THE UNITED REPUBLIC OF TANZANIA

NATIONAL AUDIT OFFICE

PERFORMANCE AUDIT REPORT ON PROVISION OF SEWAGE SERVICES IN URBAN AREAS

AS PERFORMED BY
THE MINISTRY OF WATER AND IRRIGATION AND PRESIDENT'S OFFICE - REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

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

MARCH 2018

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PREFACE

The Public Audit Act No. 11 of 2008, Section 28 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 expenditure or use of resources in the Ministries, Departments and Agencies (MDAs), Local Government Authorities (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 His Excellency the President of the United Republic of Tanzania, Dr. John Pombe Joseph Magufuli and through him to the Parliament of the United Republic of Tanzania the Performance Audit Report on the Management of Provision of Sewage Services in Urban Areas. The main audited entities are the Ministry of Water and Irrigation and the President's Office - Regional Administration and Local Government.

The report contains findings, conclusions and recommendations that have focused mainly on improving the system for provision of sewage services in urban areas on areas such as sewage service provision, coordination of sewage services among different actors, and monitoring the performance of UWSSAs and LGAs in order to ensure effectiveness in the provision of sewage services in the country.

The Managements of the Ministry of Water and Irrigation and the President's Office - Regional Administration and Local Government were given the opportunity to scrutinize factual contents of the report and come-up with comments. I wish to acknowledge that discussions with the two audited entities have been very useful and constructive in achieving the objectives of this particular audit.

My office intends to carry out a follow-up audit at an appropriate time regarding actions taken by the audited entities in relation to the recommendations of this report.

In completion of the assignment, the office subjected the report to the critical reviews of two subject matter experts, Dr. Shaban Mgana, Senior Lecturer of the University of Ardhi and Prof. Karoli Nicholas Njau, Senior Lecturer of Nelson Mandela African Institution of Science and Technology who came up with useful inputs on improving the output of this report.

This report has been prepared by Mr. Frank Mwalupale – Team Leader and Mr. Deogratius Shayo – Team Member under the supervision and guidance of Ms. Asnath L. Mugassa – Audit Supervisor, Eng. George C.

Haule – Assistant Auditor General and Ms. Wendy W. Massoy – Deputy Auditor General.

I would like to thank my staff for their assistance in the preparation of this report. My thanks should also be extended to the audited entities for their fruitful interactions with my office.

Prof. Mussa Juma Assad
Controller and Auditor General
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28 March, 2018

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LIST OF ABBREVIATIONS AND ACRONYMS

BOD	-	Biochemical Oxygen Demand
COD	-	Chemical Oxygen Demand
DAWASCO	-	Dar es Salaam Water Supply and Sewerage Corporation
DUWASA	-	Dodoma Urban Water and Sanitation Authority
EWURA	-	Energy and Water Utility Regulation Authority
ISO	-	International Standards Organization
ISSAIs	-	International Standards of Supreme Auditing Institutions
KUWASA	-	Kigoma Urban Water Supply and Sanitation Authority
LGAs	-	Local Government Authorities
MKUKUTA	-	Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania
MoWI	-	Ministry of Water and Irrigation
MWAUWASA	-	Mwanza Urban Water and Sanitation Authority
PO-RALG	-	President's Office - Regional Administration and Local Governments
SUOWASA	-	Songea Urban Water Supply and Sanitation Authority
TSS	-	Total Suspended Solid
TANGA UWSA	-	Tanga Urban Water Supply and Sanitation Authority
TZS	-	Tanzania Shilling
UNEP	-	United Nations Environment Programme
UWSSAs	-	Urban Water Supply and Sanitation Authorities
WSPs	-	Waste Stabilization Ponds

DEFINITION OF TERMS

Key terms		Definition
Biochemical oxygen demand	-	Is the mass concentration of dissolved oxygen consumed under specified conditions by the Biochemical oxidation of organic and/or inorganic matter in wastewater (The Tanzania standard: Municipal and industrial wastewaters: General tolerance limits for municipal and industrial wastewaters: TZS 860:2006)
Chemical oxygen demand	-	The mass concentration of oxygen equivalent to the amount of dichromate consumed by dissolved and suspended matter when a sample of wastewater is treated with that oxidant under defined conditions. *(The Tanzania standard: Municipal and industrial wastewaters: General tolerance limits for municipal and industrial wastewaters: TZS 860:2006)*
Effluent	-	means gaseous waste, water or liquid or other fluid of domestic, agricultural, trade or industrial origin treated or untreated and discharged directly or indirectly into the environment *(Environmental Management Act of 2004)*
Off-site sanitation	-	refer to the removal of sewage from the point of generation to the point of disposal through sewer network
On-site Sanitation	-	A sanitation system that is contained within a householder's plot occupied by the dwelling and its immediate surroundings.
Pit latrine		A latrine with a pit for the accumulation and decomposition of excreta and from which liquid infiltrates into the surrounding soil
Sanitation	-	means the provision of appropriate facilities and services for the collection and disposal of human excreta and waste water *(Water supply and Sanitation Act of 2009)*
Service Provider	-	An institution or organisation with actual or delegated responsibility for providing sewerage or sanitation services to the communities. Service Providers can include inter alia Local Government Authorities, Non-Government Organisations, and private operators *(National Water Sector Development Strategy for the period from 2006 to 2015)*

Sewage	-	means a combination of excreta, urine and sullage (waste from household sinks, showers, and baths, but not toilets) and liquid waste from homesteads, institutional, commercial and industrial processes and operations*(Environmental Management Act of 2004)*
Sewer	-	means any pipe or conduit other than a drain used, or for use, for the conveyance of sewage *(Water supply and Sanitation Act of 2009)*
Sewerage	-	means the infrastructure that conveys the sewage. It encompasses systems of pipes, chambers and manholes that convey the sewage *(National Water Sector Development Strategy for the period from 2006 to 2015)*
Sewage Services	-	means services including provision of sewer network or vacuum truck for the purposes of collection, transportation and disposal of sewage *(National Water Sector Development Strategy for the period from 2006 to 2015)*
Total Suspended Solids	-	Solids that either float on the surface of, or in suspension in water, sewage or other liquids and which are removable by laboratory filtering or centrifuging under specified conditions. *(The Tanzania standard: Municipal and industrial wastewaters: General tolerance limits for municipal and industrial wastewaters: TZS 860:2006)*

EXECUTIVE SUMMARY

The overall tasks for ensuring adequate provision of sewage services fall under the Ministry of Water and Irrigation and President's Office – Regional Administration and Local Government, Regional Secretariats and Local Government Authorities through Urban Water and Sanitation Authorities and Local Government Authorities. They are vested mandates by the Water Supply and Sanitation Act of 2009 and Environmental Management Act No. 20 of 2004 and its Regulations of 2005 together with Local Government Urban Authorities Act of 1982.

Tanzania in particular, in recent years has experienced sanitation and health related problems. Poor sanitation and hygiene services have been identified by the public as a concern and cause of various health and sanitation related problems indicated by frequent waterborne associated and sanitation related diseases such as cholera and typhoid. This in turn led to a reduced workforce and working hours, and increased health care costs. The Government of Tanzania has incurred high costs for health care for her citizen affected by the communicable diseases which arise from poor sewage management in urban areas. Similarly, the Government is losing revenue due to reduced productivity when the workforce is affected by the communicable diseases.

These costs the Government of Tanzania TZS 301 billion (equivalent to USD 206 million, or USD 5 per person each year. This is approximately 1 percent of the National Gross Domestic product (GDP) according to the study carried-out by the Water and Sanitation Program (WSP) in 2012. In this case, it is necessary that both the Ministry of Water and Irrigation (MoWI) and the President's Office – Regional Administration and Local Governments (PO-RALG) put extra attention to the issues of sanitation impacts on human health while discharging their management of provision of sewage service functions. Because of this, the National Audit Office decided to undertake the audit on the area of sewage management to ascertain challenges faced and suggest possible measures to address them.

The overall objective of the audit was to determine whether the provision of sewage services in urban areas by Ministry of Water and Irrigation through Urban Water and Sanitation Authorities (UWSSAs) and PO-RALG through Local Government Authorities (LGAs) is adequately managed to prevent eruption of waterborne associated and sanitation related diseases to the community.

The audit covered the period of five financial years from 2012/13 to 2016/17 and the main audited entities were Ministry of Water and Irrigation and PO-RALG. The audit focused on the activities undertaken

by UWSSAs and LGAs in regard to the provision of sewage services covering collection, transportation, treatment, and final disposal. It assessed the extent of access to sewerage services (level of sewerage coverage by the population), maintenance and expansion trends of the sewer networks. Also, it assessed implementation of mechanisms for providing on-site sanitation services for those not connected with sewer network.

The audit reviewed the performance of the Ministry of Water and Irrigation and PO-RALG from the planning phase, implementation of the provision of sewage services in the country, coordination of the key stakeholder whose activities have impacts to the provision of sewage services as well as monitoring and evaluation of the sewage services activities.

Three main methods were used to make the evidence collected more concrete and reliable. These are: interviews, document reviews and physical observations. The following are the audit findings, conclusion and recommendations.

Main Findings

Inadequate Access to Sewerage Services in Urban Areas

The audit noted that, access to sewer network is still low and has not significantly improved over time because more than 70% of the urban dwellers lack access to the sewer network. From 2012/13 to 2016/17 the average access to sewer network has increased by at least 1.3 percent while the average population growth rate is 2.4 percent. UWSSAs allocate an average of 8.8 percent of their annual budget[1]to support the expansion of the desired sewer infrastructures that include sewer network and faecal sludge treatment facilities. This is inadequate as it does not correspond to the increased demand caused by the increased population.

The audit team also noted that an average, only 44% of the population in the visited UWSSAs with access to sewer network was not connected to the available sewer networks.

Unsatisfactory Provision of On-site Sanitation Services by Local Government Authorities

The provision of onsite sanitation services by PO-RALG through Local Government Authorities is not done adequately. Analysis of auditors

[1]UWSSAs' annual budgets and audited financial statements for the financial years 2012/13 – 2016/17

has revealed that not all generated sewage are timely collected. This has led to overflow of sewage from septic tanks in some of the streets especially from the commercial buildings and highly populated areas. It also accelerates illegal discharge of sewage to the environment especially during rainy seasons.

In addition, a significant high percent of generated sewage is not disposed in an officially recognized sludge ponds usually connected to waste water stabilization ponds. In 6 out of 12 visited LGAs namely Tanga CC, Mbinga TC, Sengerema TC, Mpwapwa TC, Kigoma MC and Kasulu TC didn't have designated faecal sludge disposal site. Approximately 12,264,000 cubic meters of sewage collected are disposed using unacceptable standards including disposing them in water bodies. This poses high risk for eruption of sanitation related diseases.

6 out of 12 visited LGAs lack waste treatment facilities, and therefore disposed untreated sewage into the water bodies such as rivers and the ocean. This has impact to the environment and if this situation prevails for the foreseeable future, there would be risks of increase in sanitation related diseases.

Transportation of emptied sludge from on-site sanitation systems is not done to acceptable standards. Vacuum trucks used for collecting and transporting faecal sludge from households do not meet the required standards, as a result they pollute the environment.

Lack of accountability in managing collection, transportation and disposal of sewage by LGAs, absence of mechanism for controlling private faecal sludge service providers; and failure of LGAs in integrating issues of collection, transportation and disposal of on-site generated faecal sludge hinders the provision of on-site sanitation services in their areas of jurisdiction. The audit noted that, LGAs, have assumed responsibilities meant for UWSSAs which is contrary to Section 55 (g) of the Local Government Urban Authorities Act, No.8 of 1982.

Effluent discharged by most of the UWSSAs' waste treatment facilities to the environment does not meet the effluent standards for the different parameters as set by Tanzania Bureau of Standards (TZS 789:2008). This is because the levels of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and pH were higher in the downstream.

Unsatisfactory Provision of Off-site Sewerage Services by UWSSAs

Inadequately functioning sewer networks indicated by the presence of sewer overflows due to increased frequency of sewer pipes blockage.

Inadequate control or misuse of sewer systems and absence of coordination between LGAs and UWSSAs in controlling damage of the sewer network were the main causes of the poor functioning of the sewer network.

Most of the sewer networks were built between 1930's and 1970s, so they are old and dilapidated. Inadequate maintenance, siltation, causes frequency blockage and collapse and results in overflows of sewage to the environment.

Weak Coordination of activities for Provision of Sewage Services

Based on the observation on the low rate of expansion of sewage network, and the existence of the dilapidated sewer networks and WSPs, the Ministry of Water has not adequately fulfilled its responsibility in providing technical and financial support to UWSSAs. The Ministry of Water and PO-RALG, do not have clear coordination and communication strategy for provision of sewage services activities. Thus, the Ministries have not established effective coordination mechanism that will enable them to support UWSSAs and LGAs towards achieving their goals for the sustainable provision of sewage services in the country.

Furthermore, the audit noted that coordination between UWSSAs and LGAs was not adequate. This has affected their ability to implement the National Water Policy and Strategies and by-laws on ensuring adequate provision of sewage services in the communities. As a result, there were destructions of sewer networks due to dumping of solid material into sewer network and also during the implementation of construction projects. This was mainly attributed by the lack of joint coordination mechanisms that could bring both UWSSAs and LGAs together in developing plans and strategies that would be implemented by all of them in prohibiting dumping of solid material into sewer network and destruction of sewer lines by any undertaking construction projects.

Inadequate Monitoring and Evaluation of the Performance of UWSSAs and LGAs by Ministry of Water and Irrigation and PO-RALG

The audit team noted that, PO-RALG do not have Key Performance Indicators for monitoring provision of on-site sanitation activities in its M & E plan. The audit noted further that PO-RALG key performance indicators and plans were mostly focused on water related issues and to an extent covered the issues of building onsite sanitation facilities such as toilets in the public institutions. As a result, collection, transportation and disposal activities were not adequately monitored.

Unlike PO-RALG, Ministry of Water and Irrigation has developed Key Performance Indicators that were used by Energy and Water Utility Regulatory Authority (EWURA) to measure the performance of UWSSAs in the provision of offsite sewage services. However, the Ministry of Water had not adequately made follow up to ensure UWSSAs effectively implement the issued recommendations. Consequently the performance of UWSSAs has not been satisfactory towards increasing access to sewer coverage and meeting the national effluent quality standards.

Main Audit Conclusions

The provision of sewage services in urban areas is not adequately done to prevent eruption of sanitation related diseases to the society.

Over a time, the access to sewerage services has not significantly improved to match with the increased population. Sewer networks are increasing at a lower rate than that of the population growth, whereby for the past four years 2012/13 to 2016/17 the average increase in sewer network and population growth rate stood at 1.3 and 2.5 respectively. In big cities like Dar Es Salaam, the access to sewer network has decreased from 7.4 in 2012/13 to 4.2 in 2015/16. Thus, more than 70 percent of the population in urban areas do not have access to improved sewer networks.

On average out of 73 per cent of total population served with water, only 9 percent of have access to sewer network, whereas 91 percent depends on Vacuum trucks for emptying their pit latrines and septic tanks. These have been contributing to pollution of the environment as most of them discharge untreated sewage to the receiving bodies especially during rainy season.

Significant amount of the estimated generated faecal sludge amounting to 600 cubic metres for the six visited UWSSAs were not collected and disposed of through the officially recognized waste water treatment plants/stabilization ponds. Furthermore, waste water treatment plants in the six visited UWSSAs were not working efficiently; as the effluent discharged to the environment do not meet the national effluent quality standards. Therefore, there is high risk of increasing sanitation related diseases due to improper discharge of sewage from residential and commercial areas.

The available sewer networks are very old and dilapidated with insufficient capacity to meet demands for off-site sanitation of the generated sewages, which resulted in frequent blockages and collapses. Regarding the performance of on-site sanitation services,

unavailable or grounded vacuum trucks in the visited LGAs made it difficult to provide on-site sanitation services. This responsibility was vested to unregulated private service providers who were not being controlled.

Main Audit Recommendations

In order to improve the provision of on-site and off-site sewage services, recommendations were issued to the President's Office - Regional Administration and Local Government and the Ministry of Water and Irrigation.

President's Office - Regional Administration and Local Government (PO-RALG) should ensure that:

1. LGAs put in place strategies for ensuring effective removal of faecal sludge from communities' on-site sanitation systems;

2. LGAs should develop long and short term plans and corresponding budgets for the provision of on-site services in areas of their jurisdiction;

3. LGAs develop effective mechanisms for managing the cost and quality of services rendered by private service providers who provide on-site sanitation services. The developed mechanism should enable them to ensure service providers adhere to the set national standards for the collection, transportation and disposed-of effluent, and set affordable sewage collection fees for the community;

4. Monitoring and evaluation plans are established that include setting key performance indicators for measuring the performance of UWSSAs in the provision of on-site sanitation services. The developed indicators should be used regularly during the supervision and monitoring the effectiveness of the sanitation services provided; and

5. Coordination mechanism is established between LGAs and UWSSAs that will facilitate proper implementation of the provision of sanitation services in the country. The mechanisms should demarcate clearly the roles of each actor regarding the provision of on-site sanitation services so as to promote efficiency and accountability among them.

The Ministry of Water and Irrigation (MoWI) should ensure that:

1. UWSSAs develop comprehensive plans for the provision of sewerage services that include maintenance, rehabilitation and expansion of the sewer networks and waste water treatment infrastructures, taking into consideration the population growth in their areas of jurisdiction;

2. UWSSAs implement measures to enhance the operational efficiency of the wastewater treatment plants e.g., waste stabilization ponds and ensure that the quality of effluent is improved as stipulated by the national standards for quality of effluent;

3. Collected funds from sewerage services are effectively utilized for improving the sewerage infrastructure including wastewater treatment plants e.g., the Waste Stabilization Ponds;

4. UWSSAs develop effective mechanisms for protecting public sewer networks including preventing disposal of solid materials into the sewer networks;

5. Mechanisms for monitoring and evaluating the performance of UWSSAs in the provision of off-site sewage services are strengthened. The mechanisms should be used to conduct regular monitoring and provide timely feedbacks to the respective UWSSAs; and

6. Develop mechanism to involve private sector in the provision of sewage services in urban areas.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Audit

Sewage means a combination of excreta, urine, and sullage and liquid wastes from homesteads, institutional, commercial and industrial processes and operations[2].Depending upon the source of generation, wastewaters are broadly classified as domestic wastewater and industrial wastewater. Domestic wastewater contains 99 percent water and contains only one percent solids **(Christian, 2006*)***. Industrial wastewater contains 60 percent water and 40 percent solids[3].

Domestic wastewater from any area has the potential to contaminate not just the local environment but also ground water, lakes and rivers used for supplying fresh water. Thus, the sanitary crisis can take its toll on residents and on the national freshwater resources (Wright, 1997).

Tanzania in particular, in recent years has experienced sanitation and health related problems. Poor sanitation and hygiene has been identified by the public as a concern and cause of various health and sanitation related problems. For instance, according to World Health Organization (WHO) Disease Outbreak News, as of 20th April, 2016, a total of 24,108 cholera cases, including 378 deaths, were reported for both Tanzania - Mainland and Zanzibar. The majority of those cases had been reported from 23 regions in Mainland Tanzania 20,961 cases equivalent to 87 percent of the total reported cases, including 329 deaths[4] were reported

Consequently these outbreak of sanitation and health related problem have also been caused by poor provision of sanitation services as reported by World Health Organization diseases outbreak news of 20th April, 2016. Therefore, the provision of adequate sanitation services in the communities is a key aspect of ensuring that the broader sanitation challenges are addressed.

Despite the government's effort, through different program such as "Mpango wa Kupambana na Kupunguza Umaskini Tanzania (MKUKUTA) II" and Water Sector Development Program (WSDP I&II), the provision of sewage services in the country remain unsatisfactory. This is because to-date only 11 out of 26 regions in Mainland Tanzania have

[2]The Water Supply and Sanitation Act no. 12 of 2009
[3]State of Michigan Department of Environmental Quality: Training manual for waste water treatment plant operators.
[4]http://www.who.int/csr/don/22-april-2016-cholera-tanzania/en/:Disease Outbreak News 22 April 2016

sewer networks and approximately 9 percent of the total population in the country have an access to sewerage system. The remaining 14 regions in Mainland Tanzania are not served with sewer networks, hence they depend on on-site sanitation services which offer unsatisfactory services.

1.2 Motivation for the Audit

(i) High healthcare costs to the Government

The Government of Tanzania incurred high costs for healthcare of the people affected by the communicable diseases arising from poor sewage management in urban areas. Similarly, the Government is losing revenue due to reduced productivity when the workforce is affected by the communicable diseases.

These costs the Government of Tanzania TZS 301 Billion (equivalent to USD 206 Million, or US D5 per person each year. This is approximately 1 percent of the national Gross Domestic product (GDP) according to the study carried-out by the Water and Sanitation Program (WSP) in 2012.

(ii) Increased outcries from communities regarding serious health problems due to outbreaks of cholera and typhoid diseases

There have been outcries from communities regarding serious health problems due to frequent outbreaks of cholera and typhoid diseases which in turn led to a reduced workforce and working hours, and increased health costs.

This is because about 70 percent of the populations living in urban areas do not have access to the improved sanitation system (e.g. sewers and septic tanks)[5]. Hence, they are using different options for emptying their sludge. Some of those options pose risks to humans and to the environment, particularly where there is reliance on non-connected systems such as septic tank, pour flushing system[6] and pit latrines (Hutton et al. 2007).

Furthermore, a study conducted by the University of Dar es Salaam in 2012 pointed-out that coastal waters in many parts of Tanzania are highly polluted due to the presence of discharged sewage from residential areas. For example, in Dar es Salaam City, the release of untreated domestic sewage has contaminated the Msimbazi River and degraded the aquatic ecosystem.

[5] A review of sanitation and hygiene in Tanzania by MSABI, April 2013

[6] The World Health Organisation (WHO) in 2008, (Ministry of Health and Social Welfare, 2011), (World Bank et al., 2011) and A review of sanitation and hygiene in Tanzania (MSABI), 2013

On the other hand, UN Report calls for wastewater focus in Post-2015 Agenda, as 80% of worlds wastewater is discharged untreated.
Discharge of untreated wastewater into lakes and rivers have a material impact on human health, social and economic development and ecosystem sustainability[7].

(iii) One of the priority areas of the Government

Access to Provision of adequate sanitation services is one of the priority areas of the Government of Tanzania as stipulated in Mkakati wa Kukuza Uchumi na Kupunguza Umasikini Tanzania (MKUKUTA II) and Water Sector Development Program.

It is also among the major concerns in promoting sustainable development of any country as described in the United Nation's 2030 Agenda for Sustainable Development Goals (SDGs). It directly supports 2 out of 17 Sustainable Development Goals of the United Nations. Those two SDGs are:

a) ***Good Health and Wellbeing***: In this aspect, this SDG's target is to substantially reduce the number of deaths and illnesses caused by hazardous chemicals and air, water and soil pollution and contamination by 2030. For this matter provision of quality sewage services contributes to the achievement of this goal by reducing the number of sanitation related diseases resulting from water contamination; and

b) ***Clean Water and Sanitation:*** Improving efficiency and effective of provision of sewerage services contributes to the achievement of SGD target through improved sanitation related activities and programmes and wastewater treatment. It also contributes to the increasing access to adequate and equitable sanitation and hygiene. In terms of environment, it minimizes pollution through proper management of wastewater.

It is against this background that the National Audit Office decided to undertake the audit on the area of sewage management to ascertain challenges faced and suggest possible recommendations to address these challenges.

[7] http://web.unep.org/newscentre/un-report-calls-wastewater-focus-post-2015-agenda-80-worlds-wastewater-discharged-untreated

1.3 Design of the Audit

1.3.1 Objective of the Audit

The main objective of the audit was to determine whether the provision of sewage services in urban areas by the Ministry of Water and Irrigation[8] (MoWI) through Urban Water and Sanitation Authorities (UWSSAs) and President's Office - Regional Administration and Local Government (PO-RALG) through LGAs is adequately managed to prevent eruption of sanitation related diseases to the society.
The specific audit objectives are to:

a) determine the extent of problems of provision of sewage services in the country;
b) assess the efficiency and effectiveness of provision of sewage services conducted by UWSSAs and LGAs in the whole process of sewage management starting from collection to disposal;
c) determine whether MoWI and PO-RALG effectively coordinate the activities for provision of sewage services undertaken by various stakeholders in the country; and
d) assess whether MoWI and PO-RALG monitor the performance of UWSSAs and LGAs to ensure effective provision of sewage services.

Detailed main audit questions along with specific audit questions are presented in ***Appendix* two** of this report.

1.3.2 Assessment Criteria

In order to assess the extent of provision of sewage services in urban areas, different assessment criteria were drawn from different sources such as: Policies, Legislations Acts and Regulations, guidelines and the best practices for the provision of sewage services. The assessment criteria used in this audit were based on the following specific areas.

(a) Access to sewage services in urban areas

Coverage of sewerage system

Proportion of households connected to the public sewage system was expected to increase from 18 per cent in 2010 to 22 percent in 2015. This is according to National Strategy for Growth and Reduction of Poverty (NSGRP) II or MKUKUTA II (2010 – 2015) Goal No. 4 (iv)

[8] Throughout this report Ministry of Water and Irrigation will be referred as Ministry of Water

Amount of generated sewage collected, transported and disposed off

Section 124 of the Environmental Management Act 2004 requires Local Government Authorities to prescribe, issue guidelines and standards explaining how sewage from cesspool and sludge from septic tanks need to be collected and transported by specified vehicles for disposal. They should also ensure the amount of generated sewage is collected, transported and disposed off.

