THE UNITED REPUBLIC OF TANZANIA

NATIONAL AUDIT OFFICE

THE ANNUAL GENERAL REPORT ON THE PERFORMANCE AND SPECIALISED AUDITS FOR THE PERIOD ENDING 31ST MARCH, 2020

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

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Ref. No. CGA.319/421/01 **30th March, 2020**

His Excellency Dr. John Pombe Joseph Magufuli,
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40400 DODOMA.

SUBMISSION OF THE ANNUAL GENERAL REPORT ON THE PERFORMANCE AND SPECIALIZED AUDITS FOR THE PERIOD ENDING 31ST MARCH 2020

I am delighted to submit the Annual General Report of the Controller and Auditor General on the Performance and Specialized Audits for the Period ending 31st March 2020 pursuant to Article 143 (4) of the Constitution of the United Republic of Tanzania of 1977 (as amended from time to time) and Section 34 of the Public Audit Act No. 11 of 2008.

Charles E. Kichere
CONTROLLER AND AUDITOR GENERAL

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LIST OF ACRONYMS AND ABBREVIATIONS

AfDB	African Development Bank
AUWSA	Arusha Urban Water Supply and Sanitation Authority
BoQs	Bill of Quantities
BWBs	Basin Water Boards
CRB	Contractors Registration Board
DAWASA	Dar Es Salaam Water and Supply Authority
DC	District Council
DFID	Department for International Development
DUWASA	Dodoma Urban Water Supply and Sanitation Authority
DWE	District Water Engineer
GIZ	German International Cooperation
KPIs	Key Performance Indicators
LGAs	Local Government Authorities
M&E	Monitoring and Evaluation
MC	Municipal Council
MDAs	Ministries, Departments and Agencies
MISs	Management Information System
MoWI	Ministry of Water and Irrigation
MTEF	Medium Term Expenditure Framework
PAC	Public Accounts Committee
PMU	Procurement Management Unit
PO-RALG	President's Office - Regional Administration and Local Government
RS	Regional Secretariat
SDGs	Sustainable Development Goals
SOUWASA	Songea Urban Water and Supply Authority
TANROADS	Tanzania National Roads Agency
TARURA	Tanzania Rural Roads Agency
TAUWSSA	Tabora Urban Water Supply and Sanitation Authority
TUWSSA	Tanga Urban Water Supply and Sanitation Authority
TZS	Tanzanian Shillings
USAID	United States of America International Development
UWSSAs	Urban Water Supply and Sanitation Authorities

PREFACE

I am pleased to present my General Report on the Performance and Specialized Audits. The general report this time concerns five individual performance audits and one follow - up report focusing on the provision of clean water and sewage services in the country. Main audited entities were the Ministries and Authorities responsible for water and sewage services, including the Ministry of Water and Presidents Office Regional Administration and Local Government.

This report aims at providing our stakeholders (Members of Parliament, Central and Local Government Officials, Media, the Donor Community, Non-Government Organizations, Community Based Organizations, etc.) with analysis of the findings arising from the individual performance and specialized audits conducted by my Office as of March 2020. The details of the summarized matters can be read from the individual audit reports issued to respective Accounting Officers.

This report is being submitted to the President of the United Republic of Tanzania (URT), His Excellency Dr. John Pombe Joseph Magufuli, in accordance with Article 143 of the Constitution of the URT and Section 34(1) and (2) of the Public Audit Act, 2008.

Under Article 143(4) of the Constitution of the URT of 1977 as amended from time to time, the Controller and Auditor General is required to submit to the President every report he makes pursuant to the provisions of Sub Article (2) of the same Article. Upon receipt of such report, the President shall direct the persons concerned to submit such reports in the first sitting of the National Assembly before the expiration of seven days from the day the sitting of the National Assembly began. The same Article allows the Controller and Auditor General to submit his reports to the Speaker of the National Assembly should the President, for whatever