL OF PLASTIC WASTE
POLLUTION IN MAJOR LAKES AND THE OCEAN**



**A REPORT OF THE CONTROLLER AND AUDITOR GENERAL OF THE UNITED
REPUBLIC OF TANZANIA**

MARCH, 2021

THE UNITED REPUBLIC OF TANZANIA



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PREFACE



Section 28 of the Public Audit Act No. 11 of 2008, authorizes the Controller and Auditor General to carry out Performance Audit (Value-for-Money Audit) for the purposes of establishing the economy, efficiency and effectiveness of any public expenditure or use of public resources in the MDAs, LGAs and Public Authorities and other Bodies which involves enquiring, examining, investigating, and reporting, as deemed necessary under the circumstances.

I have the honour to submit to Her Excellency, the President of the United Republic of Tanzania, Hon. Samia Suluhu Hassan and through her to the Parliament a Performance Audit Report on the Management of Control of Plastic Waste Pollution in Major Lakes and Ocean.

The report contains conclusions and recommendations that directly concern the Vice President's Office (VPO), National Environmental Management Council (NEMC) and the President's Office-Regional Administration and Local Government (PO-RALG).

VPO, NEMC and PO-RALG were given opportunities to scrutinize the factual contents and comment on the draft report. I wish to acknowledge that the discussions with the three audited entities have been very useful and constructive.

My office intends to carry out a follow-up at an appropriate time regarding actions taken by the VPO, NEMC and PO-RALG in relation to the recommendations given in this report.

In completion of the assignment, the Office subjected the report to the critical reviews of Dr. Kessy F. Kilulya and Mr. Bahati S. Mayoma who came up with useful inputs for improving this report.

This report has been prepared by Mr. Frank Mwalupale (Team Leader) and Mr. Alfa Tandise under the supervision and guidance of Mr. Michael Malabeja - Chief External Auditor, Eng. James G. Pilly - Assistant Auditor General and Mr. Jasper Mero - Deputy Auditor General. I would like to thank my staff for their inputs in the preparation of this report. My thanks should also be extended to the entities that reviewed this report for their contribution and fruitful interactions with my office.



Charles E. Kichere
Controller and Auditor General,
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March, 2021

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LIST OF ACRONYMS AND ABBREVIATIONS

BWBs	Basin Water Boards
CC	City Council
CSO	Civil Society Organizations
DOE	Directorate Of Environment
EPA	Environmental Protection Agency
LGAs	Local Government Authorities
MARG	Marine Research Grant
MC	Municipal Council
MoW	Ministry of Water
NEMC	National Environmental Management Council
NEP	National Environmental Policy
NGOs	Non-governmental Organizations
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
POPs	Persistent Organic Pollutants
PO-RALG	President's Office-Regional Administration and Local Government
TBS	Tanzania Bureau of Standards
UDOM	University of Dodoma
UDSM	University of Dar es Salaam
UNEP	United Nations Environment Programme
VPO	Vice President's Office
WABA	Waste Audit and Brand Audit
WIOMSA	Western Indian Ocean Marine Science Association

EXECUTIVE SUMMARY

Plastic waste is now widely recognized as global environmental concern. Water bodies form the main sinks of plastic waste with estimates showing that 150 million metric tons of plastic waste are currently present in the marine and freshwater bodies. It is estimated that over 8 million metric tons of plastic waste continue to enter marine and freshwater ecosystems globally each year mostly from landbased activities.

As a growing country, Tanzania depends on aquatic resources for economic growth but has inadequate resources and infrastructures to cope with the growing discharges of plastic waste. Like other contaminants, plastics are not constrained by national boundaries because they migrate by water and air currents across countries and eventually settle in water and sediments of major water bodies, and wetlands where they will continue interacting with aquatic organisms for many years.

In light of this new environmental challenge, countries a round the world are acting to minimise these impacts through various strategies including banning single-use plastics; changing petroleum-based plastics to alternative products such as paper, glass or biodegradable plastics; recycling; and improving waste collection systems to ensure that all wastes are appropriately collected and safely disposed of. Despite all the efforts to curb plastic waste, the amount entering water bodies each year continues to increase to the extent that threatens the existence of aquatic resources and mankind which is contrary to the Sustainable Development Goal 14.

The objective of the audit was to determine whether the government has adequately managed to Control Plastic Waste Pollution in Major Lakes and the Ocean. The main audited entities were Vice President's Office through National Environmental Management Council and President's Office Regional Administration and Local Government through Local Government Authorities. The audit dwelt on assessing the Management control of the plastic waste pollution in major lakes and the Ocean. The audit covered a period of four financial years from 2017/18 up to 2020/21

The audit was conducted in accordance with International Organization of Supreme Audit Institution's (INTOSAI) performance auditing standards.

The standards require the audit team to plan and perform the audit so as to obtain sufficient and appropriate evidence as well as, provide a reasonable basis for findings and conclusions based on audit objective(s).

Main Audit Findings

Inadequate implementation of Awareness Campaigns

LGAs did not adequately conduct education campaigns to the citizens on the implementation of Reduce, Reuse and Recycle (3Rs) model indicating the waste hierarchy of reducing, recycling, and re-using of waste. It was also noted that, LGAs did not had a well-designed community awareness program since the planned awareness programs were not clear on how often the program should be carried out - weekly, monthly, bi-annually, or annually. It was not clear also on who are the targeted audience, and in which form it will take (advertisement or notice on TV or radio, consultation, training, pamphlets, internet, etc.). The observed faults affected LGAs ability to conduct performance assessment to check whether the program was effective and if it contributed to improving plastic waste management.

NEMC and LGAs did not Strictly Enforce Extended Producers' Responsibility

Both NEMC and LGAs did not enforce extended producers' responsibility to manufacturers or producers in protecting plastic waste pollution in major Lakes and Ocean. Presence of uncollected plastic bottles, plastic water and soft drink bottles, soft drink cans, and plastic packaging materials in Dar es Salaam, Tanga, Mtwara coastal areas particularly in public beaches and river inlet was the confirmation that the action on producers to collect their waste was not done. Among the factors contributed to non-implementation of extended plastics producers' responsibility, included the inadequate coordination between NEMC and LGAs. There was no sharing of statistical data and environmental findings between them.

LGAs did not Effectively Implement National Solid Waste Strategy for Recycling and Reuse of Plastic Wastes.

It was noted that the LGAs did not adopt the National Solid Waste Strategy for waste Management. Up to the time of audit, none of the LGAs had adequately implemented the national solid waste targets on waste recovery (re-use, recycling, composting, and energy recovery). It was also noted that the visited LGAs tend to recover waste by dumping on the landfills without sorting it, particularly plastic materials. Among the factors contributed to inadequate implementation of the National Strategy for recycling of plastic waste were the lack of integration of National strategy issues into LGAs plans, inadequate facilities to support the segregation of plastic waste at the generation and storage points and lack of reliable systems for predicting the amount of plastics.

LGAs did not estimate the Amount of plastic waste Generated, Collected, and Recycled

It was found that, LGAs did not have data on the amount of plastic waste being generated, collected, and recycled in their areas. The only data recorded was the general municipal waste generated and waste collected. Since they have no data for the specific type of waste, it has been difficult for them to predict the amount of plastic waste which is generated, collected, and recycled.

Lack of estimated amount of plastic waste generated, collected, and recycled was caused by lack of research for waste quantification and characterization to establish baseline data for waste types, quantities, and generation trends. On other hand, the existing practice in LGAs for which sorting, or segregation is not done at the collection or transfer stations makes it even more difficult to predict the amount of generated plastic waste.

Inadequate Monitoring and Evaluation of Performance of LGAs by PORALG

PO-RALG did not adequately monitor the implementation of protecting major lakes and Ocean from plastic waste pollution. This was because PO-RALG did not have Key Performance Indicators for monitoring the control of

plastic waste pollution in the environment particularly in major lakes and the Ocean in its monitoring and evaluation plan. PO-RALG key performance indicators and plans were focused on water related issues such as building onsite sanitation facilities and toilets in the public institutions. As a result, protection of plastic waste pollution activities was not monitored.

Inadequate Coordinating of Plastic Waste Issues by VPO

It was noted that VPO lacked information on whether National Strategies on waste reduction, re-use, and recycling were implemented. It was also noted that, deposits of plastic waste were brought to the Tanzania coastal area by ocean water from neighbouring countries. This is prominent in the coastlines of Mafia and Zanzibar.

Conclusion

Even though the Government of Tanzania has undertaken some interventions to prohibit the use of plastic carrier bags in the country, there is still a need for more interventions, especially in the other types of plastic materials such as microplastics that have shown significant impact in major lakes and the Ocean. Control of plastic waste pollution in major lakes and the Ocean is not adequately done to prevent degradation of aquatic species and possible health risks associated with exposure to plastic waste pollution.

Recommendations

In order to improve the management of control of plastic waste pollution in major waters the recommendations are issued to the Vice President's Office, President's Office - Regional Administration and Local Government, National Environmental Management Council and Local Government Authorities.

The Vice President's Office should:

- i. Develop a formal mechanism to involve PO-RALG on implementing the National strategies for Solid Waste Management including plastic waste management.

- ii. Develop mechanisms to monitor the performance of LGAs through PO-RALG on the implementation of National Solid Waste Strategy and ensure the aforesaid mechanism is effectively implemented and reported;
- iii. Strengthen the strategies to ensure effective collaboration with regional and international bodies to address the issues of plastic waste pollution in major lakes and ocean;
- iv. Consider carrying out Strategic Environmental Assessment and research on macro- and micro plastics in potential environmental compartments such as water; sediments; and organisms of all major and small lakes and ocean including rivers and estuaries, and use data obtained to guide formulation of sustainable solutions;
- v. Issues directive that requires the designer of plastic and packaging material to only produce the recyclable plastics; and
- vi. Encourage the government to develop an economic incentive for those who are involved in the plastic recycling business.

The President's Office - Regional Administration and Local Government should:

- i. Prepare short- and long-term plans that align with National Solid Waste Management Strategy for managing plastic waste pollution with clearly defined targets as well as timelines for the achievement of targets;
- ii. Ensure that LGAs prepare short- and long-term plans that addresses the National Solid Waste Management Strategy and ensure that the plans clearly define numerical targets as well as timelines for the achievement of targets;
- iii. Ensure that LGAs carry out, periodically, a comprehensive assessment of the amount of waste being generated, according to the major waste type in their respective areas.
- iv. Develop and implement awareness campaigns to the communities in order to educate them about the effects of plastic waste pollution

on the major lakes and ocean and proper implementation of the ‘3 Rs’ (reduce, reuse and recycle).

- v. Develop effective performance indicators for frequent performance monitoring of the LGAs towards implementing National Waste Management Strategy.

National Environmental Management Council (NEMC) should:

- i. Improve coordination, information sharing and communication between NEMC and LGAs by strengthening and implement infrastructure for information sharing among them;
- ii. Strengthen and implement the coordination mechanisms between LGAs and NEMC that will facilitate proper enforcement to manufactures/producers to exercise their responsibilities for collecting plastics waste products in the environment; and
- iii. Establish and enforce the mechanisms to prohibit uses of non-essential plastic as wrapping or packaging materials and recommend appropriate carry products which are accessible and affordable.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Audit

Plastic waste and micro plastics (MPs) are now widely recognized as global environmental concerns which have been reported across all environmental compartments including sediment, water, and protected habitats such as marine parks and nature reserves¹

The world produces about 350 million metric tons of various plastic items annually (Plastic Europe 2019) out of which about 8 million metric tons of plastic enter the marine and freshwater ecosystems each year by improper dumping of disused or abandoned plastic waste generated mostly from land based activities (Jambeck et al.,2015).

As a result of this continued influx of plastic each year, the world oceans are currently estimated to have 150 million metric tons of plastic waste (WEF, 2016). Like other contaminants, plastic is not constrained by national boundaries, because it migrates by water and air currents and settles in sediments at the bottom of a water body. The amount entering water bodies is projected to double by the year 2050. It is also disclosed that if no measures will be taken to change the consumption and disposal patterns there could be in the ocean more plastic than fish by weight by 2050 (WEF, 2016).

Some notable effects of plastic waste on ecological systems include ingestion and entanglement, transfer of toxic chemicals and metals, vector for pathogens and alien species, and smothering of coral reefs and benthic habitats². Furthermore, plastic waste affects socio-economic and health aspects of coastal states by causing loss of lives and displacement of people due to blockage of drainage systems. Plastic can also act as breeding grounds for vector-borne diseases such as Malaria, Zika and Dengue fevers (Krystosik et al. 2020). Likewise, the economic damages of plastic could be severely felt by Island states which rely on tourism and fishing industries as

¹ (Barnes et al. 2009), , (Jacobsen et al., 2010; Claessens et al. 2011) and (Whitmire et al. 2017).

² (CBD 2012); (Takada et al., 2013); (Rasool et al. 2020); (Gregory, 2009).

their major source of income. The impacts could result into low number of tourists due to anaesthetic problem as well as increasing operational costs for maritime vessels due to plastics wastes getting entangled and causing damage to engine propellers or steering systems³ .

As a growing economy, Tanzania depends on aquatic resources for economic growth; however, the country has inadequate resources and infrastructures to cope with the growing discharges of plastic waste.

In light of these threats from plastic waste, countries around the world are acting to minimise these impacts, including banning single-use plastics; changing petroleum-based plastics to alternative products such as paper, glass or biodegradable plastics, recycling and improving waste collection systems to ensure that all waste is appropriately collected and safely disposed of.

Despite the fact that the Government of Tanzania has undertaken some interventions to prohibit the use of plastic carrier bags in the country, there is an urgent need to explore more loopholes which keep plastic waste entering Lakes and Ocean.

The objective of the audit was to determine whether the government has adequately managed to Control Plastic Waste Pollution in Major Lakes and Ocean. The main audited entities were Vice President's Office through National Environmental Management Council and President's Office Regional Administration and Local Government through Local Government Authorities. The audit dwelt on assessing the Management control of the plastic waste pollution in major Lakes and Ocean. The audit covered a period of four financial years from 2016/17 up to 2019/20.