Quality of sewage services provided meets the sanitation standards

Section 125 of the Environmental Management Act 2004 requires Local Government Authorities to ensure that sewage is appropriately treated before it is finally discharged into water bodies or open land, and that it does not increase the risk of infections or ecological disturbance and environmental degradation.

(b) Adequacy off-site sewage services in urban areas provided by MoWI through its UWSSAs

The National Water Policy of 2002 requires UWSSAs to develop both long term and short term plans for provision of sewage services. The UWSSAs is required to have an improved infrastructure for sustainable and efficient sanitation services to those connected with sewer. Section 20 of the Water Supply and Sanitation Act of 2009 requires UWSSAs to develop and maintain the existing sewerage networks to ensure that they are effectively functioning in accordance with the stipulated standards for sustainable provision of sewage services in their areas.

In accordance to the National Water Policy of 2002, UWSSAs are required to expand public sewerage in, on, under or over any street or vault below the streets to ensure the sustainable expansion of the sewerage services in urban areas. UWSSAs should ensure that maintenance and upkeep functions are given high priority throughout the utility. UWSSAs should allocation resources mainly, financial, personnel and time for the maintenance and expansion of existing sewer schemes. This is according to Water Supply and Sanitation Act of 2009.

Furthermore, the National Water Strategy (2006-2015) requires UWSSAs to strengthen its capabilities for collecting revenue from households connected with sewer. The UWSSAs are required to ensure that the Treatment processes are done to achieve the quality standards of effluent before discharging to the environment.

(c) Adequacy on-site sanitation services in urban areas managed by PO-RALG through its LGAs

According to the National Water Strategy Plan: pg. 55 (clause 6.1) Appendix-8), Local Government Authoritiesare required to develop both long-term and short-term plans for the provision of collection and transportation of sewage from the communities. Furthermore, Local Government Authorities have to ensure that there is adequate mechanism for provision of collection and transportation of faecal sludge from the communities.

Local Government Authorities have to ensure that there is adequate control mechanism for disposing on-site sanitation per sanitation standards. Local Government Authorities should prescribe, issue guidelines and standards explaining how sewage from cesspool and sludge from septic tanks need to be collected and transported by specified vehicles for disposal. This is according to Section 124 of the Environmental Management Act, 2004.

The National Water Strategy 2006 – 2015, pg. (clause 4.7.3) requires Local Government Authorities to allocate resources mainly, financial, personnel and time for the maintenance and expansion of existing sewer schemes. Similarly, Local Government Authorities are required to collect revenue from households receiving on-site sanitation services.

Local Government Authorities should monitor the performance of private firms to ensure that the services provided by the contractors are of effective manner. This is the requirement of the Local Government (District Authorities) Act, 1982 section 49)

(d) Effective coordination of all activities undertaken by stakeholders related to the provision of sewerage services

Water Supply and Sanitation Act of 2009 requires the Ministry of Water to coordinate and provide technical and financial support for the construction of sanitation schemes and expansion or rehabilitation of existing sanitation schemes.

Furthermore, Local Government Authorities are required to coordinate budgetary requirements of the water authorities with local authority budgets and also coordinate physical planning with water authorities. This is according to Water Supply and Sanitation Act of 2009and National Water Strategic Plan.

(e) MoWI and PO-RALG monitor and evaluate the performance of UWSSAs and LGAs in the provision of sewage services in urban areas

The Water Supply and Sanitation Act 2009: 5(e) and 5(f) requires the Ministries to develop plan monitoring and evaluation the performance of UWSSAs and LGAs on the provision of sewage services in urban areas. The Ministry of Water is required to develop performance indicators for measuring the Performance of UWSSAs towards management of sewerage services.

The MoWI is required to coordinate and monitor UWASSAs in the implementation of sanitation strategies and plans. UWSSAs are required to prepare and submit annual report to the Ministry of Water and the peri-urban UWSSAs to the President's Office-Regional Administration and Local Government detailing activities and operations of UWSSAs. This is stated in the*Water supply and sanitation Act section 26(1)*

Ministries are required to ensure that the monitoring results are correctly reported to relevant channel of communication to enable effective records keeping. Also, the Ministries are required to make follow-up on the implementation of their directives on provision of sewage services. This is according to the National water strategic plan, pg. 79 (clauses 10.1.3 and 10.1.5 (a)(d))

1.4 Scope of the Audit

The main audited entities were the Ministry of Water and Irrigation (MoWI) and President's Office - Regional Administration and Local Government (PO-RALG). They are responsible for ensuring provision of sewage services to the society by facilitating and enforcing laws related to the provision of sewage services in the country. The Ministry of Water provides leadership, direction, support and monitoring to UWSSAs towards provision of off-site sewage services while PO-RALG is responsible for monitoring the performance of LGAs in the provision of on-site sanitation services in areas under their jurisdictions.

The audit focused on the activities undertaken by UWSSAs and LGAs in regard to the provision of sewage services covering collection, transportation, treatment, and discharge of effluent. It assessed the extent of access to sewerage services (level of sewerage coverage by the population), maintenance and expansion trends of the sewer networks. Also, assessed implementation mechanisms for providing on-site services for those not connected with sewer network.

The audit also assessed the extent to which the existing treatment processes facilitate the achievement of quality standards of effluent before discharge to the environment.

The audit further assessed the effectiveness of coordination of all activities undertaken by key stakeholders related to the provision of sewage services in particular; the audit assessed the effectiveness of coordination mechanisms and the level of coordination so far.

Finally, the audit assessed whether PO-RALG and the Ministry of Water have monitored the performance of LGAs and UWSSAs to ensure effective collection, transportation and treatment of sewage from point of generation to disposal point. In this regard, looked at whether the monitoring plan have integrated issues of provision of sewage services, indicators for measuring the achievement, reporting and sharing of information and follow-up on the recommendations issued by the Ministry of Water and PO-RALG to UWSSAs and LGAs respectively.

Moreover, the audit focused on both on-site and off-site sewage management. The on-site sanitation services were covered, because more than 70 percent of households in urban areas are on-site sanitation management system. The focus on off-site sewage was because most of sewer network were built between 1930s' and 1970s' when the population in the country was less than 12 million[9] when compared to the current 44.9 million people[10]. Therefore, the audit aimed at assessing the effectiveness of the Ministry of Water through UWSSAs in ensuring adequate provision of sewerage services to match the increased population.

The audit has not covered sanitation issues related to Water, Sanitation and Hygiene (WASH) which include; access to safe water, access and use of basic toilets and good hygiene practice especially hand washing with soap in order to focus with only collection, transportation and disposal of sewage.

The audit covered the period of five financial years from 2012/13 to 2016/17. The period provided reasonable timeframe over which to examine performance trends of UWSSAs and LGAs on provision of sewage services. This period also aligns with the MKUKUTA II target to ensure public sewage system increased from 18 per cent in 2010 to 22 percent by December 2015.

The audit covered the entire country but data were collected from the selected six (6) UWSSAs, seven (7) Regional Secretariats and eleven

[9] The National Census Statistics,1967
[10] The National Census Statistics,2012

(11) LGAs from which the national status on the provision of sewerage services were drawn from.

1.5 Sampling, Methods for Data Collection and Analysis

1.5.1 Sampling Methods Used

The Audit team used specific sampling method to select UWSSAs and LGAs that were visited. All regions in Tanzania mainland were grouped into six geographical zones which are Southern Highland, Northern, Lake, Western, Eastern and Central Zones.

The audit team have collected data from seven (7) regions covering all geographical zones of Tanzania Mainland. These regions are Dar es Salaam, Tanga, Ruvuma, Kigoma, Dodoma, Mwanza and Mbeya. In each geographical zone, a region with the highest population density was selected because they have high risk for eruption of diseases and destruction of environment and ecosystems. The selection also considered those regions with high frequency of recorded incidences of outbreaks of diseases related to sanitation problems such as cholera due to limited access to safe water and sanitation.

To assess the management of provision of offsite sewerage services from the selected regions, data were collected from the following UWSSAs:

a) Dar es Salaam Water Supply and Sewerage Corporation (DAWASCO);
b) Tanga Urban Water Supply and Sanitation Authority (Tanga UWSA);
c) Songea Urban Water Supply and Sanitation Authority (SUOWASA);
d) Kigoma Urban Water Supply and Sanitation Authority (KUWASA);
e) Mwanza Urban Water and Sanitation Authority (MWAUWASA);
f) Mbeya Urban Water and Sanitation Authority (Mbeya UWSA);and
g) Dodoma Urban Water and Sanitation Authority (DUWASA).

These UWSSAs were selected by considering the type of utilities and those which provides both water and sanitation services.

To assess the provision of onsite sewerage services, from the selected regions, data were collected from 12 LGAs. These LGAs were:

a) Kinondoni Municipal Council;
b) Ilala Municipal Council;
c) Songea Municipal Council;
d) Mbinga Town Council;
e) Kigoma Municipal Council;

f) Kasulu District Council;
g) Tanga City Council;
h) Dodoma Municipal Council;
i) Mbeya City Council;
j) Mpwapwa District Council;
k) Mwanza City Council; and
l) Sengerema District Council.

Selections were done by considering LGAs with highest population in that regions and where there was availability of waste water treatment facilities.

The summary of the analysis of selected LGAs and UWSSAs covered during the audit are indicated in **Table 1.1**.

Table 1.1: Visited Regions, UWSSAs and LGAs

Zone	Region visited	UWSSAs visited	Level of network coverage	LGAs visited	Category
Eastern	Dar es Salaam	DAWASCO/ DAWASA	Medium	Kinondoni MC	Municipal
				Ilala MC	Municipal
Northern	Tanga	TANGA UWSA	High	Tanga CC	City
Southern Highlands	Ruvuma	SUOWASA	Medium	Songea MC	Municipal
				Mbinga TC	Town
	Mbeya	MBEYA UWSA	Low	Mbeya CC	City
Western	Kigoma	KUWASA	Low	Kigoma MC	Municipal
				Kasulu DC	District
Central	Dodoma	DUWASA	High	Dodoma MC	Municipal
Lake	Mwanza	MWAUWASA	Medium	Mwanza CC	City Council
				Sengerema MC	Municipal

Source: *Auditor's Analysis (2018)*

1.5.2 Methods for Data Collection

Both qualitative and quantitative data were collected to provide strong evidence regarding the provision of sewerage services in urban areas in Tanzania. The audit team used different methods to gather information from the audited entities and other stakeholders in assessing whether the provision of sewerage services in urban areas by UWSSAs and LGAs were adequately provided. The methods which the audit team used: *Interviews, Document reviews and Observations* as detailed below:

(a) Documents Review

The audit team reviewed various documents from the Ministry of Water and Irrigation, President's Office - Regional Administration and Local Government, six UWSSAs[11] and ten selected LGAs[12]. The documents reviewed intended to give comprehensive and reliable information on the provision of on-site and off-site sewerage services in urban areas. Also, to be able to identify the risks/impact and possible causes and thereafter be able to gather evidences and come up with clear findings and recommendations.

Reviewed documents were for the period from July 2012 to December, 2017 and included Policies, Legislations, Plans, and Performance reports, Guidelines, Researches and Evaluations. Category of documents reviewed and reasons for their reviews are detailed in **Appendix Three**.

(b) Interviews

Different Officials responsible for provision of on-site and off-site sewerage services in urban areas were interviewed from the Ministry of Water, President's Office - Regional Administration and Local Government, six UWSSAs and eleven selected LGAs. Officials that were interviewed from the visited entities were from the:

- *Ministry of Water* included: Director of Urban Water Supply and Sanitation Division, Assistant Director-Sanitation Unit and Operational officers;
- *PO-RALG* included: Director of Local Government Division, Assistant Director - Local Government and Service Delivery Section and Operational officers;
- *UWSSAs* included: Managing Directors, Technical managers, Sewerage Engineers; and
- *LGAs* included: LGAs' Directors, Health Officers, Environmental Officers and On-site Sanitation service providers (Contractors).

During the interviews, auditors were guided by interview questions developed depending on the responsibilities of the interviewed officials. **Refer Appendix three** for more details on interviewed officials.

[11]DAWASCO, TANGA UWSA, SUOWASA, KUWASA, MWAUWASA, MUWASA and DUWASA
[12]Kinondoni MC, Ilala MC, Songea MC, Mbinga TC, Kigoma MC, Kasulu DC, Dodoma MC, Mbeya CC, Mwanza CC, and Sengerema DC

(c) Physical observations

To have a better understanding of the performance of UWSSAs and LGAs in the treatment and disposal of waste, five (5) selected waste stabilization ponds were visited in Dar es salaam, Dodoma, Mbeya, Mwanza and Ruvuma. From the selected regions, physical observation were conducted to eight (7) LGAs namely Kinondoni MC, Ilala MC, Songea MC, Kigoma MC, Kasulu DC, Dodoma MC, Mbeya CC, Mwanza CC and Sengerema DC. This helped the audit team to obtain more information regarding the audit objectives to substantiate the audit findings.

Similarly, Performance audit team arranged to collect additional information through observation of the procedures undertaken to transport on-site waste to the waste stabilization ponds, and check whether transportation is done by well-designed trucks which are special for that task, and also see whether all on-site waste are actually dumped and disposed in the designated areas.

During the process the audit team was taking notes on observed treatments process as per basic requirements standards for handling waste. The audit team also observed whether the existing sewerage network is functioning well. The team also observed whether there are some technical malfunctions such as leakages, burst, blockage etc and see if necessary actions have been taken to address existing challenges that might hamper efficient performance of the sewerage network.

1.5.3 Methods for Data Analysis

The audit team analyzed gathered data through document review, interviews and observations by separating and grouping them into qualitative and quantitative data so that they could be easily analysed using different approaches.

Quantitative data were analysed by organising, summarizing and compiling using various software for data analysis such as spreadsheets as well as different statistical methods of data computations. The analysed data were presented using data tabulations in tables, histograms and graphs with quantitative labels on indicators, charts and percentage distribution. The presented data were then explained to answer the ‘what’ and ‘how many’ questions.

Qualitative data were described, compared and related so that they could be extracted and explained in order for the data to be contended. The analysis involved looking for categories such as events, descriptions, consistencies or variances so as to develop theory from the gathered data.

1.6 Data Validation Process

The Ministry of Water and Irrigation and President's Office – Regional Administration and Local Government were given the opportunity to go through the draft report and comment on the figures and information being presented. They confirmed the accuracy of the figures used and information being presented in the audit report.

Furthermore, the information was crosschecked and discussed with experts in the field of waste water management to ensure validation of the information obtained.

1.7 Standards Used for the Audit

The audit was conducted in accordance with the International Standards for Supreme Audit Institutions (ISSAIs) used by the International Organization of Supreme Audit Institutions (INTOSAI). These standards require that the audit is planned and performed in order to obtain sufficient and appropriate evidence which provides a reasonable basis for the findings and conclusions based on the audit objectives.

1.8 Structure of the Report

The remaining chapters cover the following:

- ***Chapter Two*** provides detailed descriptions system and the process managing the provision of sewage services whereby the responsibilities of different key players in the sewage provision are described;

- ***Chapter Three*** presents the audit findings on the extent of access to sewage services in urban areas;

- ***Chapter Four*** presents the audit findings on the efficiency and effectiveness of the provision of offsite and on-site sewage services;

- ***Chapter Five*** provides the findings on the coordination, monitoring and evaluation of the activities of provision of sewage services in Urban areas;

- ***Chapter Six*** provides audit conclusions; and

- ***Chapter Seven*** outlines audit recommendations for implementation in order to improve the observed weaknesses regarding provision of sewage services in urban areas.

CHAPTER TWO

SYSTEM FOR PROVISION OF SEWAGE SERVICES IN TANZANIA

2.1 Introduction

This chapter describes the system for the provision of sewerage services in Tanzania. It covers Legal framework, government's objective and targets towards provision of sewage services in Tanzania. It also provides the key players and their main responsibilities, and key processes for the provision of sewage services in urban areas.

2.2 Governing Policies, Laws and Regulations

The following are the Policies, Laws and Regulations which govern the provision of sewage services in Tanzania.

2.2.1 Policies

National Water Policy, 2002

This policy sets the objectives on the provision of sewage services that the Ministry of Water and Irrigation and the President's Office - Regional Administration and Local Government are required to fulfill.

The main objective is to achieve sustainable, effective and efficient management of sewage services in urban areas by developing and managing urban sewerage (UWSS) services and improving onsite sanitation services in low income and peri-urban areas.

National Environmental Policy, 1997

This policy stipulates policy objective regarding sanitary practices including the provision of community needs for environmental infrastructure for sewage collection, treatment and waste disposal services.

The policy objective is to prevent and control degradation of land, water, vegetation and air which constitute of our life support system.

2.2.2 Government Legislations

There are three main legislations that drive decisions and operations in the provision of sewage services in Tanzania. These are: Urban Water Supply and Sanitation Act, 2009, Local Government Urban Authorities Act, No.8 of 1982 and Environmental Management Act, 2004.

Urban Water Supply and Sanitation Act, 2009: This stipulates the functions of the Ministry of Water and Urban Water Supply and

Sewerage Authority (UWSSAs)in ensuring the provision of sewerage services. Emphasises on operating and providing sewerage services in urban areas to ensure adequate collection and disposal of sewage;

***Local Government Urban Authorities Act, No. 8 of 1982*:**This stipulates the functions of the Local Government Authorities in ensuring provision for the removal of all on-site sanitation and the disposal of sewage from all premises and houses in its areas, so as to prevent injury to health; and

Environmental Management Act, 2004: This stipulates the functions of the Vice President's Office, National Environmental Management Council, Ministry of Water, PO-RALG and Local Government Authorities in ensuring that the quality of whatever is discharged to the environment (i.e. sewage and its management practices) meets quality parameters and is of no harm to public health and environment.

2.2.3 Government's Goals and Objectives in the Provision of Sewage Services

According to the National Water Sector Development Programme for the period 2014/15 – 2018/19, the government goal on the provision of sewage services is to ensure that sewerage and sanitation systems are developed on a cost effective and sustainable basis in order to increase coverage from 17 percent in 2007 up to 30 percent in 2020 in respective urban areas.

Furthermore, according to National Water Sector Development Strategy (2006 to 2015) the main objective of the government in the provision of sewage services is to ensure that all social groups in urban and peri-urban areas have access to improved sanitation services.

2.2.4 Strategies

National Water Sector Development Strategy (2006 – 2015), focused on improving the sewage system in order to meet the demand for sewerage and sanitation services through the following strategies:

a) promote the benefits of the use of safe methods of excreta disposal, either through sewerage systems or on-site sanitation;
b) provide for adequate sewerage or sanitation systems as part of all future water supply development schemes;
c) introduce controls on the disposal of sewage and sanitation sludge;
d) promote the use of alternative technologies for appropriate sewerage and sanitation systems; and
e) promote the re-use of sewage and sanitation sludge in appropriate circumstances.

2.3 Key Stakeholders and their Responsibilities

2.3.1 Roles and Responsibility of Key Players

There are two main Ministries which are responsible for the provision of sewage services in urban areas. These are the Ministry of Water and the President's Office - Regional Administration and Local Government

Their roles and responsibilities are as explained below:

The Ministry of Water

According to Water Supply and Sanitation Act of 2009, the Ministry of Water has the responsibility of providing water supply and sanitation services in the country.

Its main roles include: formulating national policy and strategies on sanitation management in the country and ensure smooth execution of that policy and strategies by authorities under its control; coordinating and providing technical and financial support for maintenance of existing public sewer; securing capital finance for maintenance of public sewer scheme; monitoring the performance of Water Supply and Sanitation Authorities; and providing technical and financial support to the operations of commercial Water Supply and Sewerage Authorities.

To ensure that off-site sewerage services are provided in urban areas, the Ministry discharges that role through Urban Water Supply and Sewerage Authorities. The detailed roles of UWSSAs are provided below:

Urban Water Supply and Sewerage Authorities (UWSSAs)

According to Section 60 of Water Supply and Sanitation Act No. 12 of 2009, Urban Water Supply and Sewerage Authorities are charged with the overall responsibilities of operations and management of water supply and sanitation services in their areas of jurisdiction. Furthermore, according to section 20, they were established for running conventional system of collection, treatment and disposal of sewage from domestic, commercial, institutional and industrial through sewerage network.

In particular, Urban Water Supply and Sewerage Authorities undertakes the following activities in regard to sewage management: (a) expand and maintain public sewerage in, on, under or over any street or vault below the streets to ensure sustainable expansion of the sewerage services in urban areas; (b) educate and raise public awareness to use the available sewer network and maintain it to enhance public health within the communities; (c) collect fees and levies including any regulatory levy for sewerage services supplied to consumers; (d) liaise

with Local Government Authorities on matters relating to sanitation with regards to preparing and executing the plans relating to expanding the sewerage system; and (e) prepare an annual report on its progress and submit to the Ministry of Water.

President's Office - Regional Administration and Local Government

According to function and organization structure approved by the President on February, 2015, the President's Office – Regional Administration and Local Government has the responsibility of providing water supply and sanitation services in the country through its Local Government Authorities.

It has the role of providing linkage between Central and Sectors Ministries, Development Partners and Non-State Actors (NSAs) to RSs, LGAs and other stakeholders; providing technical backstopping, capacity building, supportive supervision, monitoring and evaluation of central and sector ministries' programme, project and other related activities of respective sectors that are implemented in RSs and LGAs; facilitating establishment of Water Supply and Sanitation Bodies in Districts Headquarters and Township Authorities; and monitoring the Performance of LGAS in implementing their plans.

To ensure that on-site sewerage services are provided in urban areas, PO-RALG discharges that role through Local Government Authorities. The detailed roles of Local Government Authorities are provided below:

Local Government Authorities

According to the Local Government Urban Authorities Act of 1982 and Urban Water Supply and Sanitation Act of 2009, Local Government Authorities are responsible for: providing sewage emptying services in the communities; inspecting households, commercial properties and public spaces (monitoring and enforcement) to check the disposal practice in the communities; enforcing by-laws to prevent citizen in illegal connection to discharge their effluent to the public sewer within their area of jurisdiction; contracting and licensing of private sector sewage vacuum (collectors);coordinating physical planning with water supply and sanitation authority, enforcing by-laws to ensure that the sewerage system is not clogged by improper disposal of solid waste by the people in their areas of jurisdictions; and preventing emerging settlements to construct building over the reserved area for sewerage network within their areas of jurisdictions.

The inter-linkage among key players in the provision of sewage services in the country is detailed in **Figure 2.1** below:

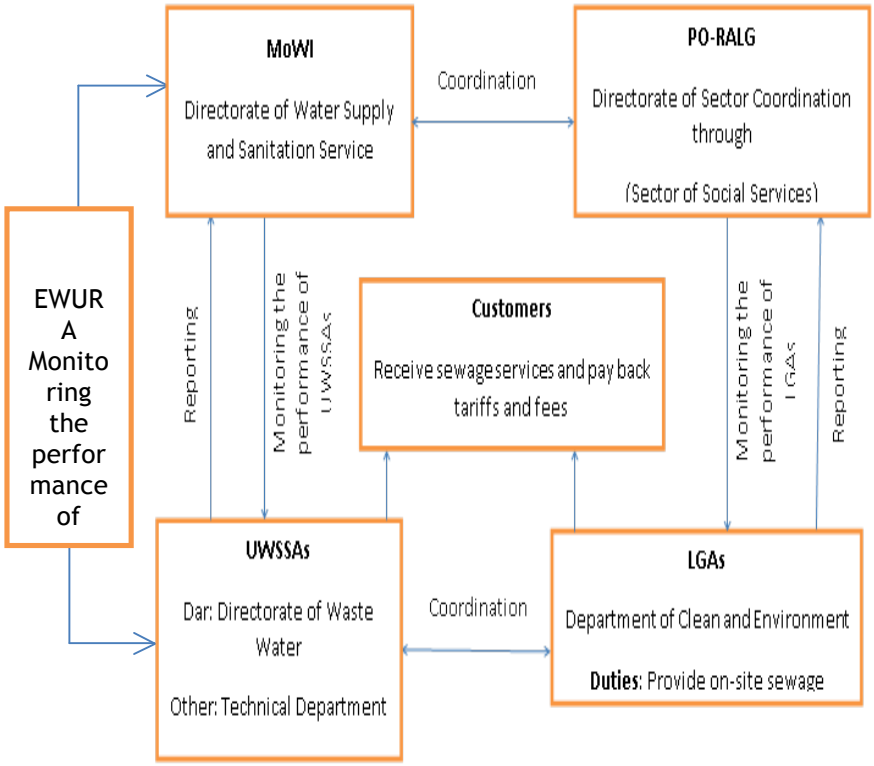


Figure 2.1: Set up for Provision of Sewage Services in Tanzania

2.4 Roles and Responsibility of Other Stakeholders

Energy and Water Utility Regulation Authority (EWURA)

The function of EWURA is to regulate Water Supply and Sanitation Authorities (WSSAs) as per Water Supply and Sanitation Act, 2009. EWURA is mandated to license and regulate commercialized Urban Water Supply and Sewerage Authorities (UWSSAs) and has developed performance indicators to measure financial and service delivery outcomes of Urban Water Supply and Sewerage Authorities.

Other responsibilities including:

a) providing licenses to service providers and regulating functions in respect of sewage services;
b) establishing guidelines on tariffs chargeable for the provision of sewage services;
c) monitoring standards of performance for the provision of sewage services; and
d) preparing and submitting report on comparative analysis of the performance of UWSSAs in relation to performance target specified in the licences of the UWSSAs.

The National Environmental Management Council (NEMC)

NEMC is the overall enforcer of environmental compliance in the country that works in collaboration with the Ministry of Water to prevent occurrence of environmental pollution. It is responsible for developing guidelines that need to be followed by Local Government Authorities or Urban Water Supply and Sewerage Authorities during disposal of general or specific types of liquid wastes to the environment.

The Council is also responsible for reinforcing the adherence to effluent discharge standards and provides technical support with respect to environmental impacts during construction or updating the sewerage system.

2.5 Relationship between Various Actors

In order for the Ministry of Water, President's Office – Regional Administration and Local Government, Urban Water Supply and Sewerage Authorities and Local Government Authorities to effectively provide sewage services in the country, there is a need to complement their efforts and use the potential contribution from other stakeholders such as Energy and Water Utility Regulatory Authority and National Environmental Management Council. **Figure 2.2** provides the relationship between the above mentioned actors:

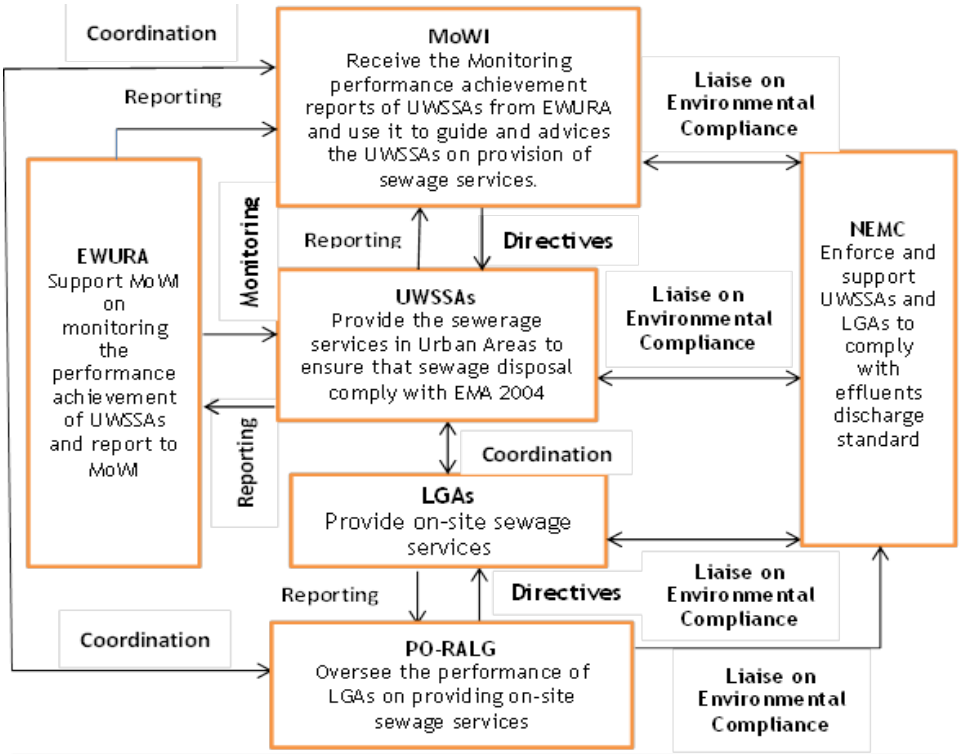


Figure 2.2: Inter-linkage between key and other stakeholders

2.6 Resources for the Provision of Sewage Services in Urban Areas

2.6.1 Sources and Funding for the Sewage Services

The funding details of the Ministry of Water, President's Office – Regional Administration and Local Government, Urban Water Supply and Sewerage Authorities and Local Government Authorities for the period from 2012/13 to 2016/17 are provided below.

Sources of funds for the Ministry of Water and PO-RALG

The operations of the Ministry of Water, President's Office – Regional Administration and Local Government are fully financed by the Government through approved annual budget appropriated by the Parliament and funds from Development Partners which are directed to some specific development projects. Table 2.2 presents the amount of funds budgeted and funds received by the Ministry of Water and PO-RALG for provision of sewage services for the period from 2012/13 to 2016/17.

Table 2.2: Budgeted and Received funds for the period from 2012/13 – 2015/16 (Figures are in millions TZS)

	Audited entities					
Financial years	Ministry of Water			PO-RALG		
	Approved funds	Received funds	%age Difference	Approved funds	Received funds	%age Difference
2012/13	372,053	166,442	45	200	35	18
2013/14	266,996	96,041	36	134	230	172
2014/15	207,663	73,154	35	134	90	67
2015/16	185,551	76,860	41	225	225	100

***Source**: Financial Records of the Ministry of Water and PO-RALG (2018)*

From **Table 2.2** above, the Ministry of Water on average received 40 percent of the approved funds for provision of sewage services for the period under review. PO-RALG on average received 84 percent of the approved funds.

Sources of fund for the Urban Water Supply and Sewerage Authorities (UWSSAs)

The major source of funds for Urban Water Supply and Sewerage Authorities is the revenues collected from provision of clean water and

sewerage services from customers connected with sewer networks. About 80 percent of the collected revenues of UWSSAs are from the provision of clean water services. However, other sources of funds include grants from Central Government and Development Partners mainly for the implementation of specific projects. Table 2.3 presents the average of the budgeted and actual collected revenues from 2012/13- 2016/17 for six visited UWSSAs:

Table 2.3: Budgeted and Actual collected revenues for the period from 2012/13 – 2016/17 (Figures are in Million TZS)

Name of Visited UWSSAs	Average Budgeted Sewerage Revenues	Actual Collected Revenues	%age of collected revenues over budgeted revenues
TANGA UWSA	229	223	97
DAWASCO	3,228	5,667	180
DUWASSA	544	648	116
SOUWASA	164	222	269
MBEYA UWSA	673	644	99
MWAUWSSA	1,003	968	99

Source: Financial information of the visited UWSSAs (2018)

From **Table 2.3**, for the last five financial years, most of UWSSAs have managed to collect revenues to the tune of what was originally planned. For example, TANGA UWSA has managed to collect more than 90 percent of its budgeted sewerage revenues while DAWASCO has achieved a collection of more than 150 percent from the expected sewerage revenues with exception of the financial year 2016/17 whereby the actual collections were 137 percent above budgeted revenue collection from sewerage**.** Moreover, Mbeya UWSSA and MWAUWSSA collection efficiency was more than 98 percent for the period under review.

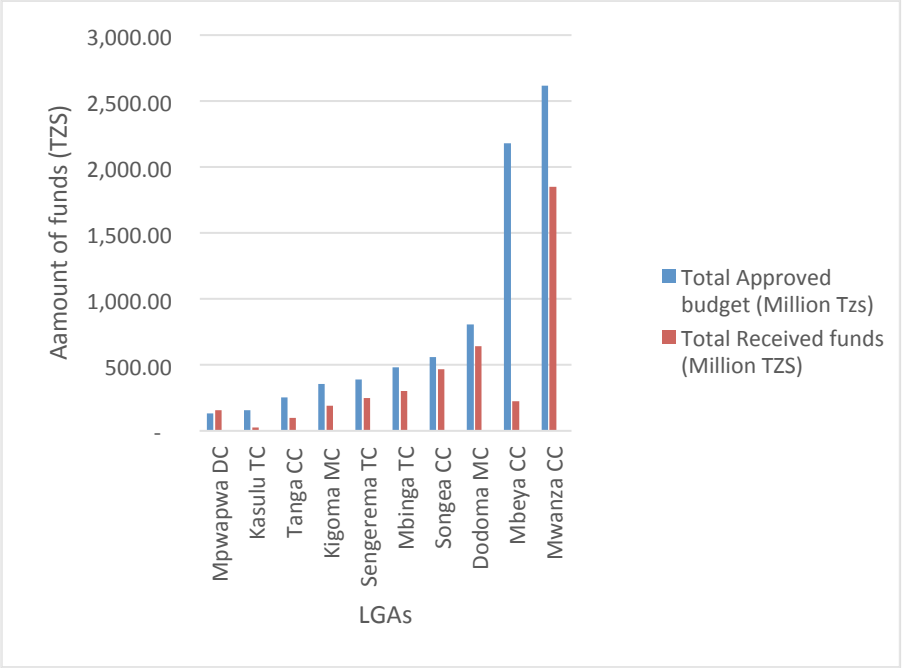
Sources of Funds for Local Government Authorities (LGAs)

The major sources of funds for Local Government Authorities are internal sources (own-collections) and the government subvention disbursed to them through PO-RALG's budget as appropriated by the Parliament.

Local Government Authorities are required to submit their estimated budgets for a given financial year to PO-RALG for review and consolidation and then submitted to the Ministry of Finance and Planning. Once the budget has been approved by Parliament, and funds are disbursed to PO-RALG, then PO-RALG disburse the same to LGAs according to the approved disbursement for each LGA.

Figure 2.3 provides an analysis of the total amount of funds that were budgeted and received by the Cleans and Environment Departments/Sections of the 10 visited LGAs for cleaning and sanitation activities in the respective LGAs.

Figure 2.3: Comparison of the total budgeted against total received funds by the Cleansing and Environment Departments for the period from 2012/13 – 2016/17 (Figures are in Million TZS)



***Source**: LGAs approved budgets/estimates and allocations for grants from Central Government from 2012/13 to 2016/17*

From **Figure 2.3** above, Mpwapwa DC received a total of TZS 156 millions which is 117 percent of the total requested funds, Tanga CC received TZS 97.7 millions equivalent to 39 percent of the request funds and Songea CC received TZS 209.5 millions equivalent to 75 percent of the requested funds from the central government as government grants for the period of 2012/13 – 2016/17 respectively. These funds were allocated for Cleansing and Environment Departments available in the respective LGAs and were mainly allocated for activities related to solid waste management.

2.6.2 Human Resources for Provision of Sewage Services

Availability of the technical personnel is important as it can be linked with the general technical performance of the system. Performance of the system is also influenced by the number of people assigned to

operate and maintain it. Table 2.4 shows staffing level analysing of the available staff against the requirements in 12 visited LGAs and 6 UWSSAs.

Table 2.4: Comparison between the available staff against required number of staff in the visited LGAs and UWSSAs

Authority	Name of the Authority	Required no. of staff	Available no. of Staff	Gap	%age gap between required and available number of staff
LGAs	Dodoma MC	53	28	25	47
	Kasulu TC	19	1	18	95
	Kigoma MC	23	12	11	48
	Mbeya CC	20	8	12	60
	Mpwapwa DC	73	8	65	89
	Mwanza CC	25	8	17	68
	Songea MC	6	4	2	33
UWSSAs	DAWASCO	79	59	20	75
	DUWASSA	12	6	6	50
	MBEYA UWSA	15	6	9	60
	MWAUWSSA	14	8	6	43
	SOUWSSA	13	12	1	8
	TANGA UWSA	14	9	5	36

Source: Staffing level analysis reports from visited LGAs and UWSSAs

From **Table 2.4** above, on average the available numbers of staff in the visited LGAs are only 32 percent of staff required. For the visited UWSSAs the available numbers of staff is 60 percent out of the staff required.

2.7 Key Processes in the Provision of Sewage Services

In major urban centres sewerage services are provided by the Urban Water Supply and Sewerage Authorities, while on-site sanitation services are provided by Municipal or District Councils. In the Townships, the responsibility for sewerage and sanitation services rests with the Local Authorities and sewerage systems rarely exist.

People living in townships and peri-urban areas are primarily depending on cesspits or pit latrines, which are emptied by the Local Authorities or contracted private operators. The summary operational process is shown in **Figure 2.4.**

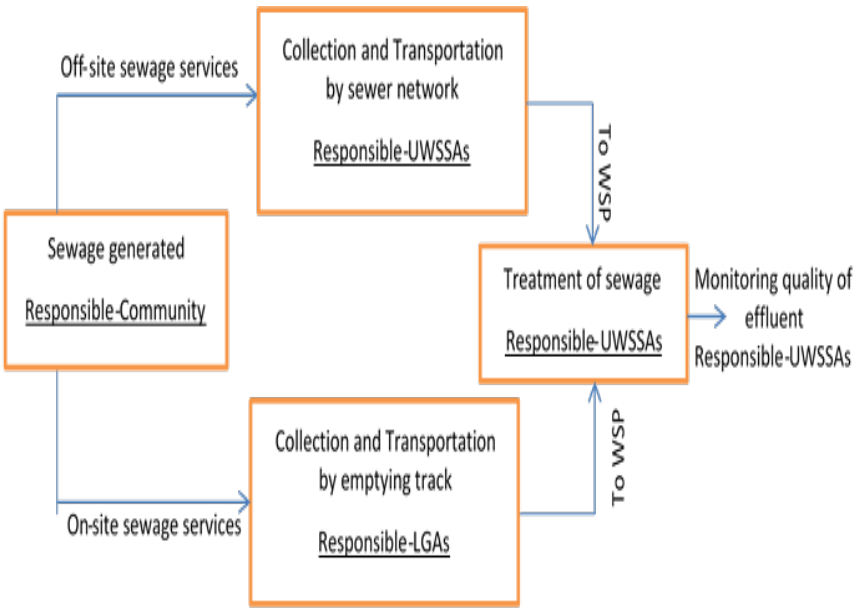


Figure 2.3: Key processes for Provision of Sewage Services in Tanzania

2.7.1 Planning

Provision of sewage services in Tanzania starts with the development of both long term and short term plans. These plans detail activities to be undertaken, available resources and the timeframe within which the Ministry of Water and PO-RALG through Urban Water Supply and Sewerage Authorities and LGAs respectively are planning to undertake those sanitation related activities.

They also detail the expected targets or outcomes that entities intend to achieve by implementing the planned activities and the strategies for the implementation of sanitation activities. The process of planning starts with a review of the previous plans and evaluation of the level of achievement of the previous plans.

All plans have to be approved by the Board of Directors for Urban Water Supply and Sewerage Authorities and Council Directors for LGAs before they are operationalized.

2.7.2 Operational Process

After the approval of the plans have been granted, both Urban Water Supply and Sewerage Authorities and LGAs then embark on implementing those plans in order to achieve the set targets. The key operational process undertaken by both Urban Water Supply and Sewerage Authorities and LGAs are summarised below:

Collection and Transportation of Sewage

On-site sanitation services

Sewage is collected and transported to the treatment process by the Local Government Authorities or contracted private companies with special vehicles upon the request of people. The collected sewage (sludge) is deposited in ponds owned by Urban Water Supply and Sewerage Authorities which are supposed to be located not very far. The Urban Water Supply and Sewerage Authorities are responsible for ensuring that the sewage undergoes proper treatment to meet the effluent discharge standard before releasing to the environment.

Procedures for On-site Sanitation Services

First, individual customer who requires sewage emptying services makes an appointment with the service provider, either Local Government Authority through its Cleans and Environment Section or private company and pay upfront for the services. Normally, the cost for sewage emptying services ranges from TZS 40,000 to 80,000/= depending on the capacity of the truck and the distance between collection and disposal points;

Second, the service provider (Local Government Authority through its Cleans and Environment Section or private company) collect the sewage from the customer and transport it to the waste stabilization pond for disposal; and

The service provider pays for dumping/disposal fees ranging from TZS 8000 to TZS 35,000 to the respective Urban Water Supply and Sewerage Authorities who is the owner of waste stabilization ponds.

Off-site sewage services

Sewage is collected and transported to pond by Urban Water Supply and Sewerage Authorities through sewer pipes. The collected sewage (sludge) is deposited in ponds owned by Urban Water Supply and Sewerage Authorities.

Procedures for New Sewer Customer Connection

The procedure is detailed below:

First stage: Customer submit a written application for new sewer connection or physically reports at the nearby Urban Water Supply and Sewerage Authorities offices;
Second stage: Customer provides details on the location of his/her house that would be use to verify availability of existing sewer in that area;

Third stage: Sewer technicians visit the site of the customer to assess the possibility for connecting him/her in the sewer network.

Fourth stage: The Sewerage Design and Construction Engineer (SDCE) consult stakeholders e.g. LGA, Tanzania National Roads Agency, Tanzania Electrical Supply Corporation& Tanzania Telecommunications Company Ltd for the work security and avoiding any inconveniency during the implementation upon verification of the boundary for the plot;

Fourth stage: The sewer technicians survey the area and provide the sketch of drawing on how to connect and estimate the distance from the customer to the nearest and possible sewer network and submit to SDCE ready for designing;

Fifth stage: SDCE design and prepare estimates and submit to the Technical Manager for further check and approval. The detailed design is given to the sewer technicians for the preparation of the drawings to be used in the field;

Sixth stage: Once the drawings and all design documents have been completed and compiled together, then SDCE calls the customer and request him/her to get prepared for works to be executed by purchasing construction materials such as cement, blocks or burnt bricks, aggregates, square wire mesh, pipe (4 inches) and sands and be ready to cover transport and technical cost of the work which includes cost for labourers, supervision by UWSSAs etc,

Seventh stage: The customer may be required to pay for a new sewer connection fee estimated to range from TZS 10,000 to 40,000 to UWSSA (New Connection Section).This sum varies from one UWSSA to another depending on their entire arrangement. Other UWSSAs like Songea and Mbeya do not charge sewer connection fees for the intention of encouraging more new customers to get connected to sewer network; and

Eighth stage: Connection is made by UWSSA and then the customer can start to use the network.

Sewage Treatment Process

The principle objective of sewage treatment is to allow sewage effluents to be degraded and disposed off without causing danger to human health or un-acceptable damage to the natural environment. Urban Water Supply and Sewerage Authorities use mainly waste stabilization ponds (WSP) to treat sewage collected from communities. The waste stabilization ponds mostly used are composed of three sub ponds/ sections/chambers namely, Anaerobic, Facultative and Maturation ponds.

At Anaerobic Ponds

Anaerobic ponds are usually the first type of pond used in a series of ponds. The raw sewage is first channelled through screen to remove any solid and floating objects before flowing to the anaerobic ponds. The sewage undergoes anaerobic digestion where anaerobic bacteria feed on the organic nutrients in the absence of oxygen. This process takes 2-3 days and reduces up to 80 percent of the dissolved organic matter.

At Facultative Ponds

The effluents sewage from anaerobic is then channelled to the facultative pond which has both anaerobic zones (deeper parts in the pond) and aerobic zones (close to the surface) where there is continued degrading of the sewage by bacteria and other micro Biochemical organisms that keep feeding on the contents of the sewage. This process normally takes 5-10 days.

At Maturation Ponds

This is the final stage whereby the sewage effluents from the facultative ponds are channelled to. The maturation process is aimed at killing and removing the anaerobic and aerobic bacteria including any other pathogens before final discharge to the environment

The following UWSSAs have Waste Stabilization Ponds with all three sets of ponds (Anaerobic, facultative and maturation): Dodoma, Dar es Salaam, Songea, Mbeya and Mwanza. Tanga did not have Waste Stabilization Pond, instead their sewage effluent is discharged to the ocean without undergoing treatment.

Monitoring the quality of effluent discharged from Waste Stabilization Ponds

This process aimed at ensuring that whatever is discharged to the environment meets quality parameters and is of no harm to public health and environment.

Water and Wastewater Quality Monitoring Guidelines for Water Utilities, 2014 issued by EWURA requires the wastewater effluent quality discharged to the environment to comply with the latest Tanzania Standard (TZS 860:2006). The standard provides limits for Municipal and Industrial Wastewaters in the country.

The parameters proposed for regular Check/Monitoring by the UWSSAs are: (a) Ammonium, (b) Biochemical Oxygen Demand (BOD), (c) Chemical Oxygen Demand (COD), (d) Color, (e) Faecal Coli form, (f)

Nitrate, (g) pH, (h) Phosphorus, (i) Total Coli form, and (j) Total Suspended Solids (TSS).

During the treatment process samples from different ponds at different treatment stages are taken to confirm if treatment infrastructure is effectively operating.

At Upstream (before the point of discharge) tests are conducted to ascertain the characteristics of the water before effluent is discharged into environment.

At Downstream (after point of discharge) tests on the other hand are conducted to assess the impact of the discharged effluent into the water source.

Quality tests are supposed to be conducted monthly.

Maintenance of the Sewerage Infrastructure

Sewerage infrastructure includes: the sewer pipes, treatment plants (waste stabilization ponds) and any other infrastructure that is used to collect, transport, treat and discharge the generated sewage.

The Technical Manager is responsible for ensuring that the entire infrastructure remains operational through routine maintenance and servicing. Major maintenance activities include: *regular flushing of the sewer pipes, desludging of the ponds, replacement of non-functional network parts*, for example, network pipes and replacement of aging network parts.

2.8 Organization and Coordination of Sewage Service

Sustainable provision and expansion of sewerage services in the communities requires an effective collaboration and coordination mechanism among sectors. Key stakeholders, whose activities impacts the work of managing the sewerage services in the communities, must share information.

For example, information from the Urban Planning Units of Local Government Authorities is essential for Urban Water Supply and Sewerage Authorities when planning for extending the layout of sewerage services to encourage more people access to the said services.

Table 2.5 shows key stakeholders and the issues to be coordinated. Under the Water Supply and Sanitation Act 2009[13], the key stakeholders whose activities and responsibilities linked directly to the

[13] Water Supply and sewerage services Act 2009,Part III (section 5,6 and 8)

provision and expansion of sewerage services are the Ministry of Water as lead, the PO-RALG, Local Government Authorities and UWSSAs.

Table 2.5: Stakeholder coordination of issues and methods required

Responsible Entity	Issue to be coordinated	Methodology of coordination required
Ministry of Water	Mobilization and allocation of resources to be used by UWSSAs, including finding other sources of funds such as from development partners, and assisting UWSSAs by providing technical support or boosting their budgets	Supporting on Planning, Budgetary and technical support information to UWSSAs
PO-RALG	Provide technical backstopping, capacity building, supportive supervision, monitoring and evaluation of Local Government Authorities programmes, project and other related activities of respective sectors that are implemented in RSs and LGAs	Conducting various Meetings, technical supports and information sharing
UWSSAs	Liaise with Local Government Authorities on matters relating to sanitation with regards to preparing and executing the plans relating to the management of sewage issues	Joint meeting and sharing information on planning and implementation of various projects
LGAs and UWSSAs	Liaise among themselves to conduct public awareness on the importance of proper management of sewage by the community	Raising public awareness on the proper use and management of public infrastructures
UWSSAs and LGAs	Liaise with NEMC to monitor environmental impacts and, for the NEMC, enforcing compliance by any person or organization to ensure the sustainable protection of the environment	Sharing environmental issues that are likely to affect projects whether before or after implementation stage.

***Sources**: Water Supply and Sanitation Act 2009 (2018)*

2.9 Monitoring, Evaluation and Reporting of Sewage Activities

Monitoring of the Performances of the UWSSAs and LGAs

In the implementation of their roles, best practice[14] requires the Ministry of Water and PO-RALG to monitor the performance of UWSSAs and LGAs respectively in providing sewage services. They are supposed to assess whether the entities achieve planned results and when planned results are not achieved, corrective actions are taken.

Ministry of Water and PO-RALG based on data received from UWSSA and LGAs, are supposed to analyse the performance of each one (UWSSAs and LGAs) against agreed targets and standards in the performance agreement and provide decision on technical advice and support to UWSSAs and LGAs for improvement.

Key Performance Indicators

Performance of an organization is evaluated using performance indicators. Performance indicators are measures of efficiency and effectiveness of the delivery of services. The performance indicators for the Ministry of Water and PO-RALG for measuring the performance of UWSSAs and LGAs respectively are as summarized below:

Ministry of Water's Performance Indicators for sewerage services

There are several performance indicators that are used by the Ministry of Water to monitor the performance of UWSSAs towards achieving their objectives as stipulated in the Business Planning Guidelines with regard to provision of sewage services in their areas of jurisdiction.

Table 2.6 shows Key Performance Indicators (KPIs) that are used to measure the degree of achievement by UWSSAs in the provision of sewerage services in their areas.

[14]ISO 14001:2004`

Table 2.6: Key Performance Indicators for Measuring Provision of Sewerage Service

Indicator	Definition	Units
Proportion of population connected to the sewerage service	The percentage of population served with sewerage service to the total population living in the service area The population served is arrived at by adding the following; (i) the number of domestic sewerage connections multiplied by the average members using that connection.	%age of population connected to sewer
Wastewater quality compliance	This indicator measures the % of the sewerage effluent samples that pass particular quality tests as per Tanzanian sewage quality standards The percentage of compliance is obtained by taking the acceptable quantity of parameter as per quality standard/the amount of the parameter obtained after the taste.	% age of compliance with effluents discharge national standard
Sewer blockages	Number of blockages per year	Number of blockage per Km per year

Source: EWURA performance benchmark guidelines (2018)

Performance indicators used by PO-RALG

The best practice "UNEP guidelines[15]"requires the PO-RALG to develop key performance indicators to monitor the performance of Local Government Authorities towards achieving their objectives for provision of on-site sanitation services in the communities. This is so, in order to assess the degree to which environmental aspects have been addressed by LGAs to ensure protection of public health.

Monitoring and evaluations report from PO-RALG, has included key performance indicators mostly aimed at tracking the performance of Water Sanitation and Hygiene (WASH) program such as number of latrine rehabilitated in primary and secondary schools.