³ (Lampretch, 2013) and (Pawar et al. 2016).

1.1 Motivation of the Audit

The audit was motivated by the following factors:

a) Presence of both macro- and microplastic pollution in marine and freshwater bodies.

A study was conducted in Mwanza on the southern shore of Lake Victoria. The locally fished Nile Perch and Nile Tilapia were examined for microplastics contents in their bodies. The results showed that, microplastic plastics were present in 20% of the fish from each species. Also, various polymer types were identified in those fishes. The likely source of this was urban waste⁴.

Based on recent (2020) research by UDSM, the sediment and cockles sampled along the Tanzania coastline were found to have a significant amount of microplastics some of which were in same ranges to those reported in developed countries which have long history of using plastic products. Mtoni Kijichi Creek site located in Dar es salaam had the highest number of microplastics (2972 particles kg⁻¹ of sediment) while the lowest was found in Ruvula site located in marine park Mtwara which had 15 particles kg⁻¹ of sediment (*Mayoma et al. 2020*). In the same study 48% of individual sampled cockles were found to have microplastics of various quantities in their tissues. Prevalence of micro plastics pollutants in sediments and cockles matched with socio-economic activities around the coastal areas. This situation suggests the need for continued efforts to raise awareness on sustainable management of litter generated by coastal dwellers.

b) The audit is in line with Sustainable Development Goals number 3,12 and 14 which intends to achieve the following:

Goal 3 (Good Health and Wellbeing): In this aspect, the SDG target is to reduce substantially the number of deaths and illnesses caused by hazardous chemicals emanating from air, water, and soil pollution and contamination

4 Biginagwa, F. J., Mayoma, B. S., Shashoua, Y., Syberg, K., & Khan, F. R. (2016). First evidence of microplastics in the African Great Lakes: recovery from Lake Victoria Nile perch and Nile tilapia. *Journal of Great Lakes Research*, 42(1), 146-149.

by 2030. Prevalence of microplastics pollutants in fish, sediments and cockle tissues pose a potential human health risk from seafood consumption which calls for further research works to substantiate the risk. In a recent study by Zanzibar researchers isolated multidrug resistant pathogenic bacteria from marine plastic litter (*Rasool et al., 2020*). Since only few studies have been carried in Tanzania, it is likely that the health risks associated with plastic litter will continue to surface as more studies are conducted.

Goal 12 (Responsible consumption and production). Intends to encourage environmentally friendly production including discouraging single use of plastic products, reducing waste and boosting recycling with the intention of reducing environmental degradation by promoting sustainable life style.

Goal 14 (Life under Water). Aimed at conserving and sustainably use the oceans, seas and marine resources for sustainable development. The first target (14.1) calls for more efforts to reduce marine pollution by minimizing the influx of land based inputs including plastic waste. The conservation of marine environments and resources is important if developing countries are to benefit from blue economy which is currently underdeveloped.

Based on this motivation and the demand from public outcry, the Controller and Auditor General decided to carry-out a performance audit on the management control of plastic waste pollution in the major Lakes and Ocean. It is expected that through this audit the causes and effects of the identified problems will help to improve the system and the processes pertaining to management of control of plastic waste pollution in major water bodies.

1.2 Audit Design

This part explains about the main audit objective, specific audit objective, scope of the audit, methods for data collection and analysis, and assessment criteria.

1.3.1 Audit Objective

The audit objective was to determine whether the government has adequately managed to Control Plastic Waste Pollution in Major Lakes and Ocean. Specifically, the audit assessed:

- The existing situation regarding the plastic waste pollution in major Lakes and Ocean in the country;
- Whether NEMC and LGAs are effectively implementing control measures to protect plastic waste pollution in Lakes and Ocean;
- Whether PO-RALG adequately monitors and evaluates performance of LGAs to ensure there is effective control of plastic waste pollution in major Lakes and Ocean; and
- The coordination of the management of control of plastic waste pollution in major Lakes and Ocean by VPO.

1.3.2 Audit Scope

The audit mainly focused on management control of the plastic waste pollution in major Lakes and Ocean. Vice President's Office through National Environmental Management Council and President's Office Regional Administration and Local Government through Local Government were the main audited entities. This is because the VPO-Division of Environment through NEMC is the over-all overseers of environmental management matters in the country including the management of plastics waste pollution. Whereas PO-RALG is responsible for monitoring the performance of LGAs in the control of plastic waste pollution into Major Lakes and Ocean.

The audit covered four financial years (2017/18 to 2020/21). The selected period enabled auditors to have an insight into the overall performance of the entities in order to draw the right conclusions on the findings.

The audit covered the entire country, but data were collected from the seven regions namely: Dar es Salaam, Tanga, Mwanza, Kigoma, Pwani, Mtwara and Mbeya. From the aforesaid regions the Audit Team collected information from 9 sampled LGAs having major Lakes and Ocean to assess performance of activities that were undertaken in their region. **Appendix 2(D)** provide list of the regions visited.

1.2.1 Sampling, Methods for Data Collection and Analysis

1.4.1 Sampling Techniques Used

The audit team selected six out of seven zones in Tanzania mainland during the audit. The six zones were purposefully selected. Also, seven regions were selected from the six zones. The criteria for selecting these zones with their respective regions include geographical coverage, presence of major Lakes and Ocean and reported cases of water pollution from plastic waste. The regions and LGAs selected for assessment are summarised in **Table 1.1**;

Table 1.1: Depict Tanzania Major Lakes and Ocean and Coastal Lines and their Pertained Urban Centres.

SN	Zones	Regions	Lakes and Ocean/ Coastlines	LGAs
1	Coastal Zone	Dar es Salaam	Dar es Salaam coastline	Ilala Municipal Council Kinondoni Municipal Council
		Pwani	Mafia coastline	Mafia District Council
2	Lake Zone	Mwanza	Lake Victoria	Ilemela Municipal Council Nyamagana Municipal Council
3	Northern Zone	Tanga	Tanga coastline	Tanga City council
4	Southern Highland Zone	Mbeya	Lake Nyasa	Kyela District Council
5	Western Zone	Kigoma	Lake Tanganyika	Kigoma-Ujiji Municipal Council
6	Southern zone	Mtwara	Mtwara coastline	Mtwara Municipal Council

Source: *auditor analysis of the visited zones*

1.4.2 Methods Used for Data Collection

The audit team used different methods to gather information from the audited entities and other stakeholders in assessing the management of Control of Plastics waste Pollution to Major Lakes and Ocean by NEMC and LGAs. The methods which the audit team used include: *Interviews, Document reviews and Observations* as detailed below:

(a) Interviews

To respond to the audit questions and provide adequate conclusions against the audit objective, interview method was used to collect information. The audit team conducted interviews and thorough discussions for the purpose of obtaining additional information related to the project so as to get clarity on the information obtained from reviewed documents and physical observations.

Therefore, the audit team conducted interviews and discussions with officials from the audited entities. **Appendix 2(A)** provides a detailed list of individuals and entities that were interviewed during the audit and the reasons for interviewing them.

(b) Documents Review

Documents were reviewed in order to obtain appropriate and sufficient information to enable the audit team to come up with clear findings, which are supported by collaborative evidence. The reviewed documents fall within the period under audit i.e., 2017/18 up to 2019/20. The documents reviewed and reasons for doing that are detailed in **Appendix 2(B)**.

(c) Observations

The audit team used physical observation method to collect primary data by conducting field surveys in various areas of the coastal areas. The aim was to observe the state of plastic waste pollution and their sources in the visited major Lakes and Ocean. Through observation, the audit team also took photographs as illustrations and evidence to be included in the findings.

1.4.3 Methods for Data Analysis

Data collected were analysed using different approaches of both quantitative and qualitative methods. Data analysis consists of examining, categorising, tabulating, or/otherwise recombining both quantitative and qualitative evidence to address the audit objective, Details of methods used for analysis are shown in **Appendix 2(C)**.

1.3 Assessment Criteria

The assessment criteria extracted from various sources such as legislations, policies, guidelines, and best practices were used to assess the management control of plastic waste pollution in major Lakes and Ocean.

Table 1. 2: Audit Assessment Criteria Used

S/N	Audit Criteria	Source
1	it is expected that LGAs implement control measures to protect plastic waste pollution in Lakes and Ocean	• Local Government (urban authorities) Act no. 8 of 1982, section 55 and sub section 1(B), Tanzania, and by-laws • Environmental management Act no. 20 of 2004
	it is expected that NEMC implement control measures to protect plastic waste pollution in Lakes and Ocean	Environmental Management Act no. 20 of 2004
3	It is expected that PO-RALG monitor and evaluate performance of LGAs to ensure there is effective Control of Plastic Waste pollution in Major Lakes and Ocean	President's Office, Regional Administration and Local Government strategic plan - 2016 - 2021
4	It is expected that VPO coordinate the management of control of plastic waste pollution in major Lakes and Ocean.	National environmental policy, 1997 (clause 91)

Source: Analysis of Criteria from different sources (2017)

The details of the assessment criteria are in chapter three and the audit questions and sub questions are found in **appendix 3**

1.4 Data Validation Process

The VPO, PO-RALG and NEMC were given an opportunity to go through the draft audit report and commented on the figures and information. Similarly, the information obtained was crosschecked and discussed with subject matter experts in Plastic Waste management to ensure its validity as

presented in this report. **Appendix 1** provides responses and action plan by VPO, PO-RALG and NEMC on recommendations issued in this report.

1.5 Standards Used for the Audit

The audit was conducted in accordance with International Organization of Supreme Audit Institution's (INTOSAI) performance auditing standards. The standards require the audit team to plan and perform the audit so as to obtain sufficient and appropriate evidence as well as, provide a reasonable basis for findings and conclusions based on audit objective(s).

The audit team believes the evidence obtained provides a reasonable basis for the findings and conclusions based on the audit objectives.

1.5.1 Structure of the Report

The remaining part of the report is structured as follows:

Chapter Two

- Description of the system for managing control of Plastic waste pollution in major water bodies.

Chapter Three

- Findings on the situation of plastic waste;

Chapter four

- Findings related to factors contributing to observed performance problems in control of plastic waste pollution in major lakes and ocean;

Chapter Five

- Findings on the Coordination, Monitoring and Evaluation of the activities of managing the control of Plastic Waste Pollution in major lakes and ocean;

Chapter Six

- Audit conclusions; and

Chapter seven

- Recommendations which are to be implemented by the audited entities in order to improve the situations

CHAPTER TWO

SYSTEM FOR MANAGING CONTROL OF PLASTIC WASTE POLLUTION IN MAJOR LAKES AND OCEAN

2.1 Introduction

This chapter describes the way the system for Controlling Plastic Waste pollution in major Lakes and Ocean. It provides details of the policy, legislations, strategies, mission, and vision of the government in controlling of plastic waste pollution in major Lakes and Ocean. It also provides details on key players, their legal mandates, and responsibilities to undertake their responsibilities. It further presents the control of plastics waste in major Lakes and Ocean in the country.

2.2 Governing Policy, National Strategy, conversion, government Laws and Regulations.

2.2.1 The National Environmental Policy 1997, Tanzania

The following are the National Environmental Policy objectives related to management of control of plastic waste pollution in the environment particularly major Lakes and Ocean:

- a) To prevent and control degradation of Lakes and Ocean.
- b) To raise public awareness and understanding of the assertion linkage between environments and development, and to promote individual and community participation in environmental actions.
- c) To promote international cooperation on the environmental agenda, expand our participation and contribution to relevant bilateral, sub-regional, regional, and global organizations and programs, including implementations of the Treaties.

2.2.2 National Strategies

- **National Environmental Action Plan (NEAP), 2013 - 2018**

The following are the implementation plans for National Environmental Action Plan (NEAP) that are related to management of control of plastic waste pollution in the environment particularly in major Lakes and Ocean (Table 2.1):

Table 2. 1: Implementation Plans for National Environmental Action Plan (NEAP)

S/N	Priority Actions	Expected output	Indicator	Implementers
1	Strengthen integrated solid waste management system	Improved solid Waste management	- Amount of solid waste collected and disposed - Amount of solid waste recovery and recycled / reuse	Ministries responsible for Local Government, Environment; and NEMC, Private sector; Public, NGOs/CBOs
2	Strengthen data-base and reporting system on municipal waste management	Data-base in place	Availability of Up-dated data	Ministries responsible for Local Government, Water, Environment; and NEMC, Private sector; NGOs/CBOs
3	Implement National Waste Management Strategy and Action Plan	National Waste Management Strategy and Action implemented	- Amount of solid waste collected and disposed - Amount of solid waste recovery and recycled/ reuse	Ministries responsible for Local Government ;Environment; and Private sector; NGOs/CBOs

Source: The National Environmental Action Plan

- National Solid Waste Management Strategy, 2018**

The following are the targets for National Solid Waste Management strategy that are related to management of control of plastic waste pollution in the environment particularly in major Lakes and Ocean:

- a) Long-term-goals, achieve approximately 80% waste recovery (re-use, recycling, composting, and energy recovery) and 20% land filling in a sanitary land fill (inert material) by 2030.
- b) Medium-term goals, achieve 50% waste recovery (re-use, recycling, composting, and energy recovery) and 50% semi-land filling by 2025.
- c) Short-term goals, achieve 30% waste recovery (re-use, recycling, composting) and 70% controlled dumping (tipping, compacting, and covering) by 2020.

2.2.3 Regional Conventions

Tanzania's coastal and marine pollution can be addressed fuller and effectively through regional cooperation. In many cases some international framework is necessary to address Trans-boundary environmental problems. Tanzania committed to intensify its cooperation with other countries of the sub-regional, regional and the world at large. Tanzania is signatory to the following multilateral environmental agreements (MEAs), relating to management of control of plastic waste pollution in the environment particularly major Lakes and Ocean.

The Convention on the Sustainable Management of Lake Tanganyika

Article 8. Prevention and Control of Pollution

Requires the Contracting States shall, as a matter of priority, take appropriate measures to prevent and reduce pollution of Lake Tanganyika and its environment arising from activities within their jurisdiction or control.