[15]UNEP Guidelines on Environmental Audit on Mining as compiled by UNDESA and UNEP

Reporting of Monitoring Results and Follow up of Recommendations

To ensure effectiveness of the monitoring activities, Ministry of Water and PO-RALG are required to share the monitoring results to the UWSSAs and Local Government Authorities and make follow up of their recommendations. Reports from UWSSAs include Monthly, Quarterly, Annual Reports and ad hoc information that may be required by Ministry of Water. The annual report submission date agreed is by 30th September of each year. The Ministry of Water has set out formats for monthly and annual reporting of their performances through indicators in Maji Information System (Maji's database). The database provides a comprehensive set of technical, commercial, financial and personnel data.

Local Government Authorities are required to produce monthly, quarterly and annual reports containing information regarding Planning and performance reports on the extent of performance of onsite sanitation activities in their areas of jurisdiction. These reports are submitted to Regional Secretariat who then submits to PO-RALG.

2.10 Initiatives Taken by the Ministry of Water and PO-RALG

As a measure for improving provision of sewage services the Ministries have done the following:

a) PO-RALG has instructed Local Government through letter with Ref No. AH. 322/418/01/48 dated 20/11/2017 requiring all Regional Secretariats and LGAs to plan and allocate areas for constructing sanitation facilities, mainly waste water treatment facilities;

b) In most of the National Water Projects implemented under Water Sector Development Programme II, sanitation components are included under component 4. These projects include: construction of major Waste Water Treatment Plant to be constructed at Jangwani, Mbezi and Kurasini in Dar es Salaam that will significantly treat collected sewage from different parts of Dar es Salaam City. There are also on-going construction of Waste Water Stabilization Ponds in Kigoma, Lindi, Musoma and Sumbawanga; and

c) In Mwanza City, they have constructed a simplified Sewer Network in squatters areas as a pilot which will later be implemented in other areas with similar conditions.

CHAPTER THREE

ACCESS TO SEWAGE SERVICES IN URBAN AREAS

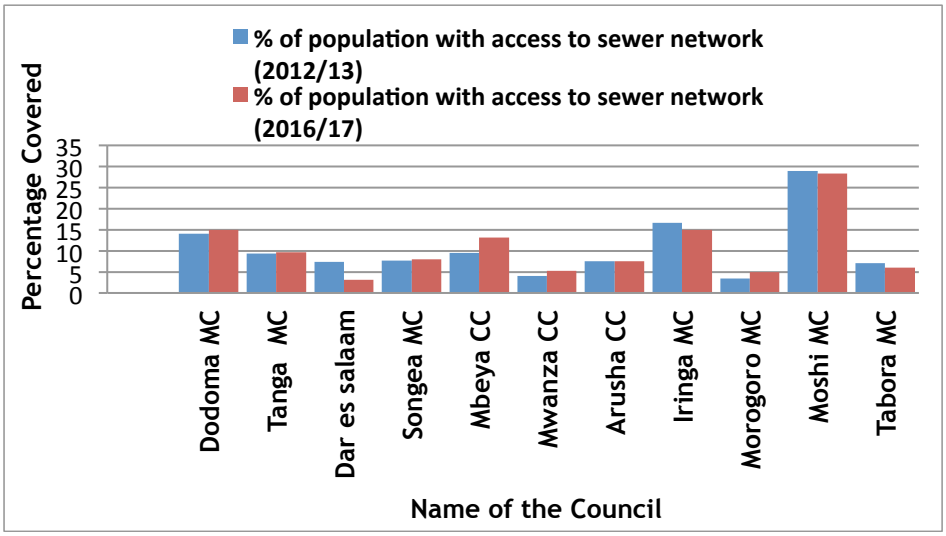
3.1 Introduction

This chapter presents the audit findings regarding the provision of sewage services in urban areas. In particular, the findings are focused on the extent to which the population can access on-site and off-site sewage services from collection and treatment of sewage.

3.2 Inadequate Access to Sewerage Services Urban Areas

The audit team revealed that the access to sewerage services by population leaving in urban area is still low and has not improved over time. More than 70 percent of the urban dwellers could not access the sewer networks in their respective urban centres. This was depicted through the interviews held with officials from the Ministry of Water and from six (6) visited UWSSAs. The same situation was also noted through the review of the annual performance reports of the Ministry of Water and UWSSAs and that of EWURA for the period from 2012/13 to 2016/17. Figure 3.1 shows the percentage of population in urban areas served with Sewer Network for the period 2012/13 up to 2016/17.

Figure 3.1: Percentage of population in urban areas served with Sewer Network for the period from 2012/13 up to 2016/17



Source: *Annual Performance Report 2012-2017 from UWSSAs, EWURA and the National Bureau of Statistics (2018)*

From **Figure 3.1**, it can be seen that Dodoma, Morogoro, and Songea Municipalities, Tanga, Mbeya and Mwanza Cities, the average access to sewer network has increased by at least 1.3 percent for the period of 4 years from 2012/13 to 2016/17 while the average population growth rate is 2.4 percent. This was mainly attributed by the increased number of connections by which stood at a minimum of 387 connections in each of the municipality or city.

On the other hand, Arusha city and municipalities of Iringa, Moshi and Tabora municipalities have recorded slight decrease in the percent of population with access to sewer network by at least 1 percent for the period from 2012/13 to 2015/16. This is simply because there was a insignificant increase in a number of sewer connections compared with the increased population in their areas. The population was increasing at an average rate of 2.5 percent.

Furthermore, in Dar es Salaam City, the average access to sewer network by the population has decreased from 7.4 percent in 2012/13 to 4.2 percent in 2015/16 and has generally been decreasing annually due to a low increase in the number of sewerage connections in comparison to the increase in population of about 5 percent per annum.

In connection to the above observation, the audit team compared the population with access to sewer network and the population connected to sewer network in the visited UWSSAs. The aim was to establish whether those with access to sewer network are also connected to sewer network as shown in the Table 3.1:

Table 3.1: Percentage of population with Access to Sewer Against the population connected to Sewer Network for the period from 2012/13 up to 2016/17

Name of UWSSA	Population with Access to sewer services (number)	Population Connected to sewer (number)	% of population not connected to sewer
DUWASA	42,000	27,350	35
MBEYA UWSA	15,142	2,166	86
MWAUWASA	337,384	196,000	42
SOUWASA	25,200	16,344	35
TANGA UWSA	34,545	12,737	63
Total	**454,271**	**254,591**	**56**

***Source**: Annual Performance Report for the period from 2012 to 2017 from UWSSAs, EWURA and the National Bureau of Statistics (2018)*

From **Table 3.1** it was observed that on average only 56 percent of the population with access to sewer network in the visited UWSSAs were connected to sewer network.

According to the interviews held with technical managers of the visited UWSSAs, it was noted that this was due to the weaknesses of LGAs in enacting the by-laws which could be a useful tool to enforce people living within the sewerage network to connect. Other reason mentioned includes high costs for sewage and inadequate budget allocated by UWSSAs for increasing number of customer connections in their areas.

The audit team also noted that, if this situation continues for the foreseeable future will contribute the risks of increase in sanitation related diseases due to illegal discharge by customers not connected to sewer network.

The Management of UWSSAs attributed the existing low levels of access to sewage services (sewer network) because the due to UWWSA allocating insufficient funds (i.e. an average of 8.8 percent of their annual budgets[16] to support the expansion of sewer infrastructure in order to increase population connected with sewer network system.

This is also compounded by the fact that most domestic users prefer to use on-site sanitation like septic tanks, Ventilated Improved Pit (VIP) latrines as opposed to connecting to sewer system which is considered expensive by the majority of customers.

3.3 Ineffective Collection of Sewage from the Communities

Through analysis conducted by the audit team it was noted that the amount of sewage collected and transported to treatment plants is very low. In average, between 0.1 and 7 percent of the generated sewage were collected and transported by truck and sewer networks respectively. This is the case for those who are not connected to sewer network (off-site) and those relying on on-site services.

Table 3.2 provides an analysis of the extent to which the generated sewage is effectively collected and transported to the disposal sites in the visited six (6) urban areas.

[16]UWSSAs' annual budgets and audited financial statements for the financial years 2012/13 – 2016/17

Table 3.2: Proportion of the amount of sewage generated and collected in visited urban areas for 2016/17

Name of the Urban Area	Estimated amount of sewage (Thousands Cubic Metres/Year)				Percentage collected
	Sewage generated	Collected by sewer network	Collected by vacuum trucks	Total collected by sewer network and trucks	(%age)
Mwanza CC	23,600	6,870	250	6,890	29
Mbeya CC	12,480	430	280	430	3
Dodoma MC	11,290	800	110	810	7
Dar es Salaam CC	98,960	3,990	440	4,430	5
Songea MC	2,340	530	10	530	23
Tanga CC	8,180	700	20	700	9
Kigoma MC	2,050	-	0.96	0.96	0.10
Mbinga TC	400	-	0.12	0.12	0.03
Sengerema TC	400	-	0.17	0.17	0.04
Kasulu TC	480	-	0.12	0.12	0.03

***Source**: Data extracted from Annual Report 2012 - 2017 from UWSSAs and EWURA (2018)*

Table 3.2 shows that Mwanza CC was the most efficient as it collected 29 percent of its waste through the network. Mbinga TC, on the other hand was the least efficient as it collected only 0.03 percent. This indicates that large amount of generated sewer is not managed adequately and not known where it is disposed off.

Furthermore, from Table 3.2 above it is estimated that Dar es Salaam produces about 98.96 million cubic metres of sewage for the period of 2016/17. Out of this, DAWASCO through sewer system and vacuum trucks collects only about 4.43 million meter cubic (equivalent to 5 percent) of sewage for treatment. The reason for this shortfall in collection is that only 3.2 per cent of population in Dar es Salaam is connected by sewer network.

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Meanwhile, about 440,000 thousand (440,000) cubic metres of sewage is collected through trucks. It is estimated that 94.53m^3 of sewage remains uncollected and its disposal will depends on the decision of the individual household or community.

This amount of sewage goes into the receiving points un-treated and continues to pollute the environment such as ground water and consequently endanger the lives of the people.

Various factors contributing to the failure of collecting sewage by both UWSSAs and LGAs were analysed, and were found to include;

(a) Low coverage of sewer network and low connections

The accessibility to sewerage services by population is still low as on average only 7.5 percent of the population living in urban areas are currently connected to the sewer network.

The low percentage of people connected to the sewer network is mainly attributed by the increasing rate of sewerage connection not matching with the rate of growth of the population which is 2.5 percent per annum. Other reasons are such as inadequate sensitization to the community on the importance of using sewer, users being far away from the main sewer and poor urban planning that hinder the accessibility of the household.

(b) Inaccessibility to some of the areas

It was noted that most of the urban areas are not well planned and that it affect the ease of extending sewer network to those areas and in some cases the emptying trucks cannot easily access area requiring the emptying services.

This is common in most of twelve visited LGAs where it was noted that only 20 percent of LGAs is planned and the rest are unplanned areas, characterized by insufficient conditions for putting in place adequate system for the collection and transportation of sewage to the disposal sites.

Other methods of sewage management suitable for unplanned areas such as use of pit latrines and septic tanks were deployed to such areas but due to rapid increase in population have rendered those methods less effective.

(c) Unavailability of faecal sludge emptying trucks

There is a problem of availability of faecal sludge emptying trucks in LGAs and this problem has contributed to the inadequate collection and transportation of sewage. The detailed information are provided in Section 3.4 of this report.

(d) Unavailability of faecal sludge treatment facilities within short distances from the points of generation

The audit team noted that in all of the visited UWWSAs, the faecal sludge treatment facilities are located on average 10- 30 kilometers from the points of generation. For example in Dar **e**s Salaam, ponds are located in Vingunguti, which is approximately 30 kilometers away from collection point at Tegeta and Kimara.

3.5 Poor quality of Effluent Discharged to the Environment

Reviews of the EWURA Regional Water Annual Performance Reports for the period from 2012/13 to 2016/17 revealed that the effluent discharged to the environment by most of the six visited UWSSAs did not meet the national effluent quality standards set by Tanzania Bureau of Standards (TZS 789:2008). This is because the levels of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and pH Level were higher in the downstream. This is an indicator that the effluents discharged from most of visited UWSSAs pollute the environment.

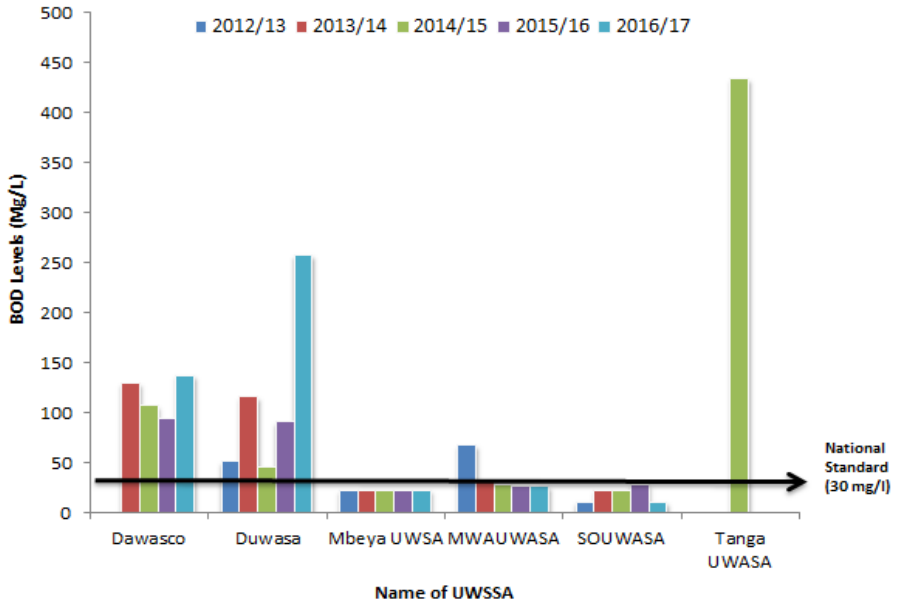
The audit team made an analysis of each of the four indicators in Figure 3.2 up to Figure 3.4 with intention of highlighting to what extent each of the six visited UWSSAs were complying with the requirements of the four indicators.

Out of these quality parameters, the audit team performed further analysis using four key parameters which are BOD, COD, TSS and pH to determine the extent to which the effluent parameters comply with the permissible effluent quality standards as shown below.

a) Biochemical Oxygen Demand (BOD)

BOD is the amount of dissolved oxygen needed by aerobic Biochemical organisms in a body of water to break down organic materials. Discharge of effluent with high BOD levels higher than 30mg/l results in depletion of dissolved oxygen available for aquatic life in the receiving water bodies, which affects survival of fish and other aquatic life. The acceptable National Standard for BOD is 30 mg/l.

Figure 3.2: Performance of UWSSAs on the measurement of BOD for the period from 2012/13 to 2016/17



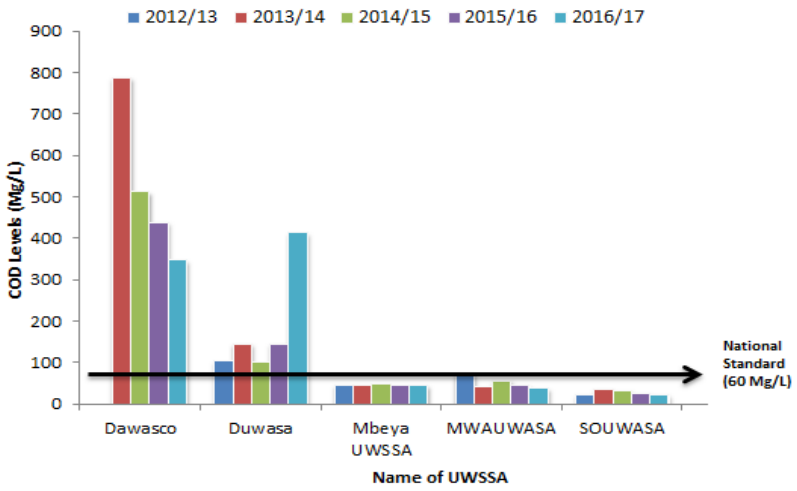
***Source**: UWSSAs' Annual Performance Reports - 2012/13 to 2016/17 (2018)*

Figure 3.2 indicates that, DUWASA, Tanga UWASA and DAWASA/DAWASCO BOD levels in effluent discharged was above the recommended limit. This means that, the effluents discharged by these UWSSAs contaminate the environment and hence poses risks to the receiving bodies such as the survival of aquatic species due to depletion of oxygen

b) Chemical Oxygen Demand (COD)

This is a measure of organic compounds and pollutants in the water. Discharge of effluent with high COD levels higher than 60mg/l results in depletion of dissolved oxygen available for aquatic life in the receiving water bodies, which affects survival of fish and other aquatic life. The acceptable National Standard for COD is 60mg/l

Figure 3.3: Performance of UWSSAs on the measurement of COD for the period from 2012/13 to 2016/17



***Source**: UWSSAs' Annual Performance Reports - 2012/13 to 2016/17 (2018)*

From **Figure 3.3**, it is noted that, DUWASA and DAWASA/DAWASCO COD's levels in effluent discharged was above the recommended limit. On the other hand TAUWSSA did not measure COD level for the period under review.

c) Total Suspended Solids (TSS)

TSS is the total amount of suspended solids present in sewage. Discharge of effluent with high TSS levels higher than 100mg/l results in depletion of dissolved oxygen available for aquatic life in the receiving water bodies, which affects survival of fish and other aquatic life. The acceptable National Standard for TSS is 100mg/l.

Table 3.3: Performance of UWSSAs on the measurement of TSS for the period from 2012/13 to 2016/17

Name of UWSSA	2012/13	2013/14	2014/15	2015/16	2016/17
	Actual measurement results (mg/l)				
DAWASCO	-	720	566	276	515
DUWASA	-	-	-	68	94
MBEYA UWSA	-	-	-	80	70
MWAUWASA	44	17	62	53	72
SOUWASAs	586	-	-	-	599
TANGA UWSA	-	-	-	-	-

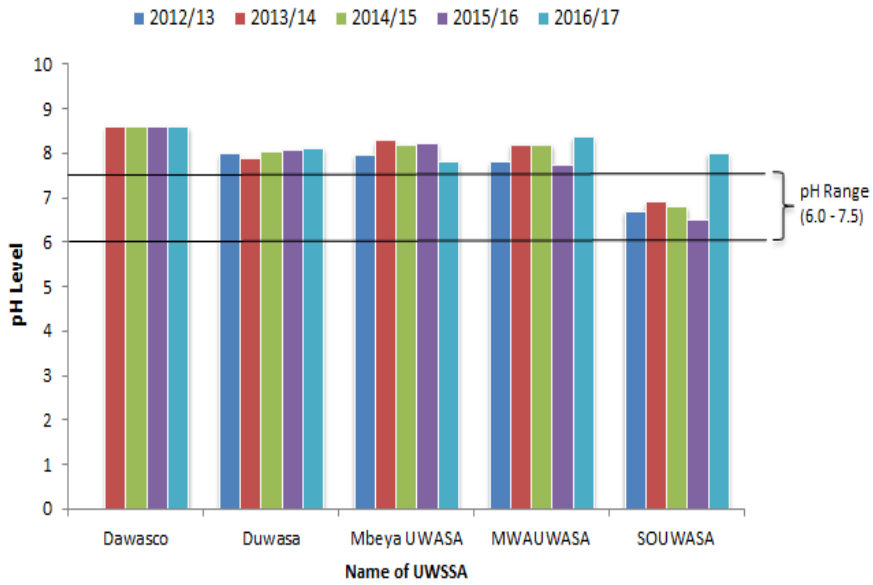
***Source**: UWSSAs' Annual Performance Reports - 2012/13 to 2016/17 (2018)*

Table 3.3 shows that DAWASCO's TSS level was about five folds above the recommended limit by an average of 5 times for the period under review, while DUWASSA's TSS level was within the required limit. TAUWSSA did not measure TSS level for the period under review.

d) pH Level

pH level is the measure of acidity and alkalinity level in waste water. The acceptable National Standard for pH is 6.5 – 8.5. If the effluents pH level of the sewage is below 6.5 or higher than 8.5 it indicates that nature of waste water is either too acidic or too alkalinity and therefore, results in destroying the quality of receiving water bodies, which in turn affects survival of fish and other aquatic life and damages plant health, making them less resistant to insect damage and disease. The pH values for the effluent in the visited UWSSAs are indicated in Figure **3.4**:

Figure 3.4: Performance of UWSSAs on the measurement of pH for the period from 2012/13 to 2016/17



Source: UWSSAs' Annual Performance Reports - 2012/13 to 2016/17 (2018)

From **Figure 3.4** it is indicated that DUWASA, TAUWSSAs and DAWASA/DAWASCO, the pH levels in effluent discharged were above the recommended limit.

In general, the audit observed that UWSSAs have not met all BOD, COD, TSS and pH national standards as prescribed in the National Water and Wastewater Quality Monitoring Guidelines for Water Utilities.

It was further noted that despite the fact that the quality of effluent produced is insufficient to meet the requirements of the national effluent quality standards for receiving waters, a polishing or tertiary treatment was needed but interviewed officials from UWSSAs indicated that there was no plan. This means that the problem of insufficient quality of the effluent would keep on persisting.

Reasons for failure to meet the national Effluent Standards

Through interviews held with technical managers and sewerage engineers from the six visited UWSSAs, it was revealed that the main factors that attributed to the failure to meet national standards included:

(i) Sewage Waste Treatment Ponds operating beyond their designed capacity

The audit team noted that at Dar es Salaam, the Waste Stabilization Ponds owned by DAWASCO are operating beyond the designed capacity. Through the review of progress reports from DAWASCO, the audit team noted that, Vingunguti waste stabilization ponds which serves a larger portion of Dar es Salaam were designed to accommodate 1849 cubic meters of sewage per day.

But up to the time of this audit the ponds were receiving about 2246 cubic metres of sewage an addition of 397 cubic meters of sewage per day which is equivalent to 21 percent above its designed capacity. This has affected the efficiency of treatment of disposed sewage because the rapid increase of the volume of sewage overloads the capacity of ponds and hence decreases the flow retention time of sewage in waste stabilization ponds.

(ii) Irregular desludging of ponds

Through the physical observations made in all six visited UWSSAs the audit team noted that, failure to meet the national standards by most of the visited UWSSAs was partly attributed to lack of irregular desludging of ponds. This case was noted in Ponds located at Vingunguti, Kurasini, and Mabibo areas in Dar es Salaam whereby the anaerobic ponds were full of sludge and left for long period of time without desludging them. The last time these ponds were desludged was in 2007.

Consequently, the practice has adversely affected the operational capacity and efficiency of the Waste Stabilization Ponds and has led to poor quality effluent discharged to the environment and in turn poses a risk to human health and aquatic species.

(iii) Absence of stringent controls to ensure that unwanted waste did not get into the ponds

Waste disposal regulation requires that the inlet of municipal waste water treatment facility must be fitted with a bar screen to remove solids and be attended to remove the accumulating materials and dispose it in an incinerator. It was observed that unwanted substances such as plastic bags, tyres, clothes and untreated industrial liquid etc., were found in Vingunguti, Kurasini, and Mabibo waste stabilization ponds. This is as shown in Photo 3.1 (a) and Photo 3.1 (b) below. Consequently, all these have adversely affected the operational capacity and efficiency of the sewage treatment infrastructures.

Photo 3.1(a): Solid substances in the ponds of Vingunguti in Dar es Salaam: (Photograph was taken on 02/10/2017)

Photo 3.1(b): Solid substances in the ponds of Kurasini in Dar es Salaam: (Photograph was taken on 02/10/2017)

CHAPTER FOUR

PROVISION OF OFF- AND ON-SITE SEWAGE SERVICES

4.1 Introduction

This chapter presents the audit findings regarding the provision of sewage services in urban areas covering both on site and off site services. In particular, the findings are focused on the access by the population to on-site and off-site sewage services from collection and treatment of sewage. Below are the details of the findings:

4.2 Unsatisfactory provision of off-site Sewage Services

According to Section 20 of Water Supply and Sanitation Act of 2009, UWSSAs are required to develop and maintain public sewerage in, on, under or over any street or vault below the streets to ensure that there is sustainable provision of sewerage services in urban areas.

Through the analysis of the level and adequacy of services provided by UWSSAs to the customers who have been connected to the sewage network, the following weaknesses were noted from the visited UWSSAs:

4.2.1 Inadequately Functioning Sewer Networks

According to Section 20 of Water Supply and Sanitation Act of 2009, UWSSAs are required to ensure that sewer systems are well maintained to sustain its functioning and also ensure that the system expansion rate stays well ahead of the population growth.

During the inspection of sewer networks from six (6) visited UWSSAs, it was observed that most of the sewer networks were not functioning well. Sewer networks were blocked and not were allowing sewage to pass through as originally designed.

This problem of mal functioning sewer networks was evidenced by the following factors:

Presence of Sewer overflows

Through physical observations to the existing sewer networks from six visited UWSSAs and the review of incidences register

books of the respective UWSSAs, the audit team noted that sewer networks at Dar es salaam City (managed by DAWASCO), Dodoma Municipality (managed by DUWASSA) and Tanga City (managed by TUWSSA) were not functioning well. This was due to frequent re-occurrences of sewage overflows along the sewer lines and sometimes flooding of sewage in cities/town centre. In these cases untreated sewage overflows from sewer lines into the environment prior to reaching sewage treatment facilities

The examples of overflows that experienced by those urban areas mentioned above are as indicated on Photo 4.1(a) and Photo 4.1(b).