Article 9. Prevention of Sedimentation

Requires each Contracting State, as a matter of priority, to take appropriate legal, administrative, and technical measures to prevent all causes of excessive sedimentation in the Lake, such as land degradation (micro plastic pollution in the sediment of the lake).

Amended Nairobi convention for the protection, management and developments of the marine and coastal environment of the Western Indian Ocean (2010)

- i. Article 6. Pollution caused by dumping

Requires contracting parties shall take all appropriate measures to prevent, reduce, and combat pollution of the convention area by dumping of the waste. Also, other matters at Lakes and Ocean taking into account applicable international rules and standards and recommended practices and procedures.

ii. Article 12. Cooperation in combating pollution in case of emergency

A. Requires the contracting parties shall cooperate in taking all necessary measures to respond to pollution emergency in the conventions areas and to reduce or eliminate all the threats of the pollution resulting therefrom. To this end, the contracting shall, individually and jointly, develop and promote contingency plans for responding to incidence involving pollution or the threat thereof in the conventions area.

B. States that, when a contracting party become aware of a case in which the conventions is in imminent dangers of being polluted or has been polluted, it shall immediately notify other state likely to be affected by such pollutions, as well as competent international organizations. Furthermore, it shall inform, as soon as visible, such other state and the organisations of any measures it has taken to minimise or reduce pollutions or the threats thereof.

United Nations Convention of the Law of the Sea (UNCLOS)

The United Nations Convention of the Law of the Sea (UNCLOS), the International Convention for Prevention of Pollution from Ships (MARPOL 73/78), the London Convention and Protocol addressing dumping of waste at sea; the Basel, Rotterdam, and Stockholm Conventions are all dealing with hazardous substances. The UNCLOS list also includes Conventions on Migratory Species and on Biological Diversity that include provisions to prevent harmful impacts of marine debris. UNCLOS has legal binding mandates which regulate activities carried in the Ocean to prevent, reduce, and control pollution of the marine environment.

2.2.3 United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP) is responsible for catalysing and encouraging international and national action for more effective management of the environment matters.

2.2.4 Laws, and Regulations Governing (Micro) Plastics

There are a number of Legislations which are related to management of plastics waste pollution management in Tanzania the most relevant among them include:-

Environmental Management Act 2004, Act No. 20 of 2004, Tanzania

Gives the mandate to the Local Government Authorities to control plastic waste from entering in the major water bodies. Also, gives mandate to the Local Government Authorities to involve the private sector and Non-Governmental Organizations (NGOs) in solid waste management activities

The Environmental Management (Prohibition of Plastic Carrier Bags) Regulations 5, 2019 gives the power to NEMC and LGAs to enforce the law which prohibits using plastic carrier bags. Regardless of their thickness they are prohibited from being imported, exported, made, sold, stored, supplied and used in Mainland Tanzania.

2.3 Institutional Framework

In order to facilitate the implementation of the control of plastic waste pollution in major Lakes and Ocean, each of the institutions which are crucial stakeholders on the aforesaid subject matter have to play their role effectively. Here below are the key institutions with their responsibilities on the management of control of plastic waste pollution in major Lakes and Ocean.

2.3.1 Vice President's Office (VPO) - Division of Environment

The following are the roles and responsibilities of VPO towards managing the control of plastic waste pollution in major Lakes and Ocean:

- Formulate policies, National Strategies and Action Plan, legislations and guidelines relevant to the subject matter
- Coordinate issues relating to articulation and implementation of environmental management aspects of other sector policies; and
- Coordinate issues relating to articulation and implementation of the National Environmental Policy
- Oversee action plan for implementation of solid waste management systems Monitor and coordinate performance of National Environmental Management Council (NEMC)

2.3.2 President's Office - Regional Administration and Local Government

The following are the roles and responsibilities⁵ of PO-RALG towards the control of plastic waste pollution in major Lakes and the Ocean:

- PORALG is responsible for ensuring harmonized mechanism of dealing with different policies, approaches and methodologies to improve efficiency in managing plastic waste.
- the PORALG receives, reviews and scrutinizes the LGAs" progress reports submitted by Regional Secretariat
- Ensures that LGAs provide conducive or enabling environment for investment in solid waste recovering
- Provides conducive or enabling environment for investment in waste management

2.3.3 National Environmental Management Council (NEMC)

The key roles of NEMC for environmental enforcement and compliance in the country are:

- Conducts inspections to various facilities to ensure that, the facilities follow the requirements given to them either through various legislations or through the conditions provided in their EIA certificates
- Enforces and ensures compliance of the national environmental quality standards; coordinate with other key stakeholders in

⁵ The functions and organisation structure of the prime minister's office, regional administration, and local government (PMO-RALG as approved by the President on 12th February, 2015).

addressing all issues on environmental management; regulating and monitoring the collection, disposal, treatment and recycling of waste, and

- Issues administrative and prosecution notices.
- Enhances the capacity of the City or Municipal Councils on waste management systems and approaches applicable in their respective municipalities.

2.3.4 Local Government Authorities (LGAs)-City Councils, Municipalities and District Councils

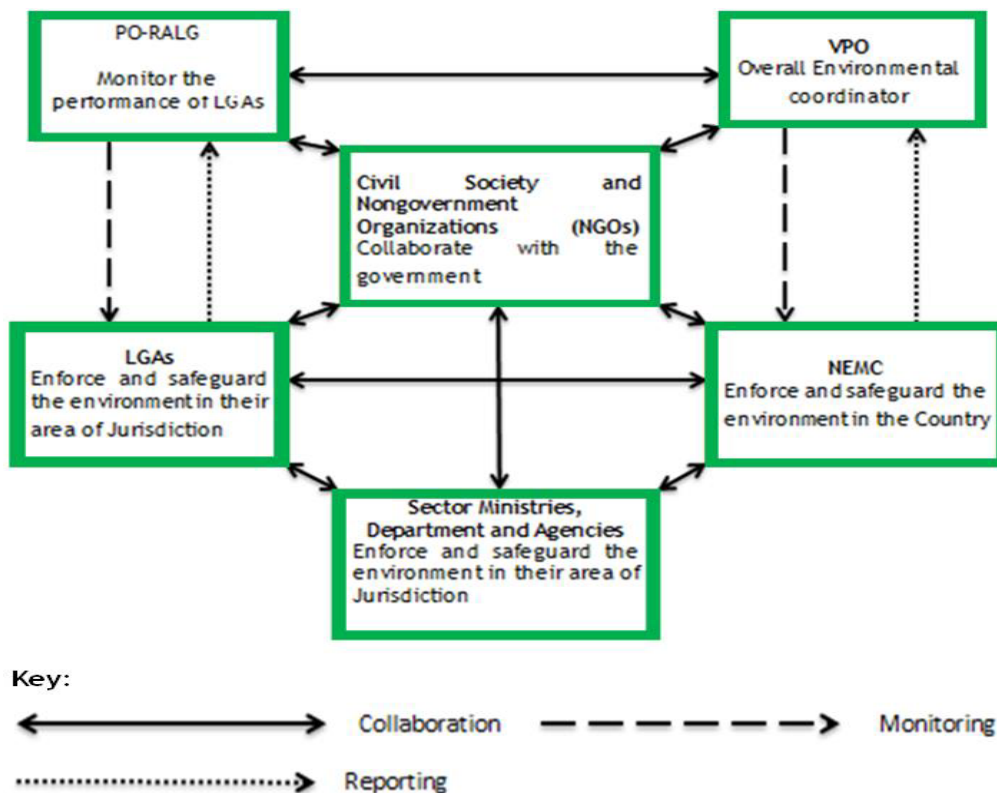
Local governments are responsible for managing plastic waste along with other solid waste in the areas under their jurisdiction.

- Create awareness to the communities on the control of plastics waste in major Lakes and Ocean
- Encourage communities to participate in waste management
- Provide adequate support to private sectors/contractors
- Develop programmes that promote waste management as well as prevent illegal disposal of both hazardous and non-hazardous waste
- Put in place measures for enhanced Public-Private-Partnerships (PPP)
- Acquire facilities and human resources to carry out efficient waste collection and disposal as well extending waste collection coverage, and
- Through PO-RALG report to the NEMC on the state of the environment in their area of jurisdiction.

2.4 Institution set-up in managing the Control of Plastics Waste in Major Lakes and the Ocean

The delivery of Management of the Control of Plastic Waste in Tanzania is managed through a decentralization manner. The Vice President's Office-Division of Environment have the mandate to coordinate all issues related to protection of environmental degradation in the Country. The detail of institution set up for the Control of Industrial and Plastic Waste is as shown in Figure 2.1.

Figure 2.2: Institution Set up in Management Control of Plastic Waste Pollution in Major Lakes and Ocean



Source: Auditors' analysis of key stakeholders' responsibility in the Control of plastic waste pollution in major lakes and the ocean.

2.5 Management of Plastic Waste

According to United National Environment Programme (UNEP), waste management includes components of prevention, promotion and its disposal. According to UNEP, one element common to most waste policies is a waste hierarchy. Figure 2.2 presents waste hierarchy steps.

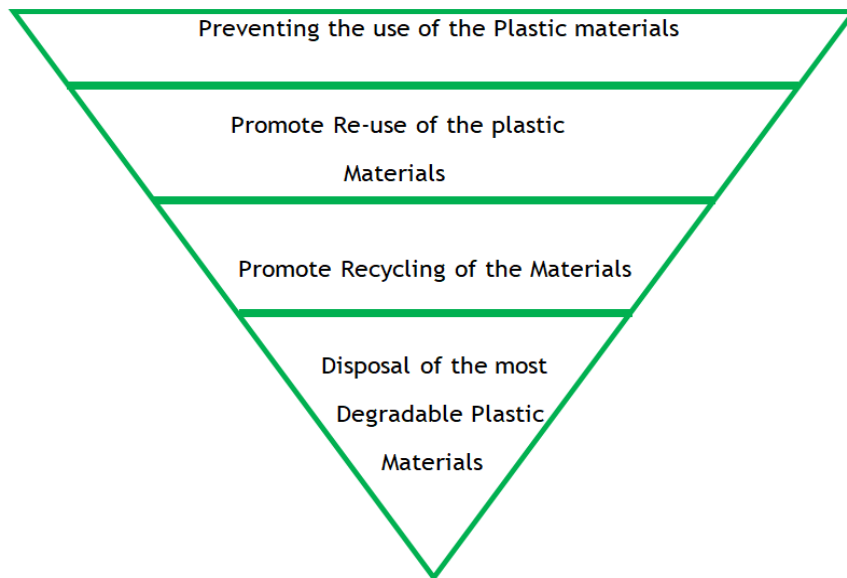


Figure 2.2: Ideal Plastic Waste Management System (source: United Republic of Tanzania the National Solid Waste Management Strategy, 2018).

This Waste Management hierarchy can be explained as follows

2.5.1 Prevention and Reduction

Waste prevention is the first stage in the waste management stream. Preventing the generation of plastic waste is deemed the most efficient solution to the problems caused by plastic waste and is thereby placed at the top of the hierarchy. Prevention may involve reducing the quantity of plastic waste, and limiting the adverse impacts generated by plastic waste. Policies aimed at reducing waste may involve changing consumer patterns or instituting new strategies in the manufacturing industry. Reducing the packaging in a few companies may, for example, be much more efficient than recycling measures in thousands of households. As the waste management generates revenue for businesses, changes in the waste market itself may also reduce the amount of waste.

2.5.2 Recycling

There are several reasons for recycling plastic waste as much as possible: It reduces the amount of plastic waste destined for final disposal; it reduces the need for transport; and it makes use of valuable resources in the waste

and reduces the use of virgin raw materials. However, recycling will always generate 'waste of the waste' which needs to be disposed of in a sound manner. Recycling also requires transport of waste to the recycling plant, and the recycling process itself may require energy. Informal and unsound recycling practices in many waste-importing countries are prone to involve criminal activities.

2.5.3 Recovery

Energy produced by incineration and gasification may be used to produce hot water, steam and/or electricity. Some processes involve the recovery of energy and raw materials. Recovery of waste may be carried out by the generator of the waste or organised externally after the collection and transport stages. As energy recovery produces air emissions, it is often less preferred than re-use and material recycling.

2.5.4 Disposal

Disposal is the end station for the plastic waste, and secure handling here is of paramount importance. Disposal in landfills is the most common solution for handling plastic waste that cannot be treated by recycling, composting or incineration. Landfills vary from open, uncontrolled dumps to sanitary landfills that are a fully acceptable environmental solution. The main differences are in the way they are operated and the level of adverse environmental effects they produce. To reduce or eliminate the hazardous properties of waste, treatment is required at the disposal site. The two main approaches are thermal destruction and chemical treatment.

2.6 Monitoring of the Performances of LGAs

The PO-RALG strategic plan (2016/17 - 2020/21) states that, it is the responsibilities of PO-RALG to monitor the performance of LGAs in the country. Therefore, PO-RALG is responsible to monitor the implementation of the Municipal Solid Waste (Management and Handling) roles.

2.6.1 Key Performance Indicators

The best practice and “PO-RALG strategic plan (2016/17 - 2020/21)” requires the PO-RALG to develop key performance indicators to monitor the performance of LGAs towards achieving national targets highlighted in the National solid waste management strategy⁶. Performance indicators help the PO-RALG to assess and evaluate the degree to which national targets have been addressed by LGAs to achieve the overall goals.

2.6.2 Reporting of Monitoring Results and Follow up of Recommendations

LGAs are required to produce monthly, quarterly and annual reports containing information management and handling of municipal solid waste including plastic waste in their areas of jurisdiction. These reports are being submitted to the Regional Secretariat who then submits them to PO-RALG.

2.7 Coordination of Control of Plastic Waste Pollution Activities by VPO

Sustainable management of control of plastic waste pollution in major Lakes and Ocean requires an effective coordination between VPO and PO-RALG.

VPO sets policies, national vision and strategies towards managing plastic waste pollution in the country. However, the implementing agencies specified in these rules which are cities, municipalities and district authorities do not fall into the administrative or financial control of VPO. As such, VPO does not have the powers to ensure compliance by these implementing agencies. Thus, coordination with the ministries under whose administrative jurisdiction these agencies fall is crucial for ensuring better implementation of waste management rules and in ensuring that waste management receives the desired thrust and emphasis by the government.