Photo 4.1 (a): Showing overflows of Sewage to the environment due to blockage of sewer lines as taken on 10/10/2017 in Tanga

The audit team established main causes for the frequent sewage overflows in those urban areas. They included:

a) High frequency sewer line blockage

The analysis on the frequency of incidences of blockages of the sewer network in the given period of the audit for the visited UWSSAs was made. The analysis intended to establish the trend of blockages. The outcomes of the analysis is presented in **Table 4.1**

Table 4.1(a): Number of sewer blockages in the visited UWSSAs

Name of UWSSA	Financial Year(Number of blockages)				
	2012/13	2013/14	2014/15	2015/16	2016/17
DAWASCO	1863		2,247	2,201	2,799
DUWASA	1630	1289	561	213	91
MBEYA UWSA	45	45	40	35	42
MWAUWASA	720	780	840	960	1044
SOUWASA	213	274	263	440	482
TANGA UWSA	425	534	205	954	988

***Source**: UWSSAs' Annual Reports 2012 - 2017 (2018)*

Furthermore, review of EWURA annual reports has indicated that, number of blockages per kilometre has been increasing each year as indicated in Table 4.1 (b)

Table 4.1(b): Number of sewer blockages in the visited UWSSAs

Name of UWSSA	Financial Year(Number/km/year)				
	2012/13	2013/14	2014/15	2015/16	2016/17
DAWASCO	9.4	8.5	8.7	11.7	14.8
DUWASA	6.1	3.9	4	3.8	18.9
MBEYA UWASA	0.9	7	10	11	3.2
MWAUWASA	10.9	0.4	5.3	3.3	10.5
SOUWASA	5.8	7.4	7.1	11.9	12.9
TANGA UWSA	12.2	15.2	19.9	26.9	27.5

***Source**: EWURA, Annual Regional Water Report (2018)*

From **Tables 4.1(a)** and **(b),** the number of blockages for all UWSSAs has been increasing for the whole period of four years. Also, the number of blockage seemed to be very high in Dar es Salaam, especially in Kariakoo and Posta areas where there are high commercial activities and huge number of people during the day.

The reviewed EWURA Annual reports have indicated that there is a high frequency of blockage. The audit team noted that sewer blockages were contributed by factors such as dumping of unwanted materials into sewer systems, overloading of the sewer system, sand and siltation carried out by storm water that flows to sewer lines and lack of frequent maintenances of the aging sewer network.

These factors are further elaborated below:

b) Inadequate control or misuse of sewer systems

The review of annual reports from six visited UWSSAs indicated that frequent blockages resulting into poor performance of sewer networks were contributed by the habits residents of dumping solid waste into the sewer network.

The site visits made by the audit team accompanied by the technical personnel from UWSSAs observed piles of solid materials removed from the sewer lines as shown in **Photo 4.2 (a)** and **Photo 4.2(b)**.

Photo 4.2 (a): Showing Solid material removed from sewer network: (Photograph was taken on 31/10/2017 in Tanga)

Photo 4.2 (b) Showing Solid material removed from sewer Network: (Photograph was taken on 31/10/2017 at Vingunguti Ponds in Dar es Salaam)

The audit team made further inquiries and found-out that misuse of sewer network was contributed mainly by lack of collaboration between UWSSAs and LGAs to enforce by-laws that prevents illegal dumping of solid materials into the public sewer.

c) Overloading of the sewer systems

The sewer networks in all visited UWSSAs were designed to accommodate only sewage. The review of progress report and interviews held with sewage engineers to establish the causes of

overloading they explain that in most cases this happens during the rainy seasons in where excessive storm water runs into the sewer network through sewer openings or open manholes.

d) Lack of frequent maintenances of the aged sewer network

The review of UWSSAs progress reports and interviews held with the sewage engineers from the six (6) visited UWSSAs revealed that with exception of Songea and Mbeya UWSSAs sewer networks of the rest of the visited UWSSAs were built in 1930's and 1970's in that case they are all operating beyond their useful life.

Siltation and frequent collapse are some of the noted outcomes as a result of a sewer network being old and causing network blockage and overflows of sewage to the environment.

Increasing incidences of sewer pipe bursting due to aged or damaged sewer lines

It was also noted that with exception of Songea and Mbeya UWSSAs where their sewer networks are still new since they were built between 2008 and 2014, they are operating within designed capacity. The rest of visited UWSSAs' sewer networks/infrastructures, are all dilapidated and most of their pipes cannot sustain the high surrounding soil pressures.

Moreover, the reviewed annual progress reports of UWSSAs indicated frequent occurrences of pipe bursting of sewer systems attributed to aging sewer network/infrastructure. Table 4.2 shows the number of incidences/occurrences of bursting/collapse of sewer lines from the visited UWSSAs.

Table 4.2: Trend of incidences of bursting/collapse sewer lines in the visited UWSSAs

Name of UWSSAs	Financial Year				
	2012/13	2013/14	2014/15	2015/16	2016/17
DAWASA	13	8	15	11	-
DUWASA	2	2	1	1	1
MBEYA UWSA	0	1	3	3	3
MWAUWSA	0	0	0	0	0
SOUWASA	-	2	-	-	1
TANGA UWSA	8	18	10	2	6

Source: Annual Report, 2012-2017 (2018)

Table 4.2 shows that in some UWSSAs the problem of bursting/collapse of sewer lines is increasing while in other UWSSAs the situation remained relatively the same. This means there are no noted improvements.

Inadequate capacity of sewer infrastructures

The review of the annual progress reports for DUWASA, TANGA UWSA and DAWASCO indicated that most of the sewer systems were built between 1930's and 1970's they are all beyond the useful life. Due to increased urban settlements and commercial activities particularly in big cities and towns, the infrastructure in place is no longer capable to accommodate the increased sewage collection demands.

The following main factors were used to compare and establish the current capacity of the existing sewer networks in the visited UWSSAs.

- Current demand against designed capacity (actual capacity of the sewer network); and
- Current population against the designed number of people to be served in the sewer network

Table 4.3 provides the comparison of the current demand against the actual capacity of sewer networks based on the population in 2017 from six visited UWSSAs in the country.

Table 4.3: Comparison of the current demand against the actual capacity of sewer network as of June 2017

Name of UWSSAs	Amount of Wastewater (Cubic Meters/day)		
	Sewer network actual designed volume/ capacity	Actual current demand	% age volume of wastewater to be collected through sewer network
DAWASCO	40,514	590,000	1456
DUWASA	96,000	102,000	**106**
MBEYA UWSA	34,200	52,589	154
MWAUWASSA	28,438	47,474	167
SOUWASA	2100	11,200	533
Tanga UWSSA	445,700	480,000	**108**

***Source**: Auditors' Analysis from the submitted reports by UWSSAs (2018)*

From **Table 4.3**, it was observed that all sewer networks from the six (6) visited UWSSAs are operating beyond their designed capacity.

The table further shows that sewer networks operated by SOUWASA will operate 5times above the designed capacity. While that of Mbeya and DAWASA will operate 14 times above the design capacity. This implies that the Authorities have not done significant efforts to expand the sewer network to meet the current demand.

On the other hand, Table 4.4 provides the comparison of the current population against the designed number of people to be served in the sewer networks in 2017 for six (6) visited UWSSAs in the country.

Table 4.4: Comparison of the current Vs Designed Capacity in terms of Population to be served in the Sewer network in 2017

Name of UWSSAs	Year when the infrastructure was commissioned	Designed number of population	Current population expected to use the network	%age current population expected to use sewer network (2018)
DAWASCO	1979	65,000	5,781,557	8895
DUWASA	1978	Unknown	27,005	-
MBEYA UWSA	2012	353,173	435,000	128
MWAUWSA	2009	296,225	494,517	167
SOUWASA	2008	24,000	195,000	812
TANGA UWSA	1930's	34,545	289,554	838

***Source**: Auditors' analysis from the submitted reports by UWSSAs (2018)*

From **Table 4.4**, it was observed that all sewer networks from the six visited UWSSAs have capacities that do not meet the current population demands in their areas. DAWASCO sewer network is required to operate 8 thousand (8,000) times the designed capacity in order to meet the current expected demand of 5.7 million people in Dar es Salaam.

The table further shows that sewer networks operated by SOUWASA will operate 8 times above the designed capacity so as to meet its population demands. Currently, 15,936 people which are only 7 percent of the population in Songea are connected to

the sewer. Although this only 7 percent of the population it already occupies approximately 70 percent of the designed capacity of the sewer.

This calls for the Ministry of Water and the respective Authorities to invest more for expanding sewer network so as to meet the demand. If the situation will not be rectified, there is a risk of increase in environment pollution due to illegal desludging of sewage as a result of low access to improved sewage sanitation services.

4.2.2 Inadequate Maintenance and Rehabilitation of Sewer Networks by UWSSAs

The goal of sewer system maintenance is to improve system performance and preserve asset condition as long as possible. Periodic cleaning and rehabilitation/replacement of the sewer system play a big role in reducing the rate of blockage, sewer collapse and sewage spillage. The Water supply and Sanitation Act, 2009 section 5(c) requires UWSSAs to ensure that the maintenance and upkeep functions are given high priority throughout its utility. However, during the audit the team noted the following weaknesses.

i) Inadequate rehabilitation of deteriorated sewer pipelines

As noted that, most of the sewer infrastructures in six (6) visited UWSSAs were built between 1930s and 1970s and therefore, they are all dilapidated and most of their pipes cannot sustain the high surrounding soil pressures.

However, the audit team noted that, all six (6) visited UWSSAs have not rehabilitated the available sewer infrastructures over a long period of time. Furthermore, the reviewed Annual Progress Reports for the period from 2012/13 to 2016/17 prepared by six (6) visited UWSSAs, the audit team noted that most authorities mainly conduct maintenance of the sewer pipelines based on reported breakdown incidences.

Further scrutiny done of the rehabilitation of the sewer pipelines revealed that two (2) main factors contributed to the inadequate rehabilitation of deteriorated sewer pipelines. These were:

- Frequency of collapse of sewer system; and
- Re-occurrence of the same problem over time.

Increased Frequency of collapse of sewer system: The reviewed annual progress reports indicated frequent occurrence of collapse of sewer system caused by lack of rehabilitation to aging sewer network. **Table 4.5** shows the occurrence of collapse in sewer system for the visited UWSSAs.

Table 4.5: The trend of incidences for Collapsing of sewer lines in the visited UWSSAs (2012/13 – 2016/17)

Name of UWSSAs	Financial Year				
	2012/13	2013/14	2014/15	2015/16	2016/17
DAWASCO	13	8	15	11	-
DUWASA	2	2	1	1	1
MBEYA UWASA	-	-	-	-	-
MWAUWASA	0	0	0	0	0
SOUWASA	-	2	-	-	1
TANGA UWASA	8	18	10	2	6

***Source**: UWSSAs' Annual Report for the period 2012/13 - 2016/17 (2018)*

From **Table 4.5,** it can be seen that the financial year 2013/14 and 2014/15 Tanga City seemed to have more collapses. The engineer's responses pointed out that this was because the rainfall was higher compared to other years. When the amount of rain is higher it increases the soil density (weight) and the dilapidated pipe fail to accommodate the pressure and hence collapses.

Apart from the reasons mentioned above, further review and inquiries revealed that the noted frequent collapse in Tanga was because sewer infrastructure have not been replaced over a long period of time. Also, Tanga UWSA did not have long-term maintenance plan instead it mainly conducts maintenance based on reported incidences.

Re-occurrence of the same problem over time: Based on the reviewed Annual Progress Reports for the period from 2012/13 to 2016/17 prepared by six visited UWSSAs the audit team noted that the collapse/burst of sewer network were occurring more frequently during rainy season. As indicated in Table 4.5 the overall frequency of collapse of sewer network in all UWSSAs has been increasing annually. This is an indicator that the sewer system has not been rehabilitated over a period of time. A frequent occurrence of collapse of sewer network has been costing the authorities in terms of carrying repairs of regular collapsed sewer network.

ii) Inadequate Maintenance of Waste water Stabilization Ponds (WSP)

Through site visits made to the waste stabilization ponds in six visited water UWSSAs, the audit team observed that for the 7 visited waste stabilization ponds, were visually not well maintained.

The audit team noted that the amount of sludge found in some of the ponds appeared to have been accumulated over a long period of time. For instance, in Dar es Salaam City, Lugalo and Buguruni waste stabilization ponds were at least seem to be well maintained and there is little accumulation of sludge. But, for Mikocheni, Kurasini and Vingunguti waste stabilization ponds especially the anaerobic ponds were full of sludge.

In Dar es Salaam, all six (6) visited waste stabilization ponds with exception of Lugalo pond, had polythene and rubbish floating on the surface of the ponds as shown in Photos 4.3(a), 4.3(b) and 4.3(c). Also, overgrown bushes and dumped solid waste materials were also observed at Mabibo and Buguruni waste stabilization ponds as shown in **Photo 4.3 (d)**.

	
Photo 4.3 (a): Kurasini Anaerobic Pond full of sludge (Photograph was taken on 31/10/2017 in Dar es Salaam)	Photo 4.3 (b): Vingunguti Pond full of sludge (Photograph was taken on 31/10/2017 in Dar es Salaam)

	
Photo 4.3(c): Buguruni Anaerobic Pond accumulated sludge (Photograph was taken on 1/11/2017 in Tanga)	Photo 4.3 (d): Mabibo Anaerobic Pond accumulated sludge and bushes (Photograph was taken on 1/11/2017 in Tanga)

Moreover, in Dar es Salaam City upon the review of annual progress reports from DAWASCO, the audit team revealed that out of 15 pumping stations of the existing sewer network only 6 pumps were operating. The remaining 9 ceased to operate since 2015 up to the time of this audit.

The main reason for having non-operation pumps was the fact that the pumps have not been maintained since they were installed in 1970s'. The audit team did not see any efforts from DAWASCO Management to ensure that the pumps are maintained and become operational.

Consequently, having a large number of non-operating pumps affects smooth operation of sewer network which sometimes result into overflows of sewage into the environment.

4.2.3 Inadequate Implementation of Plans for the Expansion of Sewerage networks

Through the review of the UWSSAs business plans for the period from 2012/13 to 2016/17, the audit team noted that all six (6) visited UWSSAs have not adequately implemented their plans to expand sewerage networks to cover the large number of residents not connected to the sewer networks. All UWSSAs with exception of MWAUWSSA have failed to successfully implement set strategies of expanding the coverage of sewer network on their respective areas. Table 4.6 provides the detailed account of the status of the implementation of the proposed strategies aimed at increasing sewerage coverage by each UWSSAs.

Table 4.6: Comparison of Planned against Actual lateral expansion of sewerage networks in six visited UWSSAs (2012/13 – 2016/17)

UWSSAs	Planned sewer network expansion (Kilometres)	Actual sewer network expansion (Kilometres)	Difference between Planed and Actual expansion (Kilometres)	Percentage expanded (%)
DAWASCO	Not planned	18.9	18.9	N/A
DUWASA	2.5	0	2.5	0
MBEYA UWASA	38	22	16	57.9
MWAUWASA	12	17.3	(5.3)	144.2
SOUWASA	5	0	5	0
TANGA UWASA	2.5	2	0.5	81

***Source**: Data extracted from Annual Reports for the period of 2012 - 2017 from UWSSAs and EWURA (2018)*

As indicated in **Table 4.6**, both Tanga UWSSA and DUWASA had targeted to expand the lateral network by 2500 metres respectively from financial year 2012/13 to 2016/17.However, Tanga UWSSA expanded the network by 81 percent while Dodoma did not expand during the period under review. Likewise, Songea did not expand while Mbeya expanded the network by 57.9 percent. MWAUWSSA managed to expand the network by 144.2 percent as shown in **Table 4.6**.

Further analysis was made by the audit team, to analyse whether the plans were corresponding to the projected population growth rate for each UWSSAs. Table 4.7 presents the comparison of the planned expansion rate and the rate of population growth for each of the visited UWSSAs.

Table 4.7: Comparison of the Sewer Planned Expansion and the Population growth rate for each UWSSAs from 2012/13 – 2016/17

Visited UWSSAs	Average planned Expansion rate per annum (km)	Average population to be served by planned expansion	Rate of population Growth per annum	Actual population growth per annum	%age of population served as a result of expansion
DAWASCO	0	0	5.6	244,414	-
DUWASA	0.5	250	2.1	8,630	2.9
MBEYA UWSSA	7.6	3800	2.7	46,131	8.2

Visited UWSSAs	Average planned Expansion rate per annum (km)	Average population to be served by planned expansion	Rate of population Growth per annum	Actual population growth per annum	%age of population served as a result of expansion
MWAUWSSA	2.4	1200	2.3	63,767	1.9
SOUWSSA	1	500	2.1	4,269	11.7
TANGA UWSA	0.5	250	2.2	6,013	4.2

Source: UWSSAs annual progress reports for the financial year 2012/13 – 2016/17 (2018)

The reasons for low level of expansion of sewer networks are as elaborated below:

UWSSAs allocate little amount of money to support the desired sewer network (infrastructure) growth

Large sums of money have been channelled through the operationalization of UWSSAs activities and little was set aside for the newly developed lateral sewer networks or even expansion of the network. In average it was observed that in totality UWSSAs have set aside an average of TZS 2.8 billion which is equivalent to 8.8percent of the total revenues of all individual UWSSAs for the development of sewer network.

This amount was found to be insignificant in developing or expanding sewer networks to new areas within the jurisdiction of respective UWSSAs since construction of one kilometre of sewer network cost an average of TZS 635 millions to TZS 750 million to construct.

Delays in implementing major projects in the sewerage sector by the Central Government

The audit team acknowledge the completion of a new Water and Sanitation Programs and sewer networks in Songea and Mbeya authorities, which were completed in 2006 and 2014 respectively. Similarly, the audit team noted the delay of commencement of the two sewerage projects under Water and Sanitation Development Programs II for Tanga and Dar es Salaam regions which are still at feasibility study and detailed design stage.

Major projects are designed and managed by the Ministry of Water which depends very much on the Development Partners to facilitate the implementation of projects. The financing of projects which require huge sum of monies have not been steady on the area of sewerage rather the focus has been on drinking water projects.

4.2.4 Inadequate Performance of the Waste Water Stabilization Ponds (WSP)

The Water and Wastewater Quality Monitoring Guidelines for Water Utilities, 2014 provides the maximum permissible limits for quality of waste water to be discharged to the environment as per the Tanzania standard TZS 860: 2006(E).The guidelines also prescribe the permissible limits for municipal and industrial effluents to be discharged to the receiving bodies.

Up to the time of this audit, 5 out of 7 visited UWSSAs were found to use waste water stabilization ponds as the methodology used for treating waste water. The UWSSAs conducted wastewater quality monitoring by determining the level of TSS, PH, BOD and COD in the effluent.

The review of a monthly quality of effluent monitoring reports for the financial year of 2016/17, revealed that, 2 out of 6 visited UWSSAs had their effluents TSS, PH, BOD and COD values complying with TBS standards (TZS 860:2006),this implies that their treatment plant (WSP) is efficient. But for the remaining four their effluents BOD, COD and TSS did not comply with national standards. This implies their treatment plants (WSP) were inefficient.

Further inquiry was made through technical managers and sewerage engineers of visited UWSSAs, to establish reasons for the failure to meet national standards. The audit team noted that this was partly due to:

a) ponds operating beyond design capacity;
b) lack of regular desludging of ponds; and
c) absence of stringent controls to ensure that poor quality influent and solid materials did not get into the network.

The three factors mentioned above have affected the operational efficiency of the sewage treatment infrastructures and thus quality of the effluent. The detailed analyses on how

the above mentioned factors contributed to the problems are provided below:

a) Ponds were operating beyond their designed capacity

The audit team acknowledge that the visited WSPs of Songea, Mbeya, Dodoma and Mwanza were noted to be operating within the designed capacity. Out of six (6) waste stabilization ponds visited by the audit team in Dar es Salaam region, two ponds (Vingunguti and Kurasini) are totally malfunctioning due to existence excessive sludge, solid materials and other impurities and concentrations inside the ponds, especially in the anaerobic and facultative ponds.

b) Lack of regular desludging of ponds

It was also noted that desludging of ponds was done irregularly. The officials of UWSSAs mentioned that they don't even remember when the last time desludging was conducted in their respective ponds during the last 10 years. For example, in Dar es Salaam City, there were no records found at DAWASCO offices indicating when were the last time the dislodging of ponds conducted in all six (6) visited ponds.

Consequently, disposal of sewage by using sewage networks or vacuum trucks are done as if they are disposed into a pit latrines making treatment impossible and the ponds kept on polluting the environment.

For the case of UWSSAs from Songea and Mbeya, the ponds are still operating in good condition since they are still new. They were constructed between 2008 and 2014 with fewer numbers of connections almost 1350 connections which is far below the designed capacity of 2000 connections. Also, at DUWASSA the ponds are operating well and they have 2-sets which are anaerobic and facultative ponds that inhibit complete treatment process required.

c) Absence of stringent controls to ensure that unwanted waste and solid materials did not get into the network

Through the review of sewerage maintenance reports for the period under review, it was noted that sewer networks from most of the visited UWSSAs lack stringent controls to ensure poor quality effluent and solid materials did not get into the network.

This has resulted into existence of several blockages as observed during site visits made in Dar es Salaam, Dodoma and Tanga regions.

Further to that, the audit team noted that UWSSAs did conduct non routine maintenance of the available sewer networks in response to the reported blockages. However, they don't conduct preventive maintenance in order to prevent blockages. As a result of that, UWSSAs have been spending unnecessarily large amount of resources including human and financial to unblock the network, because if they left unattended it would pollute the surroundings and finally increase the risks to the spread of communicable diseases like water borne diseases.

At Vingunguti and Kurasini waste stabilization ponds in Dar es Salaam solid waste materials as shown in Photo 4.4 (a & b) were observed in the ponds which was an indicator of illegal dumping of solid waste materials in the sewer system. See **Photo 4.4 (a & b)**

Photo 4.4(a): Showing an outer look of in-use Vingunguti anaerobic pond with a resembling of a solid waste dumping site(Photo was taken on 31st October, 2017 at Vingunguti WSP).

Photo 4.4(b): Showing a mixture of sludge and solid waste in anaerobic pond at Kurasini - Dar es Salaam (photograph was taken on 02nd November, 2017)

The audit team also found the following weakness related to budgeting and funding for sewerage services in the visited UWSSAs.

4.2.5 Inadequate allocation of Resources for the Sewage Services by UWSSAs

Inadequate budgeting for sewerage services

Through the review of the Medium Term Expenditure Frameworks for 2012/13 – 2016/17 the audit team noted that, less priority was given to sewage activities compared to clean water supply activities. It was noted that upgraded projects for water supply dominated both funding and operations, while activities regarding sanitation/ sewage were neglected during the last four years covered by the audit.

This confirms that while UWSSAs have made major improvements on the infrastructures for the provision of clean water, infrastructures for the provision of improved sewerage services have been significantly lagging behind.

In addition, the audit team noted that, UWWSAs were underestimating the revenue collection for sewage, as presented in Table 2.3 in chapter two. This was indicated by the fact that UWSSAs had collected above target revenues collections. For example DAWASCO in 2013 had targeted to collect revenues of TZS 1,954 million but they collected TZS 3,391 million which is 1.7 times higher than the estimated collections. See more details in ***Appendix 5*** of this report.

Furthermore, the team noted that, despite collecting more than the targeted revenues, some of the UWSSAs did not improve their set target based on the previous years' experience.

The audit team reviewed annual budgets of six visited UWSSAs involving estimates for collections and expenditures for provision of sewerage services for the financial years ranging from 2012/13 to 2016/17. The aim was to make comparison of the percentage collected as revenues against the amounts set aside and used for the provision of sewerage services. The results of the comparisons are as presented in **Table 4.8**:

Table 4.8: Average Annual Budgeted revenues against the expenditures for Sewerage services in the visited UWSSAs for five years (2012/13- 2016/17)

Name of visited UWSSA	Average Budgeted revenues (Million TZS)	Budgeted expenditures (Million TZS)	% age of budgeted expenditure over budgeted revenues
TANGA UWSSA	229	74	79
DAWASCO	2837	474	14
SOUWASA	100	53	53
DUWASA	544	156	23
MBEYA UWSA	673	205	34
MWAUWASA	756	211	22

Source: *UWSSAs Budgets statement from 2012/13 – 2016/17 and auditors' analysis from the submitted financial information (2018)*

Table 4.8 indicates that Tanga UWSA and SOUWASAhad budgeted to spend an average of 79 percent and 53 percent from their projected revenues for the sanitation related activities. The remaining UWSSAs planned to spend a smaller amount out of their revenue (less than 50 percent).These affected the implementations of sewage activities since the set amounts were insufficient for implementing major projects related to the expansion of sewerage networks.

Also, SOUWASA in 2012/13 planned to spend more than 100 percent of the projected collected revenues to increase new customers' connections and in the following three years from 2013/14 to 2015/16 it budgeted to spend less than 55 percent of projected sewerage revenues as sewerage expenditures.