The Government of Tanzania had enacted the National Solid Waste Management Strategy in 2018, which laid some waste reduction and minimization strategies. The strategies highlighted national targets where every institution or implementers were supposed to be guided accordingly.

⁶ United Republic Of Tanzania The National Solid Waste Management Strategy, August 2018 (clause 4)

The following are the national targets highlighted in the National Solid Waste Management Strategy that LGAs were supposed to implement them.

- i. Long-term-goals; achieve approximately 80% waste recovery (re-use, recycling, composting and energy recovery) and 20% land filling in a sanitary land fill (inert material) by 2030.
- ii. Medium-term goals; achieve 50% waste recovery (re-use, recycling, composting and energy recovery) and 50% semi-land filling by 2025.
- iii. Short-term goals; Achieve 30% waste recovery (re-use, recycling, composting) and 70% controlled dumping (tipping, compacting, and covering).

CHAPTER THREE

FINDINGS ON THE SITUATION OF PLASTIC WASTE

3.1 Introduction

The findings in this chapter present the situation regarding plastic waste pollution in major lakes and the Ocean nationally. It gives the extent of implementation of Prohibition of Plastic Carrier Bags Regulations, the extent of Plastic waste pollution at the National level and at the visited LGAs and the associated implication of plastic waste pollution in Major lakes and the Ocean. The factors contributing to the observed performance problems in control of plastic waste pollution in major lakes and the Ocean are presented in next chapter (Chapter Four).

3.2 Extent of Implementation of the Prohibition of Plastic Carrier Bags Regulation

The audit examined effectiveness of enforcing the prohibition of using plastic carrier bags. The audit covered the period from 01 June, 2019 when the prohibition of the use of plastic carrier bags was introduced up to the time of this audit.

The audit acknowledges the efforts made by the government in prohibiting the use of plastic carrier bags in the country. The reviewed documents from VPO and PO-RALG followed by physical observations from 9 LGAs, have shown that there is an improvement in the state of affairs as explained hereunder:

Generally, the use of plastic carrier bags in the country has declined. A total of 253.7 tones of plastic carrier bags were surrendered to the designated collection point. **Table 3.1** shows the statistics on plastic carrier bags surrendered in Tanzania Main land.

Table3. 1: Statistics on Plastic Carrier Bag Surrendered.

SN	zones	Amount of plastic carrier bags surrendered (Tones)	Percentage
1	Eastern Zone	203.4	80.17
2	Southern Highland Zone	28.7	11.31
3	Southern Zone	1.8	0.71
4	Lake Victoria Zone	8.4	3.31
5	Western Zone	0.1	0.04
6	Northern zone	1.1	0.43
7	Central Zone	10.2	4.02
Total		253.7	100

Source: The report on the status of the Implementation of Government Prohibition of the Use of Plastic Carrier Bags, Tanzania Mainland

Table 3.1 shows that, about 253.7 tones of plastic carrier bags were surrendered to the designated collection points in seven administrative zones. However, there were no established target on the extent of the amount of wastes to be surrendered. This limited the audit to calculate the performance of this exercise. This was, to a large extent, influenced by lack of detailed and research conducted to determine the potential amount of the plastic carrier bags present in the markets or environment. Also, from the Table 3.1, the Eastern Zone surrendered a substantial amount of plastic carrier bags compared to other zones. This large amount was probably due to the areas' large population compared to other regions. The Eastern Zone has also many industrial activities.

Also, upon physical verification conducted in major Lakes and Ocean, it was observed that, plastic waste pollution related to plastic carrier bags has declined.

Among the factors that contributed to the decline were:

i. Public awareness:

The review of progress reports from VPO, PO-RALG and 9 visited LGAs indicated that, before and after introduction of the prohibition of Plastic Carrier Bags Regulation, the entities managed to disseminate public awareness education on the prohibition of the use of plastic carrier bags. The dissemination to communities was done

through magazines, publications, TV, Redio, and social media on the prohibition of the use of plastic carrier bags;

- ii. Campaign emphasizing on the communities to surrender plastic carrier bags to the designated collection point was conducted to all LGAs in the country;
- iii. Formulation of special task force to coordinate and ensure that the banned plastic carrier bags are not available in the environment; and
- iv. Presence of alternative plastics carrier bags that meet the standard of 70 GSM.

3.3. The Situation of Plastic Waste Pollutions

3.3.1 Situation at the National Level

Tanzania has a coastline that hosts the world's largest freshwater lakes. The extent of microplastics in the aquatic environment remains largely unreported. Data from volunteer beach clean-ups in Dar es Salaam areas showed that, typically, more than 70% of litter along the beaches was comprised of plastics⁷.

The audit team reviewed the Waste and Brand Audits Report (WABA) prepared by an NGO called Nipe Fagio in 2020. The information extracted from the report is just an indicative of the existing situation of plastic waste pollution in lakes and the oceans. The report indicated that, about 26 Clean-up campaigns were held in 13 regions⁸ of Tanzania. The report revealed that out of 34,740 kgs of collected waste, 20,844 kgs which is equivalent to 60%, comprised of materials related to plastic. Most of these plastic wastes ended up in waterways and finally into lakes and the ocean.

⁷ Status Updates on Plastics Pollution in Aquatic Environment of Tanzania: Data Availability, Current Challenges and Future Research Needs (Dativa J. Shilla-2018)

⁸ Dar es Salaam (Salender Bridge, Ocean Road,Kawe Beach, Coco Beach, Msigani , Mwembeyanga and Ferry), Arusha (Ngongongare and Ailanga), Dodom(Pombe river), Iringa (Frerimo),Kigoma-kipiri(Lake Tanganyika), Tanga-Korogwe(Msimbazi/Manundu and Igawiro), Mbeya(Main Stand and Soweto market), Morogoro(Manzese market), Moshi(RAU forest and River Area and Boma Ng'ombe town), Mwanza(Igogo, Mwenge and Azimio), Njombe(Kwivaha Street), Rukwa(Mazwi Hospital), Simui(Kidinda Mtoni).

Poor disposal of plastic carrier bag waste is to a large extent responsible for seasonal flooding and mosquito breeding, as they block drainages and waterways.

On the other hand, every year Tanzania accounts for flood-related deaths and excessive infrastructure damage that are likely to be connected with existence of plastic pollution. This in general has an impact on government budget, the economy and community services.

Figures 3.1, Provides the Summary of the Percentage of Types of Waste Obtained in Waste Audit and Brand Audit (WABA) for 26 Clean-up sites in 13 Regions in Tanzania.

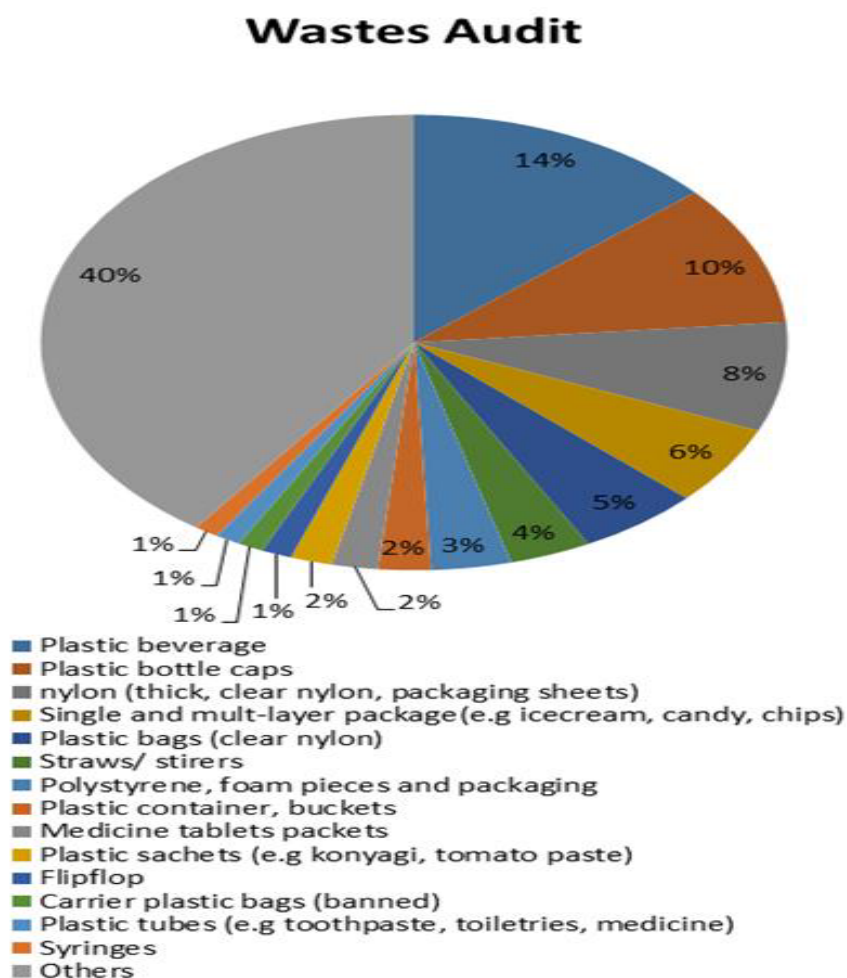


Figure 3.1: Percentage of Types of Waste Obtained in Waste Audit by WABA

Figure 3.1 shows that 60% of waste was solid waste related to plastic products. Whereas, the remaining 40% was solid waste not related to plastic materials. Table 3.2 provides detailed analysis of plastic waste composition.

Table3. 2: Analysis of Plastic Waste Composition.

SN	Plastic Waste Type	Percentage of types of waste
1	Plastic beverage bottle	14
2	Plastic bottle caps	10
3	Clear nylon, packaging sheet	8
4	Ice cream, candy, and chips packaging	6
5	Clear nylon	5
6	Straw/ stirrers	4
7	Polystyrene, form pieces	3
8	Other plastic products	10
Total % of plastic waste composition from waste audit result		60

Source: Nipe Fagio Report(2020)

From Table 3.2 it is observed that, out of 60% identified plastic products; plastic beverage bottles were the majority (14% out of 60% of plastic waste found). The percentage ranged from 10 to 37% across all sites. Plastic bottle caps were also found in the sediments of each site (about 10%) of plastic waste. Clear nylon, packaging sheet Ice cream, candy, and chips packaging, clear nylon polystyrene, and other form of plastics constituted 23% of all observed plastic waste.

3.3.2. Situation of plastic waste pollution in the visited LGAs

The situation of plastic waste pollution in the 9 visited LGAs is as presented hereunder:

The audit observed that plastic bags, plastic bottles for water and soft drink, soft drink cans, and paper packaging materials is scattered all over the place particularly in public beaches, ferries and at the point of streams or rivers entry into the Indian Ocean or the aforementioned lakes. The condition of plastic waste pollution in 9 visited LGAs is as depicted in Photos hereunder.

State of plastic waste pollution in coastal areas

Figure 3.2 A Shows a Pile of the Plastic Waste Pollution Mixed with Litters in Msimbazi River Inlet During Rainy Season. Figures 3.2 B, C, D and E also show a pile- up of plastic bags, packing materials, plastic bottles, paper boxes all mixed with water and mud. These were found in the sediments of the sampling sites along the Tanzania coasts (Tanga, Ilala, Kinondoni, Mtwara and Mafia). The majority of the aforesaid sites are beaches which are open to fisheries, petty trade and recreational activities.



Figure 3.2 A: Msimbazi River Inlet During Rainy Season
Photo taken on 10th September, 2020

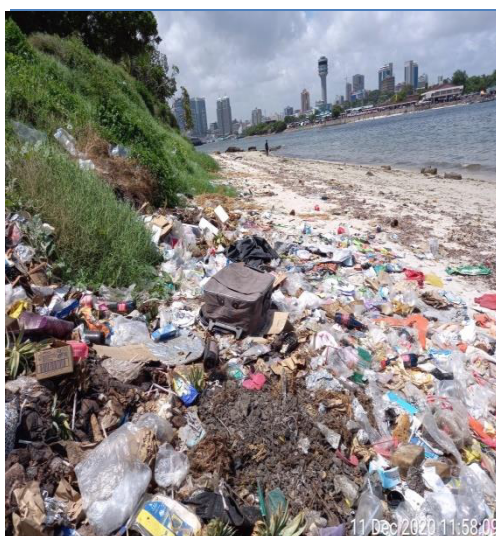


Figure 3.2 B: A Pile of Plastic Waste at Kigamboni Near Ferry. Photo Taken on 11th December, 2020

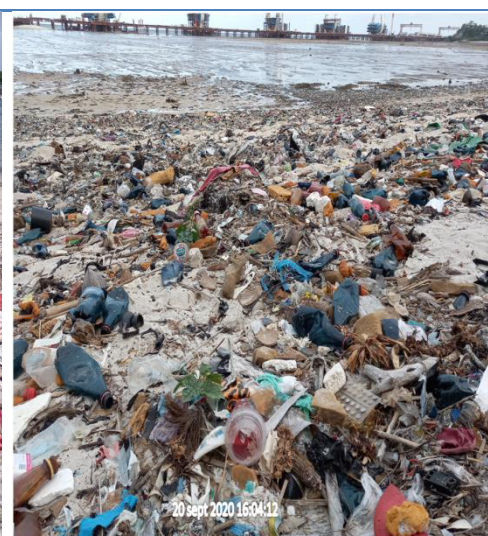


Figure 3.2 C: A Pile of Plastics Waste at Salendar Bridge in Dar -es- Salaam City. Photo Taken on 20th September, 2020.



Figure 3.2 D: Plastic Waste Deposited at Mtwara (Fish Market). Photo taken on 10th December, 2020



Figure 3.2 E: A Pile of Plastic Waste at Mafia Beach. Photo Taken on 25th September, 2020

Situation of plastic waste pollution in lakes

Figures 3.3 A, B, C and D show an existence of plastic bags, carrying/wrapping plastics, packaging materials, plastic bottles, paper boxes all mixed with water, and mud found in the sediments of sampling sites along the visited lakes in Mwanza, Kigoma and Kyela.