However, the actual expenditure did not reflect the budgeted expenditures as indicated in Table 4.8.For example Mbeya UWSA had planned to spend an average 34 percent of the actual

collections from the provision of sewerage services for adding new connections and maintenance of the existing sewer system.

On the other hand, DAWASCO planned to spend less than 20 percent of the expected revenues collected from the provision of sewerage services to improve the sewerage system with exception of the financial year 2014/15 where it budgeted to spend 36 percent of collected revenues. This situation indicates that allocation of funds for the improvements of sewerage services is not a priority for the management of DAWASCO during the budgeting process. Subsequently, it would affect the whole sewerage network if required maintenance or improvement cannot be performed within prescribed time.

Under-spending of actual revenues collected from provision of sewerage services

Further analysis was made to ascertain the proportionality between the amount of revenues collected from sewerage services and that spent for maintenance and improvement of sewerage networks. The analysis included actual amounts collected as revenues from the provision of sewerage services and actual funds that were allocated and spent for the improvements of the sewerage services.

The review found out that with exception of Tanga UWSA, most of the UWSSAs spent less than 30 percent of their total collected revenues from sewerage services for sewerage related activities.

The review of annual plans indicated that the above shortfall was attributed to low priority given to the sewerage related activities during the planning process despite the fact that there are a lot of activities in the sanitation arena that need to be prioritized during the planning stage. These activities include but not limited to maintenance, rehabilitation, ponds desludging and network expansions.

The other reason given was that because UWSSAs did not adequately analyzed the required expenditures during budgeting process in the sewerage services, thus they could not spend on what they had not budgeted for.

Table 4.9 shows the amount of actual revenues received from sewerage services versus actual expenditures spent on maintenance and expansion of sewerage networks.

Table 4.9: Actual collections versus Actual expenditures on the maintenance and expansion of sewerage networks in the visited UWSSAs (2012/13 to 2016/17)

Name of UWSSA	Financial years	Actual collections (Million TZS)	Actual expenditures (Million TZS)	%age of actual collection spent on sewerage services
TANGA UWSA	2012/13	153	64	42
	2013/14	167	113	68
	2014/15	243	104	43
	2015/16	266	245	92
	2016/17	287	340	119
DAWASCO	2012/13	3,391	97	3
	2013/14	3,572	150	4
	2014/15	4,198	88	2
	2015/16	9,084	375	4
	2016/17	8,088	532	7
DUWASA	2012/13	417	112	27
	2013/14	425	83	20
	2014/15	481	157	33
	2015/16	928	239	26
	2016/17	990	191	19
SOUWASA	2012/13	101	7	7
	2013/14	107	25	23
	2014/15	206	20	9
	2015/16	219	32	14
	2016/17	474	44	9
MBEYA UWSA	2012/13	580	26	5
	2013/14	584	63	11
	2014/15	677	52	8
	2015/16	691	42	6
	2016/17	687	56	8

***Source**: Sewerage Actual revenues and expenditures extracted from UWSSAs financial Records from 2012/13 - 2016/17 and Auditors' analysis of the provided financial records (2018)*

Table 4.9 indicates that with exception of Tanga UWSA, the rest of UWSSAs spent significantly low amounts of the collected funds from sewerage charges and fees to the maintenance, rehabilitation, expansion of sewerage network or allied sewerage expenditures in the years under review.

Tanga UWSA in 2015/2016, spent more than 90 percent of the collected sewerage revenues and in 2016/17 spent 100 percent of the collected sewerage revenues to improve the sewerage

services. The high level of expenditure to the sewage related activities enabled Tanga UWSA to improve the existing sewer network by rehabilitating, maintaining and expanding the sewer network coverage from 9 percent in 2013 to 10 percent up to the time of this audit.

On the other hand, for the years under review, DAWASCO spent less than 7 percent of the collected sewerage revenues for sewerage activities such as maintaining the sewerage infrastructures including the available six (6) waste stabilization ponds. For example, between 2012/13 and 2013/14 it was noted that DAWASCO spent less than 3 percent of the collected sewerage revenues to improve the sewerage infrastructures despite the fact that waste water stabilization ponds were in poorest condition. DAWASCO was however collecting more than 8 billion Tanzania shillings of sewerage revenues from 2015/16. As a result the sewerage network coverage declined from 7to 3 percent in 2015 when the population in the Dar es Salaam City was gradually increasing.

DUWASA utilized between 19and 33 percent of collected sewerage revenues from 2012/13 to 2016/17 for the improvements of sewerage network. The amount spent was relatively small due to the fact the existing network needs maintenance, rehabilitation and expansion to cope with the increasing population in Dodoma Municipality as the capital of Tanzania.

SOUWASA on average spent less than 15 percent of the collected sewerage revenues to increase new connections to sewerage network since the current network is short and doesn't cover all the residents ought to be connected. It was built in 2008, therefore it doesn't require high maintenance cost compared to the old networks of other UWSSAs like DAWASCO. However, according to the interviews held with sewerage engineers from visited UWSSAs, the collected revenues could have been used to increase new connections from the existing 1338 connections to 2000 connections to reach the designed sewer network capacity.

MWAUWASA on average spent less than 7 percent of the collected sewerage revenues to increase new sewer connections and maintenance of the existing sewer network. The network is still new since the Waste Stabilization Ponds started to operate in 2014.

Inadequate utilization of dumping fees in servicing the waste stabilization ponds by DAWASCO

The audit team further reviewed the amount of dumping fees charged by DAWASCO from waste water disposal charges to the private vacuum trucks operators. The review intended to establish whether the fees can be utilized to maintain the available waste stabilization ponds through pond desludging. Under normal circumstances DAWASCO is required to spend the collected dumping fees and use it to improve the observed worst conditions in their Waste Stabilization Ponds.

It was noted that DAWASCO collected at least TZS 1.7 billion from 2012/13 to 2016/17 as dumping fees from Vingunguti and Kurasini ponds. However, it was noted that very little amount of funds collected from dumping fees were spent for the ponds maintenance. The collected revenues could be used to clean the ponds.

The audit team had enquired and found out that TZS 15 million was enough to desludge 1 anaerobic pond. The collected TZS 1.7 billion was enough to undertake an annual desludge for 15 years. This could rescue the worst situation of the waste stabilization ponds in the Dar es Salaam City.

4.2.6 Revenue Collection Management from Connected household and buildings

According to Water Supply and Sewerage Act, Section 21(1)(d) and 23(b)(g), UWSSAs are required to manage collection of revenues from households connected with sewer networks. With reference to the reviewed financial information for the period from 2012/13 to 2016/17 of the six (6) visited UWSSAs that have sewerage network, the audit team found out that, all of them have managed to collect at least 85 percent of the revenues from their customers. The uncollected 15 percent are the normal arrears that are outstanding dues from late payments by the customers.

4.3 Inadequate Provision of on-site Sewage Services

The Local Government Authorities (LGAs) are required to ensure that the amount of generated sewage is collected, transported and disposed off. The audit team noted the following:

Not all generated sewage is timely collected

The review of the progress reports from eleven visited Local Government Authorities; shows that not all generated sewage are timely collected from the customers (households, businesses etc) who are not connected to sewer networks. The analysis was made by the audit team to assess the extent to which the generated sewage is timely collected and transported to the disposal sites in the visited twelve LGAs. Table 4.10 provides statistical information regarding that analyzed situation from the visited Local Government Authorities.

Table 4.10: Amount of Sewage Collected in the Visited LGAs for period from 2012/13 – 2016/17

Name of LGAs	Amount of faecal sludge needed to be collected by Trucks (m3)	Amount of faecal sludge collected by vacuum truck (m3)	%age collected by vacuum truck
Mwanza CC	23,600,000	25,248	0.11
Mbeya CC	12,480,000	2,784	0.02
Dodoma MC	11,288,000	10,512	0.10
Dar es Salaam CC	98,960,000	438,000	0.44
Songea MC	2,336,000	1,152	0.05
Kigoma MC	2,048,000	960	0.05
Mpwapwa DC	280,000	98	0.04
Sengerema TC	400,000	168	0.04
Tanga CC	8,176,000	2,304	0.03
Mbinga TC	400,000	120	0.03
Kasulu TC	480,000	120	0.03

***Source**: Auditors' analysis from LGAs Annual Reports by (2018)*

Table 4.10 indicates that, in all eleven (11) visited LGAs, not all generated sewage was timely collected. As a result, in some areas especially where there are commercial buildings such as hotels, training institutions such as schools, colleges, etc., big markets, sewage was overflowing in the streets posing risks for eruption of communicable diseases.

Furthermore, the comparison of the amount of sewage collected and that disposed was made in each visited LGAs. It was observed that significant amount of collected sewage was not disposed to the officially recognized stabilization ponds. This was mainly noted in LGAs that didn't have waste stabilization ponds. Table 4.11 provides statistical information regarding that situation in the visited Local Government Authorities.

Table 4.11: Amount of sewage disposed off in the visited LGAs for period from 2012/13 – 2016/17

Name of LGAs	Estimated Amount of faecal sludge collected by vacuum trucks (m3)	Amount of faecal sludge disposed of (m3)	%age faecal sludge disposed off in unauthorized areas
Kigoma MC	2,048,000	2,048,000	100
Mbinga TC	400,000	400,000	100
Tanga CC	8,176,000	8,176,000	100
Sengerema TC	400,000	480,000	100
Kasulu TC	480,000	480,000	100
Mpwapwa DC	280,000	280,000	100
Total for Six LGAs	**11,784,000**	**11,864,000**	

Source: *Auditor's analysis (2018)*

As indicated in **Table 4.11**, in six (6) out of eleven (11) LGAs, almost 100 percent amounting to 12,864,000 cubic meters of the collected sewage were not disposed in officially recognized stabilization ponds. This means that, a significant percentage of the collected sewage are not disposed off safely in officially recognized areas.

Transportation of collected sewage is not adequately done to standards

Through interview held with officials from LGAs and site visits to all eleven LGAs visited, the audit team noted various factors contributed to the inadequate transportation of the collected sewage. These include:

i) Not all faecal sludge generated is transported to disposal sites

Through interviewsheld with Clean and Environmental Officers from the eleven visited LGAs, the audit team revealed that, 6 out of 11 visited LGAs namely Tanga CC, Mbinga TC, Sengerema TC, Mpwapa TC, Kigoma MC and Kasulu TC didn't have designated faecal sludge disposal sites. In order to avoid polluting the environment some of these LGAs such as Mpwapwa were required to dispose sewage tonearby LGAs which have designated sewage disposal sites. Others were disposing in a nearby rivers and oceans.

This means that trucks were supposed to transport faecal sludge for an average of 50 km kilometers in order to dispose-off sewage to the Waste Stabilization Ponds located at a nearby LGA.

This was also noted to drive up the cost of transporting sewage by an average range of TZS 80,000 - 100,000/- in those LGAs while the average cost for the LGAs with Waste Stabilization Ponds located in their LGAs ranged from TZS 15,000- 20,000/.

However, through physical observations in those six (6) visited LGAs the audit team noted that most of them were disposing untreated sewage to the rivers, valleys of any open space etc. This particular practice was found to be detrimental to the environment. For example in Mpwapwa the vegetation covers have been destroyed by the practice of disposing untreated sewage to the environment.

ii) Delayed transportation of faecal sludge

Collection and transportation of faecal sludge from the point of generation is required to be done as soon as possible before the pit latrines, the septic tanks or soak pits are full and overflow to the surroundings.

Through the interviews held with selected residents/customers of Kinondoni and Ilala Municipalities in Dar es Salaam, it takes an average of three to five days for the emptying service providers to come and desludge sewage after they have made an appointment with the service provider. It was also noted that during that period while still waiting for the emptying services, they kept on using septic tank and soak pit making the situation worse to the extent of sewer overflowing to the surroundings.

The reasons for the delays in the transportation of faecal sludge were established through the interviews conducted with the service providers. The main reasons include:

a) *Poor access to the residential areas or houses that require the emptying services*: due to poor town planning in most of the visited LGAs, it was noted that emptying trucks had a difficult time to locate most of the residential areas or houses in need for the services. Hence, it took a while for them to find those areas. Also, it was noted that due

narrow roads or lack of enough space for the trucks to negotiate corners, it was also hard for them to reach those vicinities;

b) *Poor road conditions especially during the rainy season*: Roads were not passable during the rainy seasons. Drivers of the emptying trucks were facing difficult time to collect sewer from areas with unpaved impassable roads;

c) *Poor conditions of emptying trucks*: the empting trucks used to collect sewer from most of the LGAs are in poor state (mechanically). This means those trucks are plagued with frequent breakdowns and are in need of frequent maintenances; and

d) *Delayed bookings or calling for the services of the emptying trucks*: it was also noted that most of the residents who needed the services of emptying trucks, would wait until the pit latrines and septic tanks or soak pits are full to the extent that it overflow to the surroundings, before calling for the emptying services and while knowing that others probably have already booked for the same services.

Furthermore, the Clean and Environmental Officers from the 11 visited LGAs, indicated that, absence of adequate mechanisms for controlling the provision of sewage services rendered by private service providers who own most of emptying trucks is among the major cause for the inadequate transportation of sewage from residential or business areas to the Waste Stabilization Ponds.

iii) Vacuum trucks are not meeting the required standards to transport faecal sludge

Through the observation made by the audit team it was noted that vacuum trucks used to transport collected faecal sludge from residential or business areas to the waste stabilization ponds in the 5 visited LGAs did not meet the required standards. Some of the vacuum trucks were old in a way that allows spillage/drainage of the faecal sludge during the transportation. Apart from polluting areas along the roads, they also leave bad and unpleasant smell to the surroundings while transporting collected faecal sludge to the treatment plants.

Further analysis was made to establish the reasons that contributed to allowing of vacuum trucks that were not meeting standards to transport faecal sludge. The main noted reasons were:

a) Inadequate control of private sewer service providers

The audit noted that, in Dodoma Municipal Council, Mwanza, Dar es Salaam and Tanga City Councils, onsite sanitation service was provided by private people who were poorly managed by the respective LGAs. Although, LGAs were required to enter into contracts with private service providers and monitor services provided, to ensure the services provided achieve the intended objective of sewage collection, transportation and disposing it.

Interviews with Cleans and Environment and Trade Officers of the visited LGAs, and the review of vehicles trade licenses and truck register, it was noted all private service providers who were providing onsite sanitation services, were operating without contracts or a trade licence. This was observed in the four LGAs where onsite sanitation service was provided by private service providers. **Table 4.12** presents the status of the availability of contracts of the private service providers**.**

Table 4.12: Extent of Availability of Contracts of the Private Service Providers in the visited LGAs

Visited LGAs	Total number of available service providers	Number of service providers with operating contracts	Number of service providers with trade license
Mwanza CC	5	0	5
Mbeya CC	1	0	0
Dodoma MC	6	0	3
Dar es Salaam CC	32	0	20
Tanga CC	5	0	0
Kigoma MC	1	0	0
Sengerema TC	1	0	0

***Source**: Trucks register and Traders' Licensing Reports (2018)*

As it can be seen in **Table 4.12** indicates the following:

i) Lack of Operating licenses:

With exception of Mwanza City council, where all private service providers had trade licence, in other three areas; i.e Dodoma Municipal Council, Dar es Salaam and Tanga City Councils not all private service providers had trade license. For instance, in Dar es Salaam 20 out of 32 private service providers did not have trade licence and in Tanga City Council all 5 private service providers did not have trade licence.

Despite the fact that LGAs through the Local Government Urban Authorities Act, No.8 of 1982 is vested with the task of managing sewer from collection to the disposal and it is the one accountable for that area, it has not found a way to manage service providers in their areas of jurisdiction by issuing them with operating licenses.

ii) Lack of contracts between service providers and LGAs:

Table 4.12 also indicates there are no existing and formalized contracts between onsite sanitation service providers and in the four LGAs. This means that the services of those individuals who are providing faecal sludge emptying and transporting to the disposal sites are not formalized.

The interviewed council officials[17] pointed out that diffused line of responsibilities between LGAs and UWSSAs regarding provision of onsite sanitation service as the reason for inadequate management of private providers. However, the audit team is of the opinion that this is a lack of accountability of respective LGAs in fulfilling their roles for provision of onsite sanitation service as stated in Section 124 and 125 of Environmental Management Act 2004.

This is also contrary to National Water Strategic Plan, 2006 – 2015 which requires LGAs to develop both long and short term plans for provision of collection and transportation of sewage from the communities. They are also required to ensure that there is a robust control mechanism for collection and disposing on-site sanitation as per sanitation standards.

[17]Council Trade Officers and Clean and Environmental Officers

Absence of contracts and trade license with the respective council implies, the respective LGAs have no controls on regulation of collection fees and controlling their adherence to the required standards. This in turn gave room to private operators to inflate the collection fee that was not affordable to most of the customers. Consequently some customers opted to use other unsafe means for disposing their sewage which poses high risk to public health and environment.

This in turn has resulted to the services rendered being viewed as less important and not much needed. Also, it has significantly impacted on quality of services rendered since there are no well-defined performance indicators that could guide the performance of this sector;

b) Lack of supervision and monitoring mechanisms

It was also noted that all 11 visited LGAs were lacking supervision and monitoring mechanisms on the sewage services rendered to the residents of their respective LGAs. This is because LGAs do not know what could be supervised or monitored during the provision of sewage services i.e. collection and transportation of sewers. This was noted to be a challenge to most of the LGAs because service providers were operating without being regulated by the LGAs. The interviewed officials from the 5 visited LGAs, pointed out that LGAs were not so sure whether service providers were complying to the environmental requirements or not.

Furthermore, it was revealed that it was not easy for the LGAs to supervise them and gauge their performance because service providers do not have formal contracts with LGAs and hence it is difficult to deal with them. Further reviews, indicated that LGAs have legal mandate to deal with this issue and they are accountable for ensuring that good sewer services are rendered to the people.

On the other hand, it was noted that because of lack of actions from PO-RALG against LGAs that are not discharging this task as was supposed to be has contributed to the current situation of not following through the quality of services rendered.

c) Inadequate inspections of sewage vacuum trucks

As pointed out earlier, the audit team noted that inspections are not periodically conducted to the sewage vacuum trucks. The audit team noted that in all 5 visited LGAs no inspections have been conducted during the last five years. The only inspections made for vacuum trucks are the ones done by the traffic police when enforcing Road Traffic Act which was aimed at assessing the road worthiness and level of compliance to the road traffic laws. The assessment does not touch upon other technical aspects such as the environmental and health factors. Photo 4.5 (a) shows the status of the trucks as observed by the audit team.

Photo 4.5 (a): Showing the dilapidated emptying trucks with leakage

Photo 4.5 (b): Showing the dilapidated emptying trucks that do not meet standard for transporting sewage

Causes for Inadequate Transportation of Sewage

Various factors has been noted to contribute to the inadequate transportation of the collected faecal sludge from the collection points (residencies or businesses) to the disposal sites (waste stabilization ponds). These include:

Lack of sufficient workable vacuum trucks in LGAs

Local Government Authorities were expected to have vacuum trucks or contracted the services to private sectors for the collection and transportation of sewage from the points of generation to the disposal sites.

The audit team noted that 5 out of 11visited LGAs have no vacuum trucks. The remaining 7 LGAs were found to have one or two vacuum trucks which were found to be either grounded and not operating due to poor repair and maintenance or working but require several maintenances to make them operational.

Table 4.13 shows the number of vacuum trucks available for the collection of sewage and their operational status (condition) in each of the visited LGAs.

Table 4.13: Number of vacuum trucks available and their status in the visited LGAs

Name of Local Government Authority	Number of Trucks	Status (Grounded/Working)
Dodoma MC	1	Grounded
Mpwapwa DC	0	-
Tanga CC	2	Grounded
Ilala MC	0	-
Kinondoni MC	1	Working
Songea MC	0	-
Mbinga MC	0	-
Mbeya CC	1	Working
Kigoma MC	0	-
Kasulu DC	0	-
Mwanza CC	2	working
Sengerema DC	0	-

***Source**: Auditors' Analysis and Interviews held with officials from 12 visited LGAs (2018)*

Table 4.13 indicates that 5 out of 11 LGAs have emptying trucks. Two LGAs namely, Dodoma MC and Tanga CC have none in use since they are grounded due to mechanical problems. The remaining 7LGAs which is equivalent to 58 percent of all visited LGAs have no vacuum trucks at all.

This means that sewage transportation in those 7 LGAs which do not have emptying trucks or their emptying trucks grounded are using private service providers or UWSSAs for some of the LGAs which have entered Memorandum of Understanding between them.

Furthermore, through further enquiry with Cleans and Environmental Officers from 12 visited LGAs, it was noted that this situation of either not having vacuum trucks or grounded trucks was contributed by not having funds set aside by LGAs for periodical maintenance/repairing trucks. In turn, these trucks were left without adequate maintenance and kept on deteriorating to the extent of being grounded. Similarly, use grounded trucks were very old since they were purchased ten years ago.

On the other hand, the review of LGAs budget for the last four years indicated that all 11 visited LGAs have not set aside funds for either repairing or purchasing new vacuum trucks. This also made the situation even worse since no or little investment is made on the area of sanitation.

However, the audit team noted that due to the establishment of UWSSAs as water and sanitation authorities, LGAs claim that they have transferred their responsibilities of on-site collection and disposal of faecal sludge to UWSSAs contrary to the requirements of Section 126 of the Environment Management Act of 2004 and Section 55 (g) of the Local Government Urban Authorities Act No.8 of 1982. Those two sections of the laws stipulate that LGAs are responsible for removal of night soil and the disposal of faecal sludge from all premises and houses in its areas, so as to prevent injury to health. When audit team contacted UWSSAs to establish whether that assertion is true or not, they indicated that LGAs are still responsible for the management of on-site sanitation.

Consequently, people obtain service from private service providers by means of private arrangements without intervention of the LGAs. This implies that collection, transportation and disposal of onsite sanitations not adequately managed by the LGAs. This might result into illegal discharge of faecal sludge to the areas which are not specifically designed as disposal sites and that may cause spread of hygienic diseases to the community.

Inadequate planning for provision of onsite sanitation services

The reviewed annual activity plans of visited LGAs, for the financial year of 2013/14 to 2016/17, indicated that all 11LGAs did not integrate onsite sanitation services activities such as collection, transportation and disposal of sewages in their plans. Through the interviewed Cleans and Environment Officers of the visited LGAs, the audit team noted that onsite sanitation services were given less priority during planning. Gas placed more efforts on solid waste management and building of toilets.

In the absence of action plans, the LGAs failed to allocate budget for onsite sanitation services activities. As a result LGAs do provide sewage service on ad-hoc basis based on the reported cases of service demand from the citizens. In turn these result

into illegal discharge of waste water especially during rainy season, which may have adverse impact to the surrounding communities including the spread of communicable diseases such as cholera.

CHAPTER FIVE

COORDINATION, MONITORING AND EVALUATION OF SEWAGE SERVICES

5.1 Introduction

This chapter presents findings on the coordination of all activities undertaken by the Ministry of Water, PO-RALG, Urban Water Supply and Sanitation Authorities, Local Government Authorities and utility companies on the provision of sewage services. It also provides extent of monitoring and evaluation of the performance of UWSSAs and LGAs as performed by the two Ministries towards provision of sewage services. Below are the details of the findings:

5.2 Weak Coordination between Key Stakeholders

National Water Policy 2002 came out with the national goal that insisted upon Ministries responsible for the sewage services, to develop a strong coordination and collaboration mechanism to enhance effective provision of sewage service in the country. Coordination creates links and joint-actions between the different activities undertaken by various stakeholders to achieve the broader sanitation objectives. Lack of coordination and collaboration may result into duplication of effort and misuse of available scarce resources.

Interview with officials from the Ministries, LGAs and Sanitation Authorities, indicated that the existing coordination and collaboration mechanisms practised by PO-RALG and Ministry of Water, Local Government Authorities and UWSSAs are not focused on sewage activities. Very rarely these stakeholders coordinate matters relating to provision of sewage services in the country. Details are explained below:

5.2.1 Inadequate coordination between Ministry of Water and PO-RALG

The Ministry of Water was required to coordinate with PO- RALG in providing technical and financial support for construction of sanitation schemes and expansion or rehabilitation of existing sanitation schemes. This is according to Water Supply and Sanitation Act 2009, sections 5(c), (e) and 6(b).

Interviews with officials from the Ministry of Water and PO-RALG, the audit team noted that, the two Ministries have not coordinated for the issue concerning provision of sewage services. The officials mentioned that, they don't share the information regarding planning and budgeting for interventions for provision of sewage services during planning and implementation. Further, the officials mentioned that they are also not sharing the information regarding the performance of the LGAs and UWWSAs in the provision of both on site and off site sewage services.

According to the officials, lack of clear coordination and communication strategy between the two Ministries concerning provision of sewage services greatly contributed to inadequate coordination. Thus, the Ministries have not established effective coordination mechanism that will enable them to support UWSSAs and LGAs towards achieving their goals for the sustainable provision of sewage services in the country.

As a result, Water and Sanitation Authorities did not manage to adequately budget for expansion of sewer network and ended up with slow rate of expansion of sewage network, despite the existence of the dilapidated sewer network and Waste Stabilization Ponds. This signifies that the Ministry of water has not adequately fulfilled its responsibility for providing technical and financial support to UWSSAs.

5.2.2 Inadequate Coordination between UWSSAs and LGAs

According to National Water Strategic Plan of 2006-2015, Local Government Authorities were required to coordinate budgetary requirements of the water authorities and physical planning with water authorities. The coordination was to be done through meetings and reports sharing during planning and implementation of various projects or activities that would likely affect the parties concerned.

Through interview with officials from the 11 visited LGAs and UWSSAs, the audit team noted they have not coordinated with other for the issues concerning provision of sewage services. The officials mentioned that they don't have a memorandum of understanding that specifies activities that needs coordination of

the two authorities through a joint effort during planning and implementation of activities for provision of sewage services. This is contrary to the requirement of National Water strategic plan, which requires the two authorities to coordinate with each other for effective provision of sewage services. The consequences of the inadequate coordination are as explained below:

Destruction of sewer network during implementation of construction projects

Interview with Sanitary Engineer, indicated that there were some incidences of destruction of sewer network in areas where there were construction of development projects. According to the Sanitary Engineer, this is a result of inadequate coordination. This was also witnessed by the audit team during the physical visit where the team observed a blockage of sewer system at Kinyonga Street in Dodoma city which was caused by road construction work in that area. This incidence was a result of poor coordination between Dodoma Municipality Council and DUWASA during planning and implementation of road construction projects.

Review of Incidence Log book of DAWASA, indicated a similar case in Dar es Salaam City where there were several reported cases of destructions of sewer networks caused by constructions projects that were taking place near or on sewer lines. This is the indication that the Dar es Salaam City council didn't liaise with DAWASCO when it comes to the projects that can have impact to the sewer network. Photo 5.1 shows the destruction of sewer network that occurred in Dodoma municipality.


Photo 5.1: *Blockage of pipes and destruction of sewer man hole at Kinyonga Street in Dodoma. Picture was taken on 06th October 2017*

Failure to Control Destruction of Sewage Network by Community

Interviewed officials from the visited UWSSAs and Local Government Authorities, the audit team noted frequent occurrence of sewer blockages that was caused by dumping of solid waste materials into the sewer system. According to the officials, this was mainly attributed by weak coordination between UWSSAs and LGAs in enforcing the available by-laws relating to prevent dumping of solid material in the public sewer.

Absence of coordination mechanisms that can bring both UWSSAs and LGAs to develop plan and strategies including the mechanisms for prohibiting illegal disposal of solid material to the sewer system contributes to the destruction of the sewage network. As a result, the government spends scarce resources in maintaining the sewer system rather than extending sewer services in the communities.

5.3 Inadequate Monitoring and Evaluation

The Ministry of Water through its Urban Water Supply and Sewerage Directorate was required to monitor and coordinate the performance of UWSSAs in delivering sewerage service in the country. Similarly, the President's Office – Regional Administration and Local Government is required to monitor the performance of LGAs in ensuring that they plan and implement safe removal and transportation of sewage sludge to waste stabilization ponds (WSP) or digester for treatment. The audit

noted that, both PO-RALG and Ministry of Water have not conducted effective monitoring and evaluation of the Performance of Authorities as explained below:

5.3.1 Inadequate Monitoring and Evaluation of Performance of LGAs by PORALG

Through the review of Monitoring reports and interview with officials from PORALG, the audit noted that, PORALG have not effectively monitored and evaluated the performance of LGAs in the provision of onsite services.

Through the review of correspondences between PO-RALG and LGAs, through letter with ref Number. AH. 322/418/01/48 dated 20/11/2017, that audit team noted that PORALG has taken some initiatives that includes requiring Regional Secretariats and LGAs to plan and allocate areas for constructing sanitation facilities. It has also conducted joint Water Sector Reviews which involves LGAs, Ministry Education and the Ministry of Health. However, monitoring was inadequate due to the followings reasons:

Inadequate Planning for Monitoring and Evaluation of LGAs on provision of onsite sanitation services: PO-ALG was required to develop plan for monitoring and evaluation of the performance of LGAs in the provision of sewage services in urban areas. This is according to the National Water Policy of 2002, pg. 38 (clause 4.14 (ii)). However, through the review and analysis of PO RALG monitoring plan of 2012/13 to 2016/17, the audit noted that, the Ministry has not integrated onsite sanitation services activities such as collection, transportation and disposal in their plans.

The reviewed PO-RALG plans had focused on building onsite sanitation facilities such as latrines, toilets in the public institutions, schools and education on hygiene and sanitation, including hand washing. Provision of onsite sanitation services such as collection, transportation and treatment were not included in the plan. As a result, collection, transportation and disposal activities were not included in the budget as items that needed to be monitored by PO-RALG.

Because of that, PORALG, have not conducted monitoring and evaluation concerning the collection, transportation and disposal of sewage services, and is not aware of the LGAs' performance on the management of onsite sanitation services.

Lack of Key Performance Indicators for monitoring and Evaluation of onsite sanitation services activities: The reviewed PORALG Monitoring and Evaluation plan, showed that, the Ministry lacks Key Performance Indicators for measuring the performance of LGAs in the provision of sewage services in urban areas; that involves collection, transportation and disposal of faecal sludge services from customers who are not connected with sewer network.

Similarly, the review of annual progress report, 2016 of the Sector Coordination Unit of the PORALG, the audit team could not find any information collected by PO-RALG regarding the performance of LGAs in provision of onsite sanitation services in urban areas except those related to construction of onsite sanitation facilities. As a result PO-RALG did not know the extent to which the LGAs are performing in areas of provision of sewage services to prevent eruption of sanitary related diseases.

Failure of PO-RALG to develop monitoring and evaluation plan with defined key performance indicators, is associated with lack of accountability from PO-RALG on its role for ensuring effective provision of sewage services to the community.

5.3.2 Inadequate Monitoring and Evaluation of Performance of UWSSAs by

Unlike, PORALG, the audit acknowledge the effort done by the Ministry of Water regarding planning for monitoring and evaluation of performance of UWSSAs in the provision of offsite sewage services. The audit noted that, Ministry of Water used the Performance Benchmarking Guidelines for Water Supply and Sanitation Authorities 2014, to evaluate the Performance of Water and Sanitation Authorities. The Ministry of Water has signed a Memorandum of Understanding with the UWSSAs and agreed on performance targets with key performance indicators in order to determine UWSSAs performance.

The analysis of Key Performance Indicators has shown that four developed key performance indicators were linked to provision of offsite sewage services. These were percentage of proportion of population connected with sewer network, number of incidences of sewer blockages per year; compliance to waste water quality and compliance to safe disposal of sludge. Through these KPIs,

EWURA has been evaluating UWSSAs performance on annual basis. Despite of these efforts and annual performance ranking of UWSSAs by EWURA, the following were the weaknesses noted:

i) Targets used were below the National Water Strategic Plan and MKUKUTA II Goals

The analysis of the targets set by the Ministry of Water for percentage of proportion of population connected with sewerage network for each UWSSA, indicated that the set targets were below 30 percent of National Water Strategic Plan of 2015. According to Water Sector Development Program, 2006-2015 issued in 2006, the target was to increase sewerage service coverage to 30 percent by 2010 and to 100 percent by 2025.While MKUKUTA II goals (2010 – 2015) target was to increase access to sewage services to 35 percent by 2015, the set targets for the six visited UWSSAs were below this target as indicated Table 5.1:

Table 5.1: Set Target for percentage of proportion of population connected with Sewerage network for the Six Visited UWSSAs from 2013/14- 2016/17

Name of Urban Water and Sanitation Authority	Set Target Proportion of Population connected to Sewer Network (%)	% age deviation from the National target
DAWASCO	10	67
DUWASA	27	10
TAUWASA	9.7	67
MWAUWASA	20	30
SOUWASA	9.9	67
MBEUWASA	16	47

Source: EWURA Water Regional Report, 2016/17

As seen in **Table 5.1**, all six (6) UWSSAs target were below the National Water Sector Development target. The percentage variation from the national target ranges from 10 to 67 where DAWASCO, TAUWASA and SOUWASA registered the highest variation of 67 percent. DUWASA was the only one whose target of 27% was much close to the National Water target of 30 percent.

Interviewed technical managers of the visited UWSSAs mentioned that, the targets were agreed by EWURA and Ministry of Water after considering funds available in their business plan. Other

reason for setting the target that is below the National Water target is the huge investment that will be required to meet that target.

Evaluating UWSSAs using the targets that were below the national target, may lead to failure in achieving the national goals for improving access to sewage service in urban areas. It is also an indication that, the Ministry of Water did not put much effort to ensure that the country will meet the millennium development goals for provision of improved sanitation services.

ii) No significant increase in access to sewage services in Urban Areas

Further analysis on the trends of the achievement of the set target for increasing number of people served with sewer network, the audit team noted that there were no significant improvements in increased proportion of population connected to sewer network for the visited UWSSAs. The trends and targets are indicated in **Table 5.2**.

Table 5.2: Achievement of Target for percentage of proportion of population connected with sewerage network for the Six Visited UWSSAs from 2013/14- 2016/17

Name of Urban Water and Sanitation Authority	Set Target Proportion Population connected to Sewer Network (%)	Actual Achieved Proportion of Population connected to Sewer Network (%)			
		2013/14	2014/15	2015/16	2016/17
DAWASCO	10	7	5	3	3
DUWASA	27	9.4	12	15	14
TANGA UWSA	9.7	10	10	10	10
MWAUWASA	20	4	5	5	23
SOUWASA	9.9	7.7	8	8	7
MBEYA UWSA	16	11	12	13	14

***Source**: EWURA Water Regional Report, 2016/17*

As indicated in **Table 5.2**, with the exceptional of MWAUWASA had experienced a significant improvement in 2016/17, there were no significant improvements in increased proportion of population connected to sewer network for the remaining 5 UWSSAs. TAUWASA has been achieving the set target for three years and its target had not changed. A different case was noted

in DAWASCO where the trends were observed to have dropped from 7 to 3 percent from 2013/14 to 2016/17.

Review of EWURA Regional Water Performance reports indicated that the low or insignificant investment in increasing sewerage network coverage were the result of failure of Water Sanitation to achieve the set targets.

With these insignificant increased trends in the proportion of population connected to sewer network, the Ministry of Water has not taken adequate efforts for ensure provision of adequate funds to enable UWSSAs to expand sewage network to meet the growing population.

iii) Inadequate Follow up of the Implementation of EWURA recommendation to UWSSAs

Through the review of Regional Water performance report of EWURA, the audit team noted that, some of the recommendations issued to UWSSAs regarding increasing the proportion of population connected to sewage and decreasing sewer blockage were not adequately implemented. In addition, there is no evidence to show that the Ministry of Water has made efforts to put additional pressure on the UWSSAs regarding their conduct in dealing with increasing access to sewage in urban areas.

For example, poor performance of DAWASCO was mainly attributed by the failure of Ministry of Water to make sure that DAWASCO implement the recommendations issued by EWURA in improving the compliance level to agreed Key Performance Indicators. Consequently, the performance of DAWASCO has been unsatisfactory in providing sustainable sewage services to the community irrespective of the increased population of 5.4 million people in Dar es Salaam City.

This was also noted through the review of DAWASCO's progress reports for the financial year 2012/13 to 2016/17, where the audit team noted that DAWASCO was performing poorly in term of complying with effluents standard, increasing accessibility to sewer network by the population as well as reduction of number of sewer blockage by ensuring comprehensive maintenance of sewer network.

This implies that the Ministry of Water did not adequately conduct follow-ups on ensuring that all recommendations issued to UWSSAs are timely addressed for the intention of ensuring adequate provision of sewerage services by UWSSAs.

5.3.3 Non Reporting and sharing the results of M&E to Key stakeholders

The Ministry of Water and PO-RALG were required to ensure that the monitoring results are correctly reported to relevant channel of communication to enable effective records keeping. They are also required to make follow-ups on the implementation of monitoring and evaluation recommendations issued to UWSSAs and LGAs. This is in accordance with the Water Supply and Sanitation Act 2009: Section 5(f) and 26 (1)).

According to interviews with LGA officials, LGA reports are submitted to RAS (Regional Administrative Secretariat) and RAS reports to PO-RALG. Review of the progress reports prepared by the PO-RALG showed that the PO-RALG did not receive any information/report regarding management of onsite sanitation services from LGAs through RAS. This has caused the Ministry to be unaware on the extent of performance of LGAs in management of onsite sanitation services. As a result LGAs were implementing their activities without close supervision from the PO-RALG.

CHAPTER SIX

CONCLUSION

6.1 Introduction

This chapter provides conclusions of the audit. The basis for drawing the conclusion is the overall and specific objectives of the audit as presented in chapter one of this particular audit report.

6.2 General Conclusion

Despite the fact that the Government of Tanzania has undertaken some interventions to improve sewage services especially in urban areas, there is still a need for more interventions, especially in areas where there is rapid increase in population and commercial activities. The provision of sewage services in urban areas is not adequately done to prevent eruption of sanitation related diseases to the society.

Based on the facts presented in the findings chapter, the auditors concluded that the Ministry of Water and the President's Office Regional Administration and Local Government are inefficient in ensuring effective provision of sewage services in urban areas in Tanzania. This is because in most of the visited UWASSAs and LGAs neither off-site nor on-site sewage services were fully provided. This is because on average out of 73 per cent of total population served with water only 9 percent have access to sewer networks, whereas 91 percent depended on vacuum trucks for emptying their septic tanks.

Also, collection of on-site sewage from the 91 percent of population who have no sewer network was not adequately provided. This was attributed to unavailable or grounded emptying trucks in the visited LGAs that prohibit provision of onsite sewage collection services and have delegated their responsibility to private service providers to provide the services without being controlled.

6.3 Specific Conclusions

The following are the specific conclusions:

6.3.1 Provision of Onsite sanitation Services is not adequately done by LGAs

Local Government Authorities (LGAs) did not fully perform their duties to ensure that the amount of generated sewage is collected, transported and disposed off as required by the Local Government Urban Authorities Act, No.8 of 1982. Instead of LGAs performing this mandatory role, they left it unattended and assume that this role of the provision of onsite sanitation services has been delegated to UWSSAs.

Furthermore, sewage collection and transportation is left to private service providers who are not regulated and managed by the LGAs. These private service providers are operating without having formal contracts with LGAs. Through those formal contracts it was expected that private service providers would be inspected and monitored through agreed key performance indicators and also regulate other aspects of service provision including collection fees as well as adherence to the health and environmental laws and standards.

As a result, approximately 98.7 percent of sewage generated from 70 percent of the population which does not have access to sewer network, is not known whether they are collected, transported, and disposed in acceptable standards. This poses high risk for the environment and eruption of the sanitation related diseases.

Moreover, lack of accountability of LGAs regarding onsite sanitation services, inadequate coordination between LGAs and UWSSAs and inadequate budgeting for the provision of onsite services are also affecting the provision of onsite services in Local Government Authorities.

6.3.2 Provision Off-site Sewage Services is not effectively done by UWSSAs

The existing sewer networks in urban areas do not meet the demand of the population in urban areas and are not functioning

efficiently. The sewage networks are not maintained and functioning well as was supposed to be the case. This is indicated by frequent incidences of blockages, re-occurrences of sewage overflows along the sewer lines and sometimes flooding of sewage in cities/town centres. Thus, untreated sewage is discharged into the environment prior to reaching sewage treatment facilities.

Despite the fact that, in the six visited UWSSAs, the dilapidated and old sewer network were built between 1930s and 1970s, UWSSAs did not plan and allocate sufficient funds for maintenance, rehabilitation and expansion of the sewer networks.

Poor functioning of sewer network resulted from inadequate control or misuse of sewer systems, overloading of the sewer system and inadequate maintenances of the aged sewer network. Further to that, lack of collaboration between UWSSAs and LGAs in enforcing by-laws for preventing illegal dumping of solid waste material into the public sewers, has also contributed to the high frequency of blockage of sewer networks.

The existing waste stabilization ponds are not adequately functioning to effectively achieve the set national quality effluent discharge standards. Waste stabilization ponds are in poor state as they have developed large volumes of sludge with overgrown bushes. This has affected the effectiveness of the treatment process of the sewage collected, and the life span of the treatment infrastructure, resulting into discharge of effluent with higher levels of BOD, COD, TSS and pH which are above the recommended limits. Only 2 of the 5 Waste Stabilization Ponds in the visited UWSSAs met effluent discharge standards.

The inefficiencies of these sewage treatment infrastructures are contributed by ponds operating beyond their designed capacity due to increased generation of sewage associated with rapid population growth. Inadequate maintenance, lack of regular dislodging of ponds and absence of stringent controls to ensure solid materials did not get into the network also contributed to the observed inefficiencies.

Although, UWSSAs are collecting revenues from dumping fees from the Waste Stabilization Ponds, the small amounts of money collected as revenues are allocated for the maintenance of

treatment facilities. Also, UWSSAs allocates insufficient amount of funds for the improvements of sewerage networks. Failure to allocate and use the collected revenues from the provision of sewerage services have left the sewerage infrastructures in a poor and dilapidated condition characterized by frequent blockages, collapses and silting of the waste water stabilization ponds.

6.3.3 Inadequate Monitoring by the Ministry of Water and PO-RALG

The existing monitoring done by the PO-RALG did not take onboard the issues of provision of on-site sanitation services. In this regard, all visited LGAs have not managed to address the challenges of inadequate collection and disposal of on- site sewage generated from the communities residing in their areas of jurisdiction.

PO-RALG lack performance indicators linked to the activities for the provision of sewage services. The available key performance indicators concentrated on the issues related to the construction of onsite sanitation facilities such as toilets in the public institutions. Also, PO-RALG lacks a well-defined effective and functional reporting mechanism on the provision of onsite sanitation services. As a result PO-RALG is unaware of the status of provision of sewage services in LGAs.

Although, the Ministry of Water have Monitoring and Evaluation plans with indicators linked to the provision of off-site sewage services, the Ministry did not adequately conduct monitoring and evaluation to assess the performance of UWSSAs on the provision of off-site sewage services. The Ministry of Water did not manage to assess the performance of UWSSAs in the provision of off-site sewage services.

Generally, lack of accountability and coordination among the Ministry of Water and the President's Office – Regional Administration and Local Government with regard to the provision of sewage services has also contributed to the ineffective provision of sewage services.

CHAPTER SEVEN

AUDIT RECOMMENDATIONS

7.1 Introduction

The audit findings and conclusion pointed-out weaknesses on the provision of on-site and off-site sewage services in urban areas in order to prevent eruption of sanitation related diseases to the society.

Further improvements have been identified in areas such as planning and provision of sewage services covering collection, transportation, treatment, and discharge of effluents. Other areas for further improvements include monitoring and evaluation of performance of UWSSAs and LGAs in the provision of sewage service and the coordination between the Ministry of Water and the President's Office – Regional Administration and Local Government on the provision of sewage services.

The National Audit Office believes the recommendations that have been given in this report need to be fully implemented so as to improve the provision of sewage service in urban areas. The recommendations will also ensure the presence of the 3Es of Economy, Efficiency and Effectiveness in the use of the public resources.

7.2 Recommendations to the audited entities

The following recommendations are specifically addressed to the Ministry of Water and the President's Office – Regional Administration and Local Government:

7.2.1 Recommendations on improving provision of on-site sanitation services

President's Office - Regional Administration and Local Government (PO-RALG) should ensure that:

1. LGAs develop and put in place strategies for ensuring effective removal of on-site sanitation from the communities;

2. LGAs are develop long and short term plans and their corresponding budgets that capture issues of provision of onsite sewage services in areas of their jurisdiction;

3. LGAs develop effective mechanisms for managing the cost and quality of services rendered by the private service providers who provide on-site sanitation services in areas of their jurisdictions. The developed mechanism should enable them to control service providers to adhere to the set national standards for the collection, transportation and disposed-off effluent, and set affordable sewage collection fees for the community;

4. Monitoring and evaluation plans are established and include setting of key performance indicators for measuring the performance of LGAs in the provision of onsite sanitation services. The developed indicators should be used regularly during the supervision and monitoring of the effectiveness of the provided sewage services provided; and

5. Coordination mechanisms are established between LGAs and UWSSAs that will facilitate proper implementation of the provision of sewage services in the country. The mechanisms should demarcate clearly the roles of each actor regarding the provision of onsite sanitation services so as to promote efficiency and accountability among them.

7.2.2 Recommendations on improving provision of off-site Sewage Services

The Ministry of Water (MoWI) should ensure that:

1. UWSSAs develop comprehensive plans for the provision of sewerage services that include maintenance, rehabilitation and expansion of the sewer networks and waste water treatment infrastructure, taking into consideration the population growth in their areas of jurisdiction;

2. UWSSAs develop a well-established model for the allocation of financial resources between water supply and sanitation services in order to cater for both hardware and

software capital requirements for on-site and off-site sanitation services;

3. UWSSAs implement measures to enhance the operational efficiency of the waste stabilization ponds and ensure that the quality of effluent is improved as stipulated by the national standards for quality of effluent;

4. the collected funds from sewerage services are effectively utilized for improving the sewerage infrastructures including the Waste Stabilization Ponds;

5. UWSSAs develop effective mechanisms for protecting public sewer networks including preventing disposal of solid materials into the sewer networks;

6. UWSSAs construct exclusive community onsite faecal sludge treatment plants that are cost effective and efficient. These plants since they are community based will effectively reduce faecal sludge haulage costs for low income households who are the majority in urban and peri-urban areas;

7. Policies, Acts and regulations related to sanitation are synchronised so as to avoid conflicts and duplications of responsibilities given to UWSSAs and LGAs as government key sanitation entities by national Policies and Acts;

8. Strengthen its mechanisms for monitoring and evaluating the performance of UWSSAs in the provision of off-site sewage services. The mechanisms should be used to conduct regular monitoring and provide timely feedbacks to the respective UWSSAs; and

9. Develop mechanism to involve private sector in the provision of sewage services in urban areas.

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APPENDICES

Appendix 1: Responses from the Audited Entities

This part covers the responses from the two audited entities namely, the Ministry of Water and the President's Office – Regional Administration and Local Government. The responses are divided into two i.e. general comments and specific comments in each of the issued audit recommendations. This is detailed in appendices 1(a) and 1(b) below:

Appendix 1(a): Responses from the Ministry of Water and Irrigation

General Comment

Auditors' comments and recommendations are noted and adhered to. During the implementation of WSDP I, the most undertakings were the provision of clean and safe water to the community in general.

However, with the increasing number of population and expansion of cities and councils in urban areas, in the implementation of WSDP II, the Management have now put much emphasises in the provision of Sanitation Services in urban areas by issuing directives to every UWSSAs to include Sanitation services in their planning Water Projects and also to some completed Water Projects in their areas of jurisdictions. Letter with Reference no. BA.101/600/01B/33 dated 18th October, 2017 requesting PO-RALG to prepare and set aside land for implementation of Sanitation services are attached for audit verification.

Specific Comments

S/ No	Recommendation	Comments of the Ministry	Planned actions	Implementation Timelines
1.	UWSSAs develop comprehensive plans for the provision of Sewerage Services that include maintenance, rehabilitation and expansion of the sewer networks and Waste Water Treatment Infrastructure, taking into consideration	WSDP II target of sewerage average coverage in urban is 30%. by 2020. The ministry plans to include sanitation project implementation plan in each project. So far new project are under implementation in Mwanza,	Every planned water projects to include Sanitation services	**2020**

	the population growth in their areas of jurisdiction.	small town of Magu, Misungwi, Lamadi and Sewerage project in Musoma & Bukoba, and Dar es Salaam (Mbezi, Kurasini and Jangwani)		
2.	UWSSAs develop a well established modal for the allocation of financial resources between water supply and sanitation services in order to cater for both hardware and software capital requirements for on-site and off-site sanitation services.	Auditor recommendation is adhered to, however with the newly established National Water Investment Fund and the use of Earmarked Financing model, the Ministry intends to set a certain amount of funds for UWSSAs to insure provision of water supply and Sanitation services	To ensure that Ministry and its implementing Agencies annual budgets includes the Sanitation projects	Each year
3.	UWSSAs Implement measures to enhance the operational efficiency of the waste stabilization ponds and ensure that the quality of effluent is improved as stipulated by the nation standards for quality of	Insist in the compliance of Water and Wastewater Quality Monitoring Guidelines issued by EWURA in 2014 to improve maintenance and stabilization of ponds so that quality of	Inclusion of sanitation projects in the monitoring and evaluation parameters by MoWI	Each quarter of the year

	effluent.	effluent is improved to meet the quality parameters as required by the National Standards.		
4.	The collected funds from sewerage services are effectively utilized for improving the sewerage infrastructures including the waste stabilization ponds.	Auditor's recommendation is adhered to, the management will make sure that reasonable fees is collected and utilized accordingly for improvement of the sewerage infrastructure including; collection, transportation, treatment and discharge the generated sewerage	Inclusion of Sanitation projects in the monitoring and evaluation parameters by MoWI	Each quarter of the year
5.	UWSSAs develop effective mechanisms for protecting public sewer networks including preventing disposal of solid materials into the sewer networks.	Auditor's comment noted. The Management will insist on the use of concrete covers and create awareness as well as enhance existing by Laws to protect Public sewer networks	Ministry to issue directives to UWSSAs to use concrete covers to public sewer networks create awareness to the community and enhancement of existing laws	**Continuous**
6.	UWSSAs construct	Auditor's comment	The lesson of Mwanza	Starting financial year

	exclusive community onsite faecal sludge treatment plants that are cost effective and efficient. These plants since they are community based will effectively reduce faecal sludge haulage costs for low income households who are the majority in urban and peri-urabn areas.	noted, we have started with simplified sewer in Mwanza mountain area. Once successful will be adopted in other areas	UWSA will be adopted to other utilities solving the Sanitation of problem in the peri-urban areas	2018/19
7.	Policies, Acts and regulations related to sanitation are synchronized so as to avoid conflicts and duplications of responsibilities given to UWSSAs and LGAs as government key sanitation entities by national Policies and Acts.	Auditor's comment noted. However the MoWI's management together with GIZ has already started to work on these challenges, analysing Policies, Strategies and Regulatory Frameworks for Urban Sanitation in Tanzania	Follow up and implementation of GIZ findings	Starting financial year 2018/19
8.	Strengthen its mechanisms for monitoring and evaluating the performance of UWSSAs in the provision of off-site sewerage services. The mechanisms should be used to conduct regular monitoring and	Auditor comments noted. Management will strengthen its mechanism for monitoring and evaluating the performance of UWSSAs in its provision of off-site sewage services, and	Strengthening monitoring and evaluation as per the issued EWURA guidelines for UWSSAs	Each quarter of the year

	provide timely feedbacks to the respective UWSSAs.	insist on compliance with Water and Wastewater Quality Monitoring Guidelines issued by EWURA in 2014.		
9.	Develop mechanism to involve private sector in the provision of sewage services in urban areas.	Auditor's comment noted.The Management have been involved in different interventions with private sectors in provision of sanitations services especially in the operations of Sewage Trucks.	The Ministry in collaboration with World Bank is now working on the modality to involve Private sector in the Sanitation Services	2017/18

Appendix 1(b): Responses from the President's Office – Regional Administration and Local Government

General Comment

The involvement of different players in this sub sector is crucial especially the Private sectors at all stages of handling transportation and dumping/treatment. This goes hand on hand with planning of human development and settlements. More resources are needed for investment on the sanitation facilities in these urban settings due to rise of urbanisation level which create demands for more improved sanitation services.

Specific Comments

S/No	Recommendation	Comments of the Ministry	Planned actions	Implementation Timelines
1.	LGAs are putting in place strategies for ensuring effective removal of on-site sanitation from the communities	Strategies have been translated into their Medium Term Expenditure Framework	Identification and location of sites for dumping and treatment sanitation facilities. Budget allocation for trucks and other related facilities. Implementation of Guidelines	2018/19 2018/19 Continuous
2.	LGAs are developing long and short term plans and their corresponding budgets for the provision of onsite services in areas of their jurisdiction	Currently, The Government is implementing the WSDP in which sanitation is one of the five sub components which ends by 2025/26	Provision of Budget and Planning guideline with priority on sanitation services, Adequate resources allocation for sanitation services Implementation of Guidelines	2018/19 Continuous

				Continuous
3.	LGAs develop effective mechanisms for managing the cost and quality of services rendered by the private service providers for on-site sanitation services in areas of their jurisdictions. The developed mechanism should enable them to control service providers to adhere to the set national standards for the collection, transportation and disposed-off effluent, and set affordable sewage collection fees for the community	Agreed	Develop sanitation service cost for onsite sanitation guideline; Regulate the private service providers; Monitoring and Evaluation of compliance to prescribed standards	2018/19 Continuous Continuous
4.	Establish monitoring and evaluation plan that include setting key performance indicators for measuring the performance of LGAs in the provision of onsite sanitation services. The developed indicators should be used	Agreed	Reviewing of the current M&E framework to include key performance indicators for onsite sanitation services. Monitoring and Evaluation of the M&E Framework	July, 2018 Continuous

	regularly during the supervision and monitoring the effectiveness of the sewage services provided			
5.	Establish coordination mechanism between LGAs and UWSSAs that will facilitate proper implementation of the provision of sewage services in the country. The mechanisms should demarcate clearly the roles of each actor regarding the provision of onsite sanitation services so as to promote efficiency and accountability among them	Ready MoU has been signed between the LGAs and UWSSAs which articulates clearly the roles and responsibilities	Enhancing the compliance of MoU between LGAs and UWSSAs	Continuous

Appendix 2: Detailed Main audit questions with sub-questions

This part provides the list of five main audit questions and their respective sub-questions:

1.0	To what extent do the people in urban areas have access to sewage services?
1.1	To what extent do the sewage systems meet the needs of the population in urban areas?
1.2	To what extent the generated sewage is effectively collected, transported, treated and disposed of?
1.3	Are the sewage services provided meet the sanitation standards to prevent occurrence/eruption of sanitation related diseases?
2.0	Does Ministry of Water through UWSSAs adequately provide off-site sewage services in urban areas?

2.1	Do UWSSAs adequately plan for the provision of off-site sewage services in their respective areas?
2.2	Are off-site sewage services rendered to those connected to sewerage network satisfactory and of good quality?
2.3	Are existing sewerage networks in urban areas functioning well?
2.4	Are sewerage networks in urban areas expanding to cope with rapidly increasing population?
2.5	Do UWSSAs adequately maintain the sewerage systems in order to facilitate effective provision of off-site services?
2.6	Are UWSSAs allocating resources (financial, personnel and time) for the maintenance and expansion of sewerage services?
2.7	Are the collection of revenues from households and other buildings receiving off-site sewage services (connected to sewerage networks) adequately managed?
2.8	Do the existing sewage treatment processes facilitate the achievement of effluent quality standards before discharging to the environment?
3.0	Does PO-RALG through LGAs adequately manage on-site sanitation services in urban areas?
3.1	Do LGAs adequately plan for the provision of on-site sanitation services in their respective areas?
3.2	Are LGAs having a working mechanism to ensure that the generated on-site sanitation is effectively collected, transported, treated and disposed of?
3.3	Do LGAs have effective control mechanisms to ensure that on-site sanitation is disposed of as per sanitation standards?
3.4	Are LGAs allocate resources (financial, personnel and time) for the management of sewerage services in their areas?
3.5	Is collected of revenue from households and other buildings receiving on-site sanitation services adequately managed?
3.6	Do LGAs monitor the performance implementation of contracts entered with the private service providers to collect, transport, treat and dispose of sewage?
4.0	Does the Ministry of Water and PO-RALG ensure effective coordination of all activities undertaken by stakeholders related to the provision of sewerage services?
3.1	Does the Ministry of Water and PO-RALG have effective coordination mechanisms with other stakeholders on the provision of sewage services in urban areas?
3.2	Is the level of coordination between the Ministry of Water and PO-RALG and other stakeholders during planning and provision of sewage services adequate?
5.0	Does the Ministries MoWI and PO-RALG monitor and evaluate the performance of UWSSAs and LGAs in the provision of sewage services in urban areas?
5.1	Do Ministries plan for monitoring and evaluation of the performance of UWSSAs and LGAs to ensure effective provision of sewage services in Urban Areas?
5.2	Do Ministries effectively use Key Performance Indicators to assess performance of UWSSAs and LGAs in the provision of sewage services in the Urban Areas?

5.3	Are conducted monitoring and evaluations address existing challenges on the provision of sewage services?
5.4	Does the Ministry of Water and PO-RALG have effective performance reporting mechanisms of activities for the provision of sewage services?
5.5	Are the results of monitoring and evaluations communicated to relevant stakeholders involved in the provision of sewage services?
5.6	Does the Ministry of Water and PO-RALG conduct follow-ups on the implementation of monitoring and evaluation recommendations by LGAs and UWSSAs?

Appendix 3: Detailed Assessment Criteria

This part provides the detailed information regarding the assessment criteria used to assess the extent of provision of sewage services in urban areas, different assessment criteria were drawn from different sources such as: Policies, Legislations Acts and Regulations), guidelines and the best practices for the provision of sewage services.

The audit questions, assessment criteria used and their sources are presented below:

Audit Criteria	**Source of Audit Criteria**
Audit Question 1: To what extent do the people in urban areas have access to sewage services?	
Coverage of sewerage system Proportion of households connected to the public sewage system increased from 18 per cent in 2010 to 22 percent in 2015;	National Strategy for Growth and Reduction of Poverty (NSGRP) II or MKUKUTA II (2010 – 2015) Goal # 4 (iv)
Amount of generated sewage collected, transported treated and disposed of LGA should prescribe, issue guidelines and standards explaining how sewage from cesspool and sludge from pit latrines and septic tanks need to be collected and transported by specified vehicles for disposal. They should also ensure the amount of generated sewage is collected, transported, treated and disposed off	Environmental Management Act 2004, Section 124 Environmental Management Act 2004, Section 125
Quality of sewage services provided meets the sanitation standards LGA should ensure that sewage is appropriately treated before it is finally discharged into water bodies or open land, and that it does not increase the risk of infections or ecological disturbance and environmental degradation.	
Audit Question 2: Are adequate off-site sewage services in urban areas provided by the Ministry of Water through its UWSSAs?	

Audit Criteria	Source of Audit Criteria
Planning for the provision of off-site sewage services The UWSSAs are required to develop both long term and short term plans for provision of sewage services.	National water policy 2002, pg.43 (clause 4.4 (i) and 47(ii)) and Best practices from ISO 14001: 2004 (clause 4.3
Quality of off-site sewage services rendered to those connected with sewer The UWSSAs are required to have an improved infrastructure for sustainable and efficient sanitation services to those connected with sewer.	National water strategic plan: pg. 55 (clause 4.11.3)
Functioning/Performance of existing sewerage networks The UWSSAs have to ensure the existing sewerage networks are effectively functioning in accordance with the stipulated standards to ensure sustainable provision of sewage services in their areas.	National water policy 2002, pg.40 (clause 4.1) Water supply and Sanitation Act,2009 section 5(c)
Expansion of sewerage networks to cope with increasing population UWSSAs are required to expand public sewerage in, on, under or over any street or vault below the streets to ensure the sustainable expansion of the sewerage services in urban areas	National water strategy 2006-2015 (clause 4,7.3) Water supply and Sanitation Act,2009 section 5(c)
Maintenance of the sewerage systems UWSSAs should ensure that maintenance and upkeep functions are given high priority throughout the utility	Planning documents and MTEF for 2012/13 – 2016/17
Allocation of resources (financial, personnel and time) for the maintenance and expansion of sewerage services The UWSSAs is required to budget for maintenance of the existing sewer scheme.	Water Supply and Sanitation Act, Section 21(1)(d) and 23(b)(g) National Water Strategy 2006 – 2015, pg. (clause 4.7.3)
Collection of revenues from those connected with sewer The UWSSAs have to strengthen its capabilities for collecting the revenue from household connected with sewer	Environmental Management Act 2004, section 30(j)

Audit Criteria	Source of Audit Criteria
Effluent Discharge Permission The UWSSAs is required to ensure that the Treatment processes is done to achieve the quality standards of effluent before discharging to the environment	
Audit Question 3: Are adequate on-site sanitation services in urban areas managed by PO-RALG through its LGAs?	
Planning for the provision of on-site sanitation services The LGAs is required to develop both long term and short term plans for provision of collection and transportation of sewage from the communities	National water policy 2002, pg.43 (clause 4.4 (i) and 47(ii))
Working mechanism for the collection, transportation and disposing generated on-site sanitation LGAs have to ensure that there is adequate mechanism for provision of collection and transportation of faecal sludge from the communities	National water strategic plan: pg. 55 (clause 4.11.3) Water Supply and Sanitation Act 2009, Section 21(1)(d) and 23(b)(g)
Control mechanisms for disposing on-site sanitation per sanitation standards LGAs have to ensure that there is adequate control mechanism for disposing on-site sanitation per sanitation standards LGA should prescribe, issue guidelines and standards explaining how sewage from cesspool and sludge from septic tanks need to be collected and transported by specified vehicles for disposal	National Water Strategy 2006 – 2015, pg. (clause 4.7.3) Water Supply and Sanitation Act 2009, section 8(b)(iv)
Allocation of resources (financial, personnel and time) for the maintenance and expansion of sewerage services LGAs are required to allocate budget for provision of sanitation services.	The Local Government (District Authorities)Act, 1982 section 49 National Water Strategy 2006 – 2015, pg. (clause 4.7.3)
Collection of revenues from those receiving on-site sanitation services LGAs is required to collect revenue from household receiving on-site sanitation services	Environmental Management Act

Audit Criteria	Source of Audit Criteria
Monitoring the performance implementation of the private service providers' contract LGAs should monitor the performance of private firms to ensure that the services provided by the contractor is of effective manner	2004 section 125 Planning documents and MTEF for 2012/13 – 2016/17 The Local Government (District Authorities)Act, 1982 section 49
Audit Question 4: Do the Ministry of Water and PO-RALG ensure effective coordination of all activities undertaken by stakeholders related to the provision of sewerage services?	
Coordination mechanisms with other stakeholders on the provision of sewage services The Ministry of Water is required to coordinate and provide technical and financial support for construction of sanitation schemes and expansion or rehabilitation of existing sanitation schemes *Level of coordination between the Ministry of Water and PO-RALG and other stakeholders* LGAs are required to coordinate budgetary requirements of the water authorities with local authority budgets and also coordinate physical planning with water authorities	Water Supply and Sanitation Act 2009, sections 5(c),(e), 6(a)(b), 26(1) National water strategic plan, pg. 79 (clauses 10.1.3 and 10.1.5 (a)(d)) Water Supply and Sanitation Act 2009, sections8(1)(a)(i) and (iii)
Audit Question 5: Do the Ministries (Ministry of Water and PO-RALG) monitor and evaluate the performance of UWSSAs and LGAs in the provision of sewage services in urban areas?	
Planning for monitoring and evaluation of the performance of UWSSAs and LGAs Ministries (MoWI and PO-RALG) are required to develop plan monitoring and evaluation the performance of UWSSAs and LGAs on the provision of sewage services in urban areas *Use Key Performance Indicators to assess performance of UWSSAs and LGAs* The Ministry of Water is required to develop performance indicators for measuring the Performance of UWSSAs towards management of sewerage services *Conducting monitoring and evaluations on the provision of sewage services* The Ministry of Water is required to coordinate and monitor UWSSAs in the implementation of	National water policy 2002, pg. 38 (clause 4.14 (ii)) MoWI Strategic plan 2011-2014, pg. 68 (b) MoWI-Medium term strategic plan (2011-2016), pg. 52 (clause 3.5.4) The Water Supply

Audit Criteria	Source of Audit Criteria
sanitation strategies and plans *Performance reporting mechanisms for the provision of sewage services* UWSSAs are required prepare and submit annual report to both MoWI and PO-RALG detailing activities and operations of UWSSAs *Communication of the results of monitoring and evaluations to stakeholders* Ministries (MoWI and PO-RALG) are required to ensure that the monitoring results correctly reported to relevant channel of communication to enable keeping of records that is effective. *Follow-ups on the implementation of monitoring and evaluation recommendations by LGAs and UWSSAs* The Ministries (MoWI and PO-RALG) required to make follow-up on the implementation of their directives on provision of sewage services	and Sanitation Act 2009: Section 5(f) *Water supply and sanitation Act section 26(1)* National water strategic plan, pg. 79 (clauses 10.1.3 and 10.1.5 (a)(d)) National water policy, pg. 48 (clause 4.14) The Water Supply and Sanitation Act 2009: 5(e) and 5(f)

Appendix 4: Methods for Data Collection and Analysis

This part provides the detailed methods for data collection and analysis. Three main methods for data collection namely, documentary reviews, interviews and observations have been described in this part.

Methods used to analyze the collected information i.e. qualitative and quantitative data have also been described in this part as well.

(i) Methods for Data Collection

The audit team used different methods to gather information from the audited entities and other stakeholders to assess whether the provision of sewerage services in urban areas by UWSSAs and LGAs were adequately provided. The methods which the audit team used were: *Interviews, Document reviews and Observations* as detailed below:

Interviews

To be able to respond to the audit questions and provide adequate conclusions against the audit objective, interview method was used to collect information during the main study phase. The interviews allowed the audit team to get a broader understanding of the audit area and identify existing challenges, root causes and eventually the consequences of the problems and challenges.

The audit team conducted interviews and discussions with officials from the Ministry of Water, PO-RALG, selected UWSSAs and LGAs. The Table below provides list of individuals' entities that were interviewed during the audit and the reasons for interviewing each one of them.

Officials interviewed and reasons for their interviews

Entities	Interviewee	Reasons
Ministry of Water	Director-Urban Water Supply and Sanitation Division	To get information on: • coordination in ensuring adequate provision of sewerage services in all Urban Centres • monitoring the performance of
	Assistant Director-	

Entities	Interviewee	Reasons
	Sanitation Unit	UWSSAs authorities
	Operational officers	
PO-RALG	Director - Local Government Division	To get information on: • coordination in ensuring adequate provision of sewage services in all LGAs • monitoring the performance of LGAs to ensure quality sewage service delivery
	Assistant Director - Local Government and Service Delivery Section	
	Operational officers	
DAWASCO, TANGA UWASASUWASA, KUWASA, MWAUWASA, MUWASA and DUWASA	7 Managing Directors	To get information on: • the extent of provision of sewerage services in the community • major projects that have been undertaken by UWSSAs in the recent past to improve sewerage services delivery • the challenges faced in implementing these projects • the impact of the projects that have so far been implemented
	7 Technical Managers	
	Sewerage Engineers	
Dodoma MC, Tanga CC, Kinondoni MC, Ilala MC, Songea MC, Mbeya CC, Mwanza CC, and Kigoma CC	Municipal Directors	To ascertain the extent of which LGAs adequately manage on-site sanitation services in the community
	Municipal Environmental Officers	
	Municipal Health Officers	
	On-site Sanitation service providers (Contractors)	To get their views on the challenges they get while implementing their contracts entered with respective LGA and whether they have any mitigation measures to solve the challenges

Documentary Review

Documents were reviewed in order to obtain appropriate and sufficient information to enable the audit team to come up with clear findings, supported by collaborative evidences.

Review of various documents from the Ministry of Water and PO-RALG, and other actors such as UWSSAs and LGAs on the

performance of the Ministry of Water and PO-RALG in the provision of sewerage services were conducted.

The reviewed documents fall within the period under audit i.e. 2012/13 up to 2016/17. Some of the documents reviewed and reasons for doing that are detailed in the Table below:

Documents reviewed and reasons for the reviews

S/N	Document	Reasons
	Documents from PO-RALG	
1.	Strategic plan	To understand what the strategies have been put in place by the ministry towards provision of on-site sanitation services in the country.
2.	Annual Plan	To understand the extent the ministry has put in its plan the issues of provision of sewage services
3.	Progress report	To understand the extent the ministry has implemented the issues of provision of sewage services in its plan
4.	Monitoring plan	Assess the extent the monitoring activities take on board the issues of provision of sewage services in urban area
5	Monitoring report	To understand the extent the ministry has monitored the performance of LGAs in implementing provision of on-site sanitation services
6	Budgeting and financial statements documents	To establish whether the audited entities and the key stakeholders have allocated resources on the management of provision of sewage services
	Documents from the Ministry of Water	
1.	Strategic plan	To understand what the strategies have been put in place by the ministry towards provision of sewerage services in the country.
2.	Annual Plan	To understand the extent the ministry has put in its plan the issues of provision of sewerage services
3.	Progress report	To understand the extent the ministry has implemented the issues of provision of sewage services as per its plan
4.	Monitoring plan	Assess the extent the monitoring activities take on board the issues of provision of sewage services in urban area
5	Monitoring report	To understand the extent the ministry has monitored the performance of UWSSAs in implementing provision of sewerage services

6	Budgeting and financial statements documents	To establish expenditure incurred by LGAs towards provision of on-site sanitation services.
	Documents from UWSSAs	
1.	Business plan	To understand what the strategies have been put in place by UWSSAs towards provision of sewerage services in the country.
2.	Annual Plan	To understand the extent the UWSSAs has put in its plan the issues of provision of sewerage services
3.	Progress report	To understand the extent the ministry has implemented the issues of provision of sewage services as per its plan
4.	Quality test results on effluent	To establish the level of compliance of the effluent with quality levels as required by Environmental Management Act of 2014
5	Effluent Discharge Regulations	To establish the standards for the different discharge parameters for effluent discharges to the environment
6	Budgeting and financial statements documents	To establish expenditure incurred by LGAs towards provision of on-site sanitation services.
	Documents from LGAs	
1.	Strategic plan	To understand what the strategies have been put in place by the LGAs towards provision of on-site sanitation services in the country.
2.	Annual Plan	To understand the extent the LGAs has put in its plan the issues of provision of sewage services
3.	Progress report	To understand the extent the ministry has implemented the issues of provision of sewage services in its plan
5	Budgeting and financial statements documents	To establish expenditure incurred by LGAs towards provision of on-site sanitation services.
	Documents from Academic Institutions	
1.	Academic publications on waste water management	To get obtain evidence of what have been published by different experts on the area of sewage services.
2.	Research papers on sewerage sector	To understand technical issues researched by academicians on waste water management
	Documents from International Organizations	
1.	United Nations Environmental Programme (UNEP)	To identify the best practice on management of provision of sewage services.

2.	International Standards Organization (ISO) on waste water management	To identify the requirement of ISO on management of sewage services.
	Documents from CSOs	
	NGOs' reports on health problems related to poor sanitation activities.	To get information on the extent of reported cased on outbreak of diseases related to poor sanitation activities in the country.

***Source**: Auditors' analysis of the reviewed documents (2018)*

(C) Observations

To have a better understanding of the performance of UWSSAs and LGAs in the treatment and disposal of waste, the selected waste stabilization ponds were visited in every selected region. From the selected regions, physical observation were conducted to eight (8) LGAs namely Kinondoni MC, Ilala MC, Songea MC, Mbinga TC, Kigoma MC, Kasulu DC, Dodoma MC, Mbeya CC, Mwanza CC and Sengerema DC. This helped the audit team to obtain more information regarding the audit objectives to sufficient the audit findings.

Similarly, Performance audit team arranged to collect additional information through observation of the procedures undertaken to transport on-site waste to the waste stabilization ponds, and check whether the transportation is done by the well-designed trucks special for that task, and also see whether all on-site waste are actually dumped and disposed in the designated areas.

During the process the audit team were taking notes on observed treatments process as per basic requirements standards for handling waste. The audit team also observed whether the existing sewerage network is functioning well. They also observed whether there are some technical glitches such as leakages, burst, blockage etc. and see if necessary actions have been taken to address the existing challenges that might hamper efficient performance of the sewerage network.

(ii) Methods for Data Analysis

Data collected were analyzed using different approaches of both quantitative and qualitative methods. Data analysis consisted of examining, categorizing, tabulating, or/ otherwise recombining

both quantitative and qualitative evidence to address the audit objective.

The Table below shows the method used for data:

Methods used for data analysis

Information Required	Methods for Analysis to be used
To determine the extent UWSSAs have ensured effectively provision of sewerage services in their area under its jurisdiction	The data was *quantitatively* analyzed and compiled using various software of data analysis such as Microsoft Excel. Then the analyzed data were presented through different ways including using data tabulations in tables, histograms, line graphs and percentage distribution Also the qualitative analysis was employed to analyze some of the interview questions
To assess the efficiency and effectiveness of provision of sewage services conducted by UWSSAs and LGAs in the whole process of sewage management starting from collection to disposal;	The data were *qualitatively* analyzed and compiled. The document review and Interview results will be tabulated in a table and all together will be analyzed to compare the responses of various interviews
To determine whetherMoWI and PO-RALGeffectively coordinate the activities for provision of sewage services undertaken by various stakeholders in the country	The data were *qualitatively* analyzed and compiled. The interview results were tabulated in a table and all together and analyzed to compare the responses of various interviews.
To assess whether MoWI and PO-RALG) monitor the performance of UWSSAs and LGAs to ensure effective provision of sewage services	The data were both qualitatively and quantitatively analyzed and compiled. The document review and Interview results will be tabulated in a table and all and analyzed to compare the responses of various interviews.

Appendix 5: Budgeted against Actual collected revenues -2012/13-2016/17

This table provides the detailed information regarding the planned and actual revenues collected by 6 visited UWSSAs for the period from 2012/13 to 2016/17(Amount in Billion TZS).

Name of visited UWASSA	Financial years	Budgeted sewerage revenues[18]	Actual collected revenues	%age of collected revenues over budgeted revenues
TANGA UWSA	2012/13	169	153.4	91
	2013/14	161	166.8	104
	2014/15	252	242.7	96
	2015/16	284	266.9	94
	2016/17	280	287	102
DAWASCO	2012/13	1,954	3,391	174
	2013/14	2,156	3,572.4	166
	2014/15	2,156	4,197.6	195
	2015/16	3,984	9,083.5	228
	2016/17	5,890	8,088	137
DUWASSA	2012/13	438.3	417	95
	2013/14	383.2	425	111
	2014/15	516.5	480.6	93
	2015/16	736.7	928.4	126
	2016/17	644.3	989.9	154
SOUWASA	2012/13	11.6	101.2	872
	2013/14	157.7	106.7	68
	2014/15	157.9	206.1	131
	2015/16	174	219.1	126
	2016/17	320.2	474.2	148
MBEYA UWSA	2012/13	472.3	579.9	123
	2013/14	546.6	584.2	107
	2014/15	820.1	676.6	83
	2015/16	724.8	690.6	95
	2016/17	800	686.6	86
MWAUWSSA	2012/13	771.1	841	109
	2013/14	848.5	883.4	104
	2014/15	869.3	950.9	109
	2015/16	1,290.2	1,088.6	84
	2016/17	1,234.6	1,077.3	87

Source: Financial information of the visited UWSSAs (2018)

[18] Bills from customers served with sewer network plus dumping fees collected from private service provider