Figure 3.3 A: Plastic Waste Deposited at Kibirizi River Inlet to Lake Tanganyika. Photo taken on 14th October, 2020



Figure 3.3 B: Plastic Waste Deposited at Milongo River Inlet to Lake Victoria. Photo taken on 9th October, 2020



Figure 3.3 C: litters of the Plastic Waste Deposited at Lake Nyasa. Photo taken on 20th October, 2020



Figure 3.3 D: A litters of the Plastic Waste Deposited at Lake Victoria. Photo taken on 9th October, 2020

Based on site observations, most of the plastics waste found in major lakes and the Ocean were transferred by the movement of water through river

inlets or streams flowing into major lakes and the Ocean. Some of the waste was trapped by aquatic plants such as sea weeds, sea grasses, water hyacinth and mangroves which kept the waste trapped in river channels, shores, and creeks for long time.

3.4 Implication of Plastic Waste Pollution in Major Lakes and the Ocean

Plastic waste has direct and indirect Impacts on different facets of environment.

3.4.1 Impact associated with exposure to plastic Waste

The following are the risks associated with exposure to plastic waste. Plastic waste has been a contributor of frequent blockage of river channels and streams in urban area, which lead into flooding. For example, frequent floods occurrence at Jangwani-Dar es Salaam is attributed to damaged infrastructural deficiencies. The damage is caused by plastic waste and other types of solid waste found in the natural and constructed drainages at Jangwani often blocking the natural water flow. As a result, almost every year this area encounters frequent flooding. **Figure 3.4 (A&B)** shows the drainage systems jammed with solid waste including plastic waste.



Figure 3.4 A: Shows Part of the Observed Jammed Condition at Jangwani Bridge. Photo taken on 13th July, 2020



Figure 3.4 B: Street Terrace Blocked due to Debris Contaminated with Plastics.

On the other hand, particles of the degraded plastic have an impact in the productivity of soil for agriculture and reduce the quality of the sand used for construction activities. In addition, the presence of these plastics wastes

on the environment causes aesthetic nuisance and create public outcry to community requiring the clean-ups.

Furthermore, long-time exposure to ingestion of the microplastics can result in different diseases. For example, plastic litter associated with diverse bacterial species, including human pathogens and *Vibrio cholera* was found on the island of Unguja, Zanzibar⁹.

⁹ Journal of Hazardous Materials 405(2021)124591

CHAPTER FOUR

FINDINGS RELATED TO FACTORS CONTRIBUTING TO THE OBSERVED PERFORMANCE PROBLEMS IN CONTROL OF PLASTIC WASTE POLLUTION

4.1 Introduction

This chapter presents factors contributing to the observed performance problems in control of plastic waste pollution discussed in the previous chapter. The chapter provides the causes and effects connected to inadequate awareness campaigns, inadequate enforcement of extended plastics producers' responsibility by LGA and NEMC, inadequate implementation of National Strategies for recycling and recycling of plastic waste and inadequate waste sorting to minimize waste disposal and management of the landfill.

4.2 Inadequate Implementation of Awareness Campaigns

Section 15 paragraphs (a) and (b) of the local Government Authorities Act, requires the LGAs to conduct public education and awareness programs. Focusing on management and handling of plastic waste as well as their effects on human health and the environment.

However, based on annual plan (2017/18, 2018/19, and 2019/20 and the nine (9) visited LGAs, it was noted that education to the citizens on the implementation of waste reduction strategy was not adequately disseminated. Also, the review of the state of environment report (2019) revealed that social behaviour could positively contribute to the adequate control of plastic waste in major Lakes and Ocean.

The audit noted the following being the reasons for the observed inadequate implementation of awareness campaign to the visited 9 LGAs.

4.2.1 Inadequate planning for awareness campaign.

The audit noted that all nine LGAs did not have a well-designed community awareness program. The programs for awareness reviewed were not clear on how the plan could be implemented. For example, the plan did not show how often the program should be carried out - weekly, monthly, bi-annually, or annually. It was not clear also who were the targeted audience, and in

which form, awareness will take place (through advertisement or notice on TV or radio, consultation, training, pamphlets, internet, etc.). Since the targeted audience was not identified the implementation of these plans were likely to fail or ineffective.

4.2.2 Inadequate monitoring of the effectiveness of awareness programmes

Although all nine LGAs carried out community awareness programs, the achievement of these programs was not monitored. No LGA conducted monitoring or evaluation to check whether the program was effective and had contributed positively to improving plastic waste management. This contributed to inadequate implementation of awareness campaign as explained in clause 4.2 above

4.3 NEMC and LGAs did not strictly enforce Extended Producer Responsibility

The audit observed the uncollected plastic bottles, plastic water and soft drink bottles, soft drink cans, and plastic packaging materials scattered all over the places. These waste materials were prominent in public beaches and rivers inlets flowing into Dar es Salaam, Tanga and Mtwara coastal areas.

The team interviewed environmental officers from the 9 visited LGAs and noted that, the aforesaid adverse situation was due to inadequate of adequate enforcement of extended producers' responsibility by LGAs and NEMC.

Inadequate enforcement of extended producer's responsibility (EPR) is contrary to Section 19 of the Regulation on the Environmental Management (Section 19 of Prohibition of Plastic Carrier Bags, 2019). This prohibition stipulated that, any manufacturer or supplier of products contained in plastic bottles has to set-up, operate or participate in a take-back system for collecting their respective waste plastic bottles for recycling purposes. It is provided that no additional price is chargeable for that service.

Through physical observation and interview with landfill operators for 9 visited LGAs noted that, the uncollected plastic products in many cases were the colored plastics. According to the interview with the management

of the recycling industries in Mwanza and Tanga City Councils it was revealed that, the colored plastic bottles were not preferable by most of the recycling industries. Based on the interview with officials it was also noted that, the Government has not introduced design control of the plastic and packaging to ensure that all produced plastics meet the minimum recycling requirement. On the other hand, there was no economic motivation for producers to produce recyclable plastics.

Interview with officers from a recycling industry in Mwanza revealed that the coloured plastic products were more costly to recycle.

Figure 4.1 (A & B) shows colored plastic bottles isolated from those bottles collected for recycling industries.



Figure4.1 A: Coloured Plastic Bottles. Photo taken on 2nd October, 2020, Tanga



Figure4.1 B: A Pile of Plastics Waste Mixed with Coloured Plastic Bottles. Photo taken on 2nd October, 2020, Tanga

The inadequate enforcement of EPR created more loopholes for manufacturer or supplier of plastic products for violating this prohibition since the chances of being caught are minimal. On the other hand, the observed lack of application of strong and deterrent sanctions leads producers to continue abusing waste management without being held responsible for their actions. That may pose significant environmental and costly health hazards.

The following are the reasons for not adequately exercising extended plastics producers' responsibility.

4.3.1 Inadequate of effective coordination between NEMC and LGAs

The audit noted that, one of the factors contributed to inadequate enforcement of extended plastics producers' responsibility there was inadequate coordination between NEMC and LGAs. There was no sharing of statistical data and environmental findings among them. It was further revealed that, LGAs was lacking the critical information from NEMC on the number of plastic products manufactures as well as the conditions that the manufactures were given by NEMC with regard to ensuring the implementation of extended producers' responsibility.

Despite the fact that it is the requirement of the Environmental Management Act, 2014 for LGAs to report to NEMC on any environmental activity, there were no reports submitted to NEMC for the whole period under review. Lack of sharing information among them limited NEMCs' ability to know the challenges facing LGAs on enforcing extended producers' responsibilities.

4.3.2 Producers and manufacturers of plastic products operate away from the LGA's territory

According to interviews made with the staff responsible for environmental issues in 9 visited LGAs the officers claimed that, most of the large producers or manufacturers or their agencies are not in direct contact with LGAs. This is because they did not operate in their area of jurisdiction. According to the officers it would be easy to follow up on the extended responsibility if the producers were operating from within the respective LGAs. However, this geographical barrier was not supposed to hinder LGA's collaboration with NEMC in enforcing the extended responsibility of plastic producers.

The audit noted that, the LGAs lacked mechanisms to ensure that manufactures who were not operating in their areas but generating a lot of waste, do collect their waste as required by laws.

4.4 LGAs did not Adequately Implement National Solid waste Strategy for Recycling and Reuse of Plastic Waste

Review of strategic plans for the nine LGAs noted that the LGAs did not adopt National Strategies for Solid Waste Management, focusing on '3 Rs' (reduce, reuse, and recycle). It was noted that the visited LGAs had the tendency of dumping or tipping solid waste on the landfills without sorting it. The focus of the visited LGAs was only on disposal of solid waste. Up to the time of this audit, none of the LGAs had implemented the National Targets on waste recovery (re-use, recycling, composting, and energy recovery).

Site visits to landfills in 9 visited LGAs showed that, the plastic waste were found to be abundant and mixed with other types of solid waste in the landfills for all visited LGAs. The mixed waste reached to the landfills because of lack of sorting at the generation and collection points. Lack of sorting of plastic waste implies that LGAs have not implemented the national solid waste management strategies for sorting which requires the LGAs to ensure that solid waste generated in their areas are being sorted at the point of generation.

Figure 4.2 (A&B) shows the modern landfills containing plastic waste mixed with other types of solid waste.

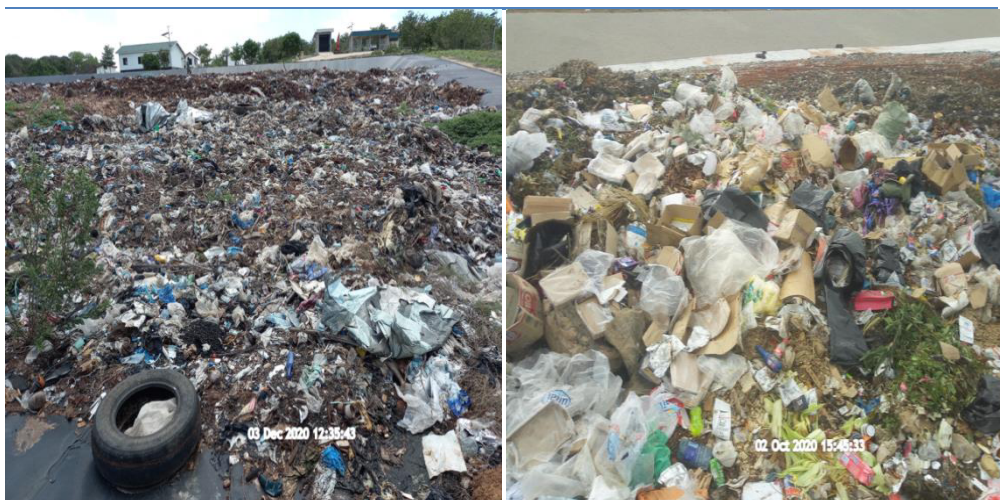


Figure 4.2 A: Landfill Containing Mixed Plastic Waste Products that Could be Recycled or Reused. Photo taken in Mtwara on 3rd December, 2020

Figure 4.2 B: Landfill Containing Mixed Plastic Waste Products that Could be Recycled or Reused. Photo taken in Tanga on 2nd October, 2020

The Audit further analysed factors that contributed to inadequate implementation of National Solid Waste Management Strategies to maximise the opportunity for recycling and reuse of plastic waste materials. The causal factors are as follows:

- LGAs have not intergrated Natioanl Strategies issues into their Plans
- Inadequate facilities to support the segregation of plastic waste at the generation and storage points;
- Lack of reliable systems for forecasting the amount of plastics; and
- Waste generated, collected, and recycled.

4.4.1 LGAs did not intergrate Natioanal Solid Waste Strategies into their Plans

Review of the plans framed by all visited LGAs and showed that all LGAs did not reflect the National Solid Waste Management Strategies in their plans. They did not address the strategies concerns on recycling and reduction of waste. Furthermore, a clear hierarchy for the management of waste had also not been defined.

In the absence of plans framed by LGAs to guide the implementation of 3Rs in each LGA, the team noticed that the LGAs did not pay attention to the implementation of 3Rs as stipulated in National Solid Waste Management Strategies.

Thus, due to the absence of plans that address national solid waste strategies, it was also difficult for VPO to assess whether waste management programs in National Solid Waste Management Strategies were being implemented all over Tanzania.

4.4.2 Inadequate facilities to support segregation of Plastic Waste

Section 41 of the Environmental Management Regulations of 2009 requires each LGA to put in place necessary plastic waste management infrastructures/facilities for segregation of various plastic categories at transfer stations and collection centres.

The audit noted that, each LGA had a different level of compliance with requirement for facilities for segregation at transfer stations and collection

centres. Table 4.2 shows the availability of a central collection point in nine visited LGAs.

Table 4. 1: Availability of a Central Collection Point in Nine Visited LGAs

LGAs	Number of streets	Number of collection point/container required	Number of collection point/container present	Deficit	Percentage deficit
Kinondoni municipal	106	-	-	-	-
Ilala municipal	159	-	-	-	-
Mafia town	10	10	0	10	100%
Mtwara town	111	111	33	78	70%
Tanga city	181	35	29	6	17%
Kigoma municipal	68	78	30	48	61%
Mwanza city	175	84	60	24	29%
Ilemela municipal	171	48	15	33	69%
Kyela municipal	120	220	53	167	76%

Source: Auditor's analysis of the availability of the collection point/container

As shown in Table 4.2, Kinondoni and Ilala did not have collection points/containers. They prefer to use door to door waste collection approach. The reason for using this approach, according to the officials, was that allocation of central collection facilities attracted random dumping of the waste and thus the place becomes littered with mixed solid wastes.

Based on Table 4.2, Tanga and Mwanza cities have lower deficits of 17% and 29% respectively. The remaining LGAs have deficits ranging from 62% to 100%. Because of this situation, it is difficult for the LGA's to sort the waste which is a necessary process for recycling and re - using plastic wastes as stipulated in the National Solid Waste Management Strategy.

Furthermore, most of the places were found to have only one collection facility (i.e., skip bucket). These skip buckets were filled with mixed types of solid wastes. **Figure 4.3 (A&B)** shows examples of skip buckets containing a mixed solid waste including plastic waste products.

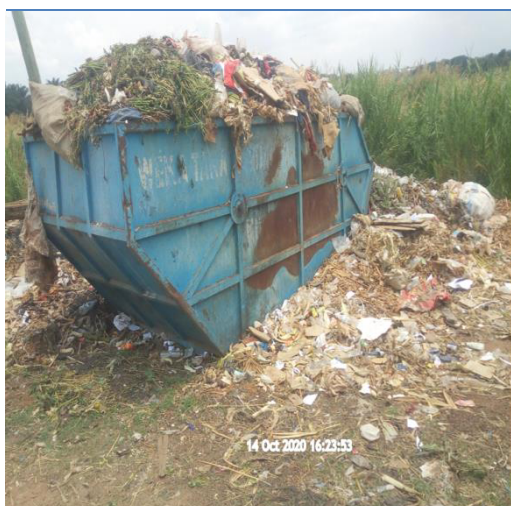


Figure 4.3 A: Examples of One Skip Bucket (Kigoma) which has been Used to Collect all Wastes Without Sorting by Municipal Teams. Photo taken on 14th October, 2020



Figure 4.3 B: Examples of One Skip Bucket (Mwanza) which has been Used to Collect all Wastes Without Sorting by Municipal Teams. Photo taken on 9th October, 2020

The presence of one collection facility at each collection point has led to indiscriminate dumping of solid waste leaving most of the area filthy. Due to having few or on solid waste collection facilities in the community, there has been a tendency for the community to illegally dump plastic waste products into rivers, streams, chanells and finally large lakes and the Ocean. A site visit conducted in Mwanza City Council found illegal dumping of waste along Lake Victoria shores as shown in **Figure 4.4 (A&B)**.



Figure 4.4 A: Plastic Waste Disposed off into the River Flowing Water into Lake Victoria, Mwanza. Photo taken on 1st July, 2020

Figure 4.4 B: Plastic Waste Deposited in Lake Victoria, Mwanza. Photo taken on 1st July, 2020

4.4.3 Disappointing communities to sort plastic waste

It was noted that, having no or few central collection facilities in the streets discouraged the communities from the practice of sorting plastic waste in their areas. It is a role of LGAs to encourage sorting of plastics to communities. However, according to the interviewed Officers, the Audit noted that LGAs did not provide a good environment for investing in the recycling business.

4.4.4 No estimates or projections exist for amount of plastic waste being generated, collected, and recycled

Section 21(1) the Environmental Management Regulation, 2009 requires the LGAs to furnish to NEMC on yearly basis information pertaining to the rate, types and composition of solid wastes generated, collected and the disposal methods employed within their areas of jurisdiction including plastic wastes. Also, the United Nations Environment programme (UNEP) emphasizes the importance of developing and maintaining a database on solid waste generated, collected, and recycled.

The review of the progress report (2017/18 to 2019/20) revealed that, all 9 visited LGAs did not have data or records on the amount of plastic wastes being generated, collected, and recycled in their areas. The only noted data recorded is the general Municipal Waste generated and waste collected. Since they have no data for the specific types of waste, it was difficult for LGAs to predict the amount of plastic wastes generated, collected, and recycled.

Based, on the Interview with the Environmental Officers from the visited LGAs, there is no study conducted for waste quantification and characterization to establish baseline data of waste types, quantities, and generation trends. On the other hand, the existing practice in LGAs for which sorting, or segregation is not done at the collection or transfer stations makes it even harder to predict amount of plastic waste.

The audit noted that at least Mwanza City Council through the Solid Waste and Environmental Management Department tried to conduct a Waste and Branding Audits (WABA) to identify waste brands and composition. Although WABA did not adequately help them in having updated information on the statistics of plastic waste generated in the area, it at least provided a glimpse of what was happening on plastic wastes.

Tanga City Council was found to use the information on the amount and composition of solid wastes produced through its Solid Waste Management Strategic Plan in 2014. According to the information the percentage of the generated plastic waste in Tanga was estimated to be 11.23% by weight of all solid wastes in the city. The solid waste physical composition survey conducted in Tanga City in 2014 revealed various amount of waste composition as shown in **Table 4.2**.

Table 4. 2: Solid Waste Composition

Source category	Remark	Composition (%)						
		Paper	Food waste	Wood & grass	Plastics	Sand & dust	Metals	Others
Household and Domestic waste	Average	7.4	14.5	29.4	7.4	7.4	32.4	1.5
Commercial SW and others	Commercial	10.3	30.9	20.6	20.6	12.4	0	5.2
	Institution	16.7	13.9	27.8	13.9	22.2	5.6	0

Source category	Remark	Composition (%)						
		Paper	Food waste	Wood & grass	Plastics	Sand & dust	Metals	Others
Street waste		2	8	18	3	60	0	9
General		9.1	16.8	24.0	11.2	25.5	9.5	3.9

Source: The Solid Waste physical composition survey conducted in Tanga City in 2014

Table 4.2 above indicates that, based on the study carried out in 2014 the indicative composition for plastic waste from the general waste in the year 2014 was 11.2%. The Table also shows that commercial activities produce more plastic waste (about 20.6 %) compared with other sources. The Institutions are seen to be the second highest producer of plastic waste as they stand at 14.0%.

Despite the aforesaid data being out of the scope of this audit, Tanga City uses them as the baseline for getting the status of composition of solid wastes generated for any financial year. Since these were the only available data at Tanga City, then the audit decided to use them to portray the picture of solid waste composition particularly plastic waste in Tanga City.

The absence of updated information on the amount of solid waste generated at the visited LGAs hindered the effectiveness of the LGAs to have strategies that address national solid waste strategy for managing plastic wastes. Also, it becomes difficult for the LGAs to demonstrate its capacity dealing with solid waste particularly plastic waste pollution in their area under their jurisdiction

Also, lack of statistics on plastic waste generated affects decision-makers ability to take actions on the associated problems as data concerning the status of plastics waste is unknown. This makes the enforcement a challenging task, it becomes more difficult to carry out information-based monitoring and enforcement. Furthermore, according to the interview the absence of regular updates of the information on the quantity of plastic waste generated in each LGA discourages investors. Interview with the officers from one of the plastic recycling industries in Mwanza revealed that, for the investor to be sure with the business they need to know the availability, rate, and quantity of plastic waste generated.

4.5 Lack of waste sorting to minimize the amount of waste disposed

The absence of segregation practices within the communities means that the achievement of 3Rs of waste continues to be haphazard. The audit noted that LGAs did not make available any plans or reports suggesting that such segregation practices were carried out. The review of progress reports for all visited LGAs indicated that disposal of solid waste remained the most favoured solution to the management of solid waste instead of waste minimization and reduction.

Lack of segregation of solid waste at the generation and collection points led to the following:

4.5.1 Reduction of the life span of the landfill because of the unwanted Plastic Waste dumped in

It was observed that lack of sorting practice at the collection or waste transfer stations has been an encouraging factor for transferring plastic waste products to the landfills. Through physical verification, the audit noted the lack of a culture to sort valuable plastic items in most of the communities covered in this audit. Thus, the LGAs, in a course of promoting recycling and re- use, are expected to encourage the community to adopt sorting and recycling practices as the best practises. On the other hand, the audit noted that LGAs did not provide enabling environment for investors to invest in the area of recycling of plastic waste to reduce the amount of waste entering the landfill.

Visits to four LGAs (Tanga CC, Mwanza CC, Kigoma, and Mtwara MC) noted that, these LGAs owned newly constructed standardized sanitary landfills. However, due to lack of sorting of waste at the point of generation, the rate of piling up of solid waste at the visited landfill was high and thus threatening the lifespan of the landfill. **Table 4.3** shows the result of analysis made on the impact of disposing recycled plastic waste in landfills.

Table 4. 3: Life Span for the Newly Constructed Landfills

LGAs	Cost (Billio n) of the landfi ll (TZS)	Number of sub cells			Time flame		
		Total Sub cell	Sub Cell Full	Sub Cell Rema ined	Commence ment date	Date for Physical Observation	Planne d time of servic e (year)
Kigom a	6	3	1	2	30/10/2019	14/10/2020	30
Mtwar a	6	2	1	1	01/02/2017	03/12/2020	15
Tanga	9	6	1	4	10/05/2020	02/10/2020	35
Mwanz a	9	6	1	5	06/12/2020	09/10/2020	45

Source: Design report of landfill and physical observation.

Table 4.3 shows that the life span of the landfill for Kigoma, and Mtwara Municipalities has shortened due to bulk disposal of solid waste into the landfill including recyclables.

Moreover, Table 4.3 indicates that, Kigoma commenced using newly landfill on 30th October, 2020. However, up to December, 2020 Kigoma MC had one out of 3 sub-cells that were completely full. Also, Mtwara had 1 out 2 sub-cells that was completely full. This implies that, the two municipalities had utilised almost half of their landfills lifespan within 1 to 3 years.

This indicates that the lifespan of the newly landfills have been highly shortened and will not attain their designed lifespan. Shortened lifespan means the government will need to allocate funds for constructing new landfills. This cost could have been avoided if the recycled materials such as plastic waste were not disposed into the landfills.

4.5.2 Increase in the landfill operation cost

LGAs incur costs for transportation of solid waste from town to the landfill points; spreading and compacting solid waste at landfill cell, and fuel. The audit is of the view that these costs can be reduced if the amount of solid waste transported to landfills could be reduced through sorting and recycling plastic waste instead of disposing it to the landfill.

Table 4.4 indicates the operational cost for collection and disposal of solid wastes.

Table 4.4: Operational Cost (in million) for Collection and Disposal of Solid Waste 2019/20

SN	Activity	Annual cost (million) of the Visited regions (TZS)			Total (million)
		Tanga	Mwanza	Mtwara	
1	Services and repairs and Fuel and lubricants	39	242	95	376
2	Service and Maintenance	39	297	8	344
Total		78	539	103	720

Source: Auditor analysis of collection and disposal of solid waste at the landfill operation.

Table 4.4 shows the operational cost for collection and disposal of solid waste in Tanga, Mwanza and Mtwara. The table indicates that, the expenditure was about TZS 720 million. This amount was just for three regions. Table 4.4 also indicates that, Mwanza City spent TZS 539 million being the highest amount compared with the rest of the regions.

Generally, the audit team is on the view that this amount could have been reduced if the amount of solid waste collected and transported to landfill were reduced through re-use and recycling of waste such as plastic waste instead of disposing all the waste to the landfill.

CHAPTER FIVE

FINDINGS ON COORDINATION, MONITORING AND EVALUATION

5.1 Introduction

This chapter presents findings on the coordination of activities undertaken by VPO-E, PO-RALG, NEMC, and LGAs.

5.2 Inadequate Monitoring and Evaluation of Performance of LGAs by PORALG

Monitoring is an important aspect designed to keep a check on the implementation and thus give feedback on the achievement made on national strategies for reduction, re-use, and recycling of solid waste, particularly plastic waste to prevent pollution in major lakes and the Ocean. According to PO-RALG strategic plan (2016/17 - 2020/21), the PO-RALG is required to monitor and evaluate any activities undertaken by LGAs.

In that regard, PO-RALG was expected to monitor the performance of LGAs towards managing the control of plastic waste pollution in major lakes and the Ocean. However, review of monitoring and evaluation report for the financial years from 2017/18 to 2019/20 revealed that, PO-RALG did not adequately monitor the performance of LGAs in protecting major Lakes and Ocean from plastic waste pollution.

, According to the documents review PO-RALG did not ensure that each LGA was implementing the National Solid Waste Management Strategies at their respective areas. Lack of ensuring the implementation of National Solid Waste was due to the fact that, PO-RALG did not adequately own the responsibility for monitoring the implementation of National strategies set out by VPO for LGAs to implement. In the absence of a plan, targets, and timelines for waste reduction and waste recycling, PO-RALG and VPO could neither focus efforts on waste reduction nor have a clear picture as to whether waste was actually being reduced to protect major Lakes and Ocean from plastic waste pollution.

The following are the causes of inadequate monitoring of the performance of LGAs on protecting major Lakes and Ocean from plastic waste pollution.

5.2.1. PO-RALG Strategic Plan (2016/17-2020/21) did not address Solid Waste Management Strategies for 3RS

Review of the National Solid Waste Management Strategy (2018) and PO-RALG strategic plan (2016/17 - 2020/21) noted that PO-RALG's Strategic Plan did not have targets aligned to National Solid Waste Management Strategy, particularly for controlling plastic waste pollution in the environment.

The following are the national targets that PO-RALGs Strategic Plan was supposed to be aligned to:

- a) Long-term-goals: achieve approximately 80% waste recovery (re-use, recycling, composting and energy recovery) and 20% land filling in a sanitary land fill (inert material) by 2030.
- b) Medium-term: goals achieve 50% waste recovery (re-use, recycling, composting and energy recovery) and 50% semi-land filling by 2025.
- c) Short-term goals: achieve 30% waste recovery (re-use, recycling, composting) and 70% controlled dumping (tipping, compacting, and covering).

Given the presence of these plans, PO-RALG did not interpret and incorporate National Solid Waste Management Strategy into their own strategic plan. This is contrary to the functions and organisation structure of the PMO-RALG (approved by the President on 12th February, 2015).

Based on interviews with Officials at PO-RALG, it was noted that this can not be achieved because of shortage of qualified staff for that sector especially those with qualifications on environmental discipline. The Division of Environment was noted to comprise of only two division staff members dealing with environmental issues in the country.

Lack of strategic targets that align with National Solid Waste Management Strategy will lead to failure in achieving overall strategically goals. Those goals include: protection of human health; reduction of poverty; reduction of waste management costs and protection of the environment.

5.2.2. Lack of Performance Indicators

Based on reviewed progress reports, it was noted that, PO-RALG did not have performance indicators, which are impact oriented, to track the performance of LGAs on the control of plastic waste pollution in major lakes and the Ocean. PORALG had fewer priorities in terms of budget and tools on issues related to protection of major lakes and the Ocean from plastic waste pollution. The lack of performance indicators has denied PO-RALG an opportunity to verify LGAs performance in this area.

5.2.3 Lack of comprehensive and continuously updated database

Based on reviewed progress reports, it was noted that, PO-RALG did not have a comprehensive and continuously updated database containing the records of LGAs' performance management of solid waste in their areas.

This denied PO-RALG an opportunity of monitoring the amount of plastic waste being generated by each LGA. Best practices emphasize the need for data gathering, analysis and maintenance for detailed national database on waste.

According to officials of the Ministry and the review of progress report for the financial year of 2017/18, 2018/19 and 2019/20, it was noted that, PO-RALG did not develop a database for recording environmental issues. It was expected that, PO-RALG would be documenting and analysing the performance of LGAs to establish the trends and categorize LGAs who needed immediate attention. Lack of sufficient information limited PO-RALG's ability to analyse issues and take proper action towards achieving the national goals on controlling plastic waste pollution in the environment.

5.3 Coordination of VPO and key stakeholders

5.3.1 Inadequate coordination between VPO and PO-RALG

Based on the interviews with officials and from reviewed VPO annual reports, the audit noted that VPO lacked information on implementation status of the national strategies on waste reduction, re-use, and recycling. The strategy was developed by VPO. While the reduction of plastic waste was a VPOs' desirable goal in their strategic plan, this goal was not monitored.

Inadequate of monitoring was because, the existing information systems at VPO were insufficient to tackle problems related to reduction, re-use, and recycling of plastic waste. VPO also did not receive formal reports from LGAs providing information on the implementation of national targets for control of plastic waste pollution.

Inadequate coordination between VPO and PO-RALG denied VPO the opportunity to have updated statistics on generation of plastic waste. As a result, VPO was not able to prepare and develop reports on the extent of achieved goals and targets. Because of the lack of statistical information, VPO is also unable to identify and map out the extent of the problem and the key routes or sources of waste.

5.3.2 Inadequate International Cooperation

Environmental pollutions do not recognize geo-political boundaries; therefore, international cooperation is inevitable to curb the plastic waste. Tanzania (through VPO) has ratified several multilateral environmental agreements. Some of the prominent agreement related to waste includes the Basel Convention and the Bamako Convention. These agreements required the parties to be committed to strictly supervising waste management during its storage, treatment, recovery, and final disposal.

The audit noted that, in the coastal area of Tanzania, there have been deposits of plastics waste brought by ocean currents from the neighbouring countries. These deposits could be identified by the brands and labels on the collected plastic. The foreign plastic wastes were more prominent in the coastal areas of Mafia and Zanzibar. This calls for joint regional efforts to strengthen the cooperation toward implementing the regional agreement for protection of major lakes and oceans.

The audit team did not find any action taken by the VPO to collaborate with the counterpart countries on the control of these plastics waste. In addition, there were no research initiatives undertaken to understand the extent of the problem. Because of this weakness in cooperation, plastic waste from foreign counties has been continuously flowing into Tanzanian beaches. Weak implementation of international agreements may also affect international monitoring and control systems as some waste operators

bypass international convention to commit illegal dumping of plastics in the ocean. Furthermore, insufficient information exchange hampered the efficient enforcement for contracting countries.

CHAPTER SIX

CONCLUSION

6.1 Introduction

This chapter presents the audit conclusions based on the findings as presented in chapters 3, 4 and 5 of this report. The conclusion forms two parts namely, general, and specific conclusions as detailed below:

6.2 General Conclusion

Despite the fact that the Government of Tanzania has undertaken some interventions to prohibit the use of plastic carrier bags in the country, there is still a need for more interventions. This need for intervention is especially crucial in the other types of plastic materials that have shown significant impact in major lakes and the ocean. This also includes the need to assess and monitor the extent of plastic contents in the materials used for the production of the currently accepted non-woven carrier bags. Control of plastic waste pollution in major lakes and the ocean is not sufficiently executed to prevent degradation of aquatic species and health risks associated with exposure to plastic Waste pollution.

Based on the facts presented in the findings chapters, the audit concludes that the Vice President's Office and the President's Office Regional Administration and Local Government are not efficient in ensuring effective protection of major lakes and the ocean from plastic waste pollution in Tanzania. This is because most of the visited LGAs neither implemented the National Solid Waste Management Strategy nor plans for managing plastic waste pollution.

Currently, the focus of the visited LGAs is only on the disposal of solid waste. There was bulk disposal of solid waste including recyclables. Bulk disposal results from lack of waste sorting by those who handle it. Sorting could significantly minimize waste disposal.

6.3 Specific conclusions

The following are specific conclusions:

6.3.1 Implementation of Environmental Control Measures by LGAs and NEMC

- i. The findings show inadequate implementation of control measures to protect plastic waste pollution in lakes and the ocean. This was caused by absence of effective strategies for implementing 3Rs hierarchy (Reduction, Re-use and Recycling) as stipulated in the National Solid Waste Management Strategies.
- ii. LGA's do not conduct comprehensive periodical assessment of the amount of waste generated, to ascertain major waste type that end up in the lakes and the ocean.
- iii. LGA'S/NEMC do not conduct effective awareness campaigns to the communities in order to educate them about the effects of the plastic waste pollution on the major lakes and Ocean and proper implementation of the 3Rs (reduces, reuse and recycle). The clean ups campaigns which are useful tool in enhancing public awareness and reducing the amount of waste entering lakes and Ocean are no longer conducted regularly. Also, monitoring and evaluation programs to check whether the program was effective and had contributed to improving waste management are not adequately conducted.
- iv. Coordination between LGAs and NEMC is not adequate to facilitate proper enforcement to manufacturers/producers to exercise their responsibilities of collecting plastic waste products from the environment. This has led to continued input of plastic pollution in major lakes and the Ocean to an unprecedented rate.

6.3.2 Monitoring and Evaluation of performance of LGAs by PO-RALG

- i. The PO-RALG does not effectively monitor and evaluate implementation of objectives and targets relating to plastic waste management. There are no indicators designed to measure the LGAs

performance effectiveness towards the management of plastic waste pollution in the environment.

- ii. Important aspects for measuring the effectiveness of strategies like implementation of 3Rs hierarchy (reduction, re-use and recycling) as stipulated in the National Solid Waste Management Strategies were not included in their monitoring and evaluation plan.
- iii. There was no short term and long-term evaluation of LGAs performance towards implementing the National Solid Waste Strategies for managing plastic waste pollution with clearly defined targets as well as timelines for the achievement of targets.

6.3.3 Coordination in Control of Plastic Waste Pollution by VPO

Lack of a formal mechanism for discussion between PO-RALG and VPO has contributed to inadequate protection of major lakes and the Ocean from plastic waste pollution. In addition, lack of effective collaboration with regional and international bodies has contributed to plastic waste pollution in major lakes and Ocean. There was no clear plan to engage local researchers and innovators to bring the know-how in helping understand the amount of plastic already present in the environment. Most of the few conducted research works were limited in scope and coverage.

CHAPTER SEVEN

RECOMMENDATIONS

7.1 Introduction

This chapter presents recommendations directed to President's Office - Regional Administration and Local Government, Vice President's Office, National Environmental Management Council and Local Government Authorities on what could be done to improve control of plastic waste pollution in major Lakes and Ocean.

The National Audit Office believes that, these recommendations need to be fully implemented to improve the way management controls the plastic waste pollutions.

The National Audit Office acknowledges the Governments' efforts through President's Office - Regional Administration and Local Government, Vice President's Office, National Environmental Management Council and Local Government Authorities towards improving management control of the plastic waste pollution in major lakes and Ocean. However, VPO, NEMC, PO-RALG and LGSs needs to come up with more interventions to improve the management of control of plastic waste pollution in major Lakes and Ocean. This step will enable them contribute significantly towards attaining national goals.

7.2 Recommendations to the audited entities

7.2.1. Recommendations to Vice President's Office

The Vice President's office should:

- i. Develop a formal mechanism to involve PO-RALG on implementing the National Strategies for Solid Waste Management including plastic waste management.
- ii. Develop mechanisms to monitor the performance of LGAs through PO-RALG on the implementation of National Solid Waste Strategy and ensure the aforesaid mechanism is effectively implemented and reported;

- iii. Strengthen the strategies to ensure effective collaboration with regional and international bodies to address the issues of plastic waste pollution in major lakes and ocean;
- iv. Consider carrying out Strategic Environmental Assessment and research on macro- and micro plastics in potential environmental compartments such as water; sediments; and organisms of all major and small lakes and ocean including rivers and estuaries, and use data obtained to guide formulation of sustainable solutions;
- v. Issues directive that requires the designer of plastic and packaging material to produce the recyclable plastics; and
- vi. Encourage the government to develop an economic incentive for those who are involved in the plastic recycling business.

7.2.2 Recommendations to the President's Office - Regional Administration and Local Government

The President's Office - Regional Administration and Local Government should:

- i. Prepare short- and long-term plans that align with National Solid Waste Management Strategy for managing plastic waste pollution with clearly defined targets and timelines for the achievement of targets;
- ii. Ensure that LGAs prepare short- and long-term plans that addresses the National Solid Waste Management Strategy and ensures plans are clearly defined in numerical targets as well as timelines for the achievement of targets;
- iii. Ensure that LGAs carry out, periodically, a comprehensive assessment of the amount of generated waste, according to the major waste type in their respective areas.
- iv. Ensure stakeholders are involved in this exercise so that a comprehensive database is generated for aiding policymaking, strategies, and interventions;

- v. Develop and implement awareness campaigns to the communities in order to educate them about the effects of plastic waste pollution on the major lakes and ocean and proper implementation of the ‘3 Rs’ (reduce, reuse and recycle).
- vi. Through LGAs develop a recognition mechanism that tracks waste pickers so that recycling work becomes more organized; and
- vii. Develop performance indicators for regularly monitoring LGAs’ performance towards implementing National Waste Management Strategy.

7.2.3 Recommendations to the National Environmental Management Council.

NEMC should,

- i. Improve coordination, information sharing and communication between NEMC and LGAs by strengthening infrastructure for information sharing;
- ii. Strengthen and implement coordination mechanisms between LGAs and NEMC that will facilitate enforcement to manufacturers/producers to exercise their responsibilities of collecting plastic waste products in the environment; and
- iv. Enforce the mechanisms to prohibit uses of the plastic as wrapping materials and recommend appropriate carry bag products which are accessible and affordable.

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APPENDICES

Appendix 1: Responses from the Audited Entities

This part covers the responses from the three audited entities namely, the VPO, NEMC and PO-RALG. The responses are divided into two i.e. general comments and specific comments in each of the issued audit recommendations. The detail is as shown in appendices 1(a, b and c below:

Appendix 1(a): Responses from the Vice President's Office

General Comment

NONE

Specific Comments

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
1	Develop and implement a formal mechanism to involve PO-RALG on implementing the National strategies for Solid Waste Management including plastic waste management.	- The VPO takes note of the Auditor's recommendation. - The formal implementation mechanisms is provided in the Environmental Management Act, 2004 (part iii, sections 11-41) provides for institutional framework for environmental management in the country which establish formal implementation mechanism between the VPO, PO-LARG and other sectors as demonstrated in	- To review and approve Waste management strategy - To direct PO-RALG to develop action Plan for the implementation of the Strategy - To develop guideline for mainstreaming waste management in the LGAs Plans - Develop capacity Building on waste management - Train REME, DEMO, MEMO on implementing strategic	By July 2022 By July 2022 By Dec 2021

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
		the figure below. The direct operational role on management of specific environmental services and waste management is conferred to sector Ministries and Local Government Authorities. • However, the challenge remains at LGA level due to limited capacity on human and financial resources.	intervention in waste management strategy	
2	Develop and implement mechanisms for monitoring the performance of LGAs through PO-RALG on the implementation of National Solid Waste Strategy and ensure the aforesaid mechanism is effectively implemented and reported;	• The VPO takes note of the Auditor's observation and recommendation. • The mechanism to monitor performance of LGAs on environmental matter is provided in the EMA 2004 34, 42 (2) (RE 2016), 42 (3) • Environmental (Solid Waste Management) Regulations, 2009 provides for the mechanism for implementation, enforcement and reporting of Solid waste Management. The regulations further provide for	Develop Monitoring and evaluation guideline for LGAs performance to manage solid waste including plastics	By September 2021

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
		the duty and obligations of LGAs in Solid waste Management. • However, there has been challenges in monitoring performance due to inadequate financial and human resources • Joint efforts are in progress between the VPO and PO-RALG to strengthen coordination and monitoring of LGAs in implementation of EMA including management of solid waste and plastics.		
3	Strengthen the strategies to ensure effective collaboration with regional and international bodies to address the issues of plastic waste pollution in major lakes and ocean;	• The VPO takes note of the Auditor's observation and recommendation. • The URT is a party to a number of MEAs and Regional Cooperations which dress issues of environmental pollution plastics inclusive. These including: Convention on Sustainable Management of Lake Tanganyika; the Basel Convention on the Control of Trans-	To domesticate the already developed Regional Marine Litter Action Plan.	By March 2022

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
		boundary Movements of Hazardous Wastes and their Disposal; the Bamako Convention on control of trans-boundary movements of hazardous wastes within the African continent; and the Nairobi Convention. • With regard to management of plastic waste in the East Africa Region, So far, Burundi, Kenya, Rwanda and Tanzania have fully enforced the ban on the manufacture of single use plastic and plastic carrier bags. • Tanzania will continue to Collaborate with other countries in region and share experience in the control of plastic wastes to facilitate reduction of plastic waste that ends up in Rivers, Major Lakes and the Oceans.		
4	Consider carrying out Strategic Environmental Assessment and research on	• The VPO take note of the Auditor's observation and Recommendation. •	• Develop mechanism to promote research on Macro and	By March 2022

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
	macro- and micro plastics in potential environmental compartments such as water; sediments; and organisms of all major and small lakes and ocean including rivers and estuaries, and use data obtained to guide formulation of sustainable solutions;	• According to EMA, 2004 Strategic Environmental Assessment (SEA) applies to bills, regulations, policies, strategies, programmes and plans. • The VPO recognizes that, generation of data and information on the concentration of plastics and micro-plastics in water bodies is of paramount importance since it informs realistic interventions in addressing pollution. In this regard, the VPO will continue promote research and assessments of plastics and micro-plastics in water bodies through academic and relevant research institutions.	micro plastic in water bodies • Develop status update on Plastic pollution in aquatic environment.	
5	Issues and ensure the implementations of the directives that requires the designer of plastic and packaging material to produce the	• The VPO take note of the Auditor's observation and Recommendation. • However, issuance of directives to designers of plastic and packaging materials on production of	• Finalising guideline for Reduce, Reuse, Recycle (3R). • Request TBS to set Standards for recycled plastics	By July 2021

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
	recyclable plastics.	recyclable plastic is not under the mandate of the VPO. Matters with issuance of standards to producers are vested with the Tanzania Bureau of Standards. • The VPO has been promoting recycling and re-use of plastic bags. The VPO is in the process of developing guideline for Reduce, Reuse, and Recycle (3R). • Take back and recycling of plastic bottles (extended producer responsibility) by the producers (industry) is anchored in the Solid Waste Regulation, 2009.		
6	Encourage the government to develop an economic incentive for those who are involved in the plastic recycling business.	• The VPO take note of the Auditor's observation and Recommendation on development of economic incentives on plastic recycling business. • The VPO will continue to promote and encourage investment in plastic recycling business however, issues regarding	To consider the issues of Plastic recycling in the environmental conservation awards	Dec 2022

No.	Recommendation	VPO- Comment(s)	Action(s) to be taken	Timelines
		“economic incentive” require high level policy decision.		

Appendix 1(b): Responses from PO-RALG

General comment

PORALG has the mandate to make sure that LGAs are implementing the policies, strategies, guidelines and services delivery standards set by sector ministries. The solid waste management and the 3Rs strategies cited in the audit are supposed to be finalised and approved by VPO and submitted to PORALG for the actual dissemination and implementation at the lower levels.

Specific Comments

No.	Recommendation	PO-RALG's Comment(s)	Action(s) to be taken	Timelines
1	Prepare short- and long-term plans that align with National Solid Waste Management Strategy for managing plastic waste pollution with clearly defined targets as well as timelines for the achievement of targets;	Noted however, PORALG has not yet received the National Solid Waste Management Strategy from the responsible Ministry i.e. Vice President's Office - (VPO)	PORALG will prepare short- and long-term plans that align with National Solid Waste Management Strategy for managing plastic waste pollution after receiving the approved strategy from VPO	Subject to the approval of the solid waste management strategy by VPO
2	Ensure that LGAs prepare short- and long-term plans that addresses the National Solid Waste Management Strategy and ensure that the plans clearly define numerical targets as well as timelines for the achievement of targets;	The recommendation is noted but, PORALG has not yet received the National Solid Waste Management Strategy from VPO	PORALG will ensure that LGAs prepare short- and long-term plans that addresses the National Solid Waste Management Strategy after receiving the approved strategy from VPO	Subject to the approval of the solid waste management strategy by VPO

No.	Recommendation	PO-RALG's Comment(s)	Action(s) to be taken	Timelines
3	Ensure that LGAs carry out, periodically, a comprehensive assessment of the amount of waste being generated, according to the major waste type in their respective areas.	The recommendation is noted	PORALG will issue directives to LGAs through Regional Secretariats to ensure that LGAs carry out, a comprehensive assessment of the amount of waste being generated, according to the major waste type in their respective areas.	Financial year 2020/21 (April 2021)
4	Ensure stakeholders are involved in this exercise so that a comprehensive database is generated for aiding policymaking, strategies, and intervention;	The recommendation is noted	PORALG will ensure that all key stakeholders are involved during the development of the database	In financial year 2021/22
5	Develop and implement awareness campaigns to the communities in order to educate them about the effects of plastic waste pollution on the major lakes and ocean and proper implementation of the '3 Rs' (reduce, reuse and recycle).	The recommendation is noted	PO RALG in collaboration with VPO will develop the awareness campaign to the communities to educate them on the effects of plastic waste pollution for further implementation by LGAs	Financial year 2021/22
6	Through LGAs develop a recognition	The recommendation is noted	PORALG will direct the LGAs to develop a	Financial year 2021/22

No.	Recommendation	PO-RALG's Comment(s)	Action(s) to be taken	Timelines
	mechanism to rag pickers so that recycling work becomes more organized; and		mechanism to rag pickers	
7	Develop performance indicators for regularly monitoring performance of the LGAs towards implementing National Solid Waste Management Strategy.	The performance indicators will be developed based on the National Waste Management Strategy which has not yet availed to PORALG by the VPO	Noted. PORALG will monitor performance of the LGAs towards implementing National Waste Management Strategy after receiving the approved solid waste management strategy from VPO and Performance indicators.	Waiting for performance indicators from VPO.

Appendix 1(C): Responses from NEMC

NONE

Specific Comments

No.	Recommendation	NEMC's Comment(s)	Action(s) to be taken	Timelines
1	Improve coordination, information sharing and communication between NEMC and LGAs by strengthening infrastructure for information sharing;	Noted for improvement. The function of each has been stipulated in EMA 2004 and is coordinated by Director for environment. NEMC has established 9 Zones where Zonal Managers have direct communication and interactions with LGAs. LGAs are engaged fully in the EIA/EA process	Establish more zones Continue with awareness creation	On going
2	Strengthen and implement coordination mechanisms between LGAs and NEMC that will facilitate enforcement to	Noted for improvement.	Continue with awareness creation.	On going

No.	Recommendation	NEMC's Comment(s)	Action(s) to be taken	Timelines
	manufacturers/producers to exercise their responsibilities of collecting plastic waste products in the environment; and			
3	Enforce the mechanisms to prohibit uses of the plastic as wrapping materials and recommend appropriate carry products which are accessible and affordable.	Noted for improvement. Continuous awareness to manufacturers and users of exempted plastic packaging on compliance to the requirements of Environmental Management (Prohibition of Plastic Carrier Bags) Regulation of 2019 is done. Promotional of locally made paper products from Mufindi Paper Industries is done to users and suppliers of plastic packaging materials	Continue with awareness creation. Enforce effectively the principles of environmental protection such as polluter pays principles and producer extended responsibility. Promote the use of biodegradable packaging materials	On going

Appendix 2: Method for data collection, Data analysis and regions visited during data collection

Appendix 2(A): Officials interviewed and reasons for their interviews

	Interviewee	Reasons
VPO-Environment	• Director of Environment • Environmental Officers	• To get information about coordination in ensuring adequate management of control of plastics waste pollution to major Lakes and Ocean. • To get information about monitoring the performance of NEMC.
PO-RALG	• Director-Sector Coordination • Assistant Director-Social Services • Social Services officers	• To get information about coordination in ensuring adequate Control of plastics waste pollution to major Lakes and Ocean in all LGAs. • To get information about monitoring the performance of LGAs
NEMC	• Director of Environmental Compliance and Enforcement • Zonal Manager • Technical staff	• To understanding their efforts in the implementation of the control activities to ensure that the Lakes and Ocean are protected from being Damaged by Plastic waste. • To understand the challenges their causes
LGAs	• Head of Department of Solid Waste and Environment • Cleansing officer • Environmental management Officers	• To understanding efforts made in the implementation of the control activities to ensure that the Lakes and Ocean are protected from being Damaged by Plastic waste. • To understand the challenges and their causes
Marine Park reservation Unit (MPRU)	• Manager-MPRU • MPRU-officers	• The impact of plastics waste into the marine reserved areas • Causes of the plastics waste pollution into marines reserved areas • The coordination between MPRU and NEMC and LGAs

Appendix 2(B): List of documents reviewed and reasons for the review

Category	Name of Document	Reason
Policy	-National environmental management policy 1997 -National Water Policy, 2002 -Sustainable Industrial Development Policy, 1996	To extract the information that will enable the audit team to evaluate the performance of the audited entities on achieving the directives of the policies
Legislations (Law & regulations)	Environmental Management Act 2004, Act No. 20 of 2004 Local Government (Urban Authorities) Act No. 8 of 1982, Tanzania and By-Laws Water Resources management Act, 2009 The Environment Management (Prohibition of Plastic Carrier Bags) Regulations, 2019	To extract the criteria for measuring the performance of the audited entities.
Strategic Plans	Strategic plans from VPO, NEMC and LGA's	To extract the criteria for measuring the performance of the audited entities.
Reports	Monitoring and Evaluation Reports. Progress Report	Evaluate the progress of implementing the planned activities
Guidelines on management control of industrial and plastic waste pollution	Guidelines	To find out if responsible authorities have these guidelines in place and if they follow the directives given in these guidelines.
Activity Plans	Annual Activity Plans for 2016/17 to 2019/20	To gain an understanding of the planned activities.
Budget	Approved Medium Term Expenditure Framework for the year 2016/17 to 2019/20	To find out how the Ministries allocate resources to the management control of industrial and plastic waste pollution into major Lakes and Ocean.

Appendix 2(C): Methods used for data analysis

Methods	Analysis
Quantitative	- The data were quantitatively analysed and compiled using various software of data analysis such as Microsoft Excel. Then the analysed data will be presented through different ways including using data tabulations in tables, histograms, line graphs and percentage distribution - Also, the qualitative analysis was employed to analyse some of the interview questions
Qualitative	The data were <i>qualitatively</i> analysed and compiled. The document reviews and Interview results will be tabulated and analysed to compare the responses of various interviews

Appendix 2(D): List of regions visited during data collection

Zone	Region to be visited	Place/Location to be visited	Category of Lakes and Ocean	LGAs to be covered	Category
Coastal	Dar es Salaam	-Beaches -Inlet rivers -Mbudya island	Marine water	Kinondoni	Municipal
				Ilala	Municipal
	Pwani	-Mafia Island -Juani isle beaches	Marine water	Mafia	Town
	Mtwara	Beaches -Inlet rivers	Marine water	Mtwara	Municipal
	Tanga	Beaches -In let rivers	Marine water	Tanga	City
Western	Kigoma	-beaches and inlet rivers (Malagarasi)	Fresh water (Lake Tanganyika)	Kigoma	Municipal
Lake zone	Mwanza	beaches and inlet rivers	Fresh water (Lake Victoria)	Mwanza	City
				Ilemela	Municipal
Southern Highlands	Mbeya	beaches and inlet rivers (Songwe)	Fresh water (Lake Nyasa)	Kyela	Town

Appendix 3: Audit Questions

1.0	Do NEMC and LGAs effectively enforce prohibition of plastic carrier bag?
1.1	Does NEMC ensure that the manufacturers of plastics carrier bags comply with the issued restriction order?
1.2	Does NEMC ensures that the importation of carrier bags is well controlled at the entry borders?
1.3	Do NEMC and LGA ensure that locally manufactured and imported non-woven plastic bags and other plastic products comply with established standards?
1.4	Do LGAs put control measures ¹⁰ to ensure less amount of plastic waste are released into Lakes and Ocean?
1.5	Do NEMC and LGA exercise extended producer responsibility principle so that producers and manufacturer of plastic products are responsible for collection and recycling of their generated plastics?
1.6	Does LGA adequately conduct awareness campaign to ensure the community in respective areas are sensitized on impacts of plastics products to the environment?
2.0	Do LGAs have adequate disposal and recycling facilities for plastic waste to encourage recovery of plastic?
2.1	Do LGAs have proper facilities to support the segregation of plastic waste at the generation and storage points?
2.2	Do LGAs have adequate facilities and equipment for handling plastic-waste (collection, storage, transportation, treatment or disposal) to encourage plastic recycling?
2.3	Do the existing waste disposal sites available at LGAs support easy recovery of plastics waste?
3.0	Do LGAs have appropriate data collection systems to estimate on the quantity and type plastics products in circulation in their areas of jurisdiction?
3.1	Do LGAs have reliable systems for predicting the amount of plastics waste generated and collected?
3.2	Do LGAs assess its plastic waste recycling capacity for all generated Plastic waste?
3.3	Did LGAs use the result of the information in 3.2 to prepare the action plans and strategies to increase their capacity to recycle, and reduce plastic waste?
3.4	Do LGAs, NEMC adequately manage both formal and informal recyclers of plastic waste?

¹⁰ As part of encouraging best practices of prevention, minimization, reuse, recycling, energy recovery and disposal.

3.5	Do LGAs have developed systems for collecting data of the amount of plastic waste collected and recycled by the existing recycling plant?
3.6	Does the LGA validate the data on plastic waste received from the recycling plant to ensure that are timely, relevant, and reliable?
4.0	Do VPO-DoE and NEMC adequately coordinate with other sector ministries (through MPRU, BWBs and LGAs) in the management of control of plastic waste?
4.1	Does VPO develop national strategies or policies exclusively for encouraging circular economy?
4.2	Has NEMC/VPO developed plastic recycling targets and targets for the prevention and reuse of plastics to reduce the use of plastics in the country?
4.3	Has VPO and NEMC estimated quantity of Plastic waste being generated in the county and its associated risks to environment/health?
4.4	Do VPO and NEMC put in place a well-defined reporting arrangement for sharing of information on plastic waste for effective control?
4.5	Is the existing information-sharing framework between NEMC, LGA and MPRU functioning well for easy control of plastic pollution into major Lakes and Ocean?
5.0	Does PO-RALG adequately monitor and evaluate performance of LGAs in the Management of Control of Plastics Waste in Major Lakes and Ocean?
5.1	Did the PO-RALG develop indicators for measuring the efficiency, effectiveness and impact of the LGAs programme on the control of plastic waste?
5.2	Did the available indicators inform a detailed process vision/path on how the LGAs ought to address the challenges facing control of plastics waste implementation in Tanzania?
5.3	Did PO-RALG establish and maintain a computerised information system (database) which consists of a broad spectrum of up-to-date information on the performance of LGAs in Tanzania?
5.4	Did the available systems designed to facilitate monitoring the LGAs programme have success towards achieving the vision of the nation on control of plastics waste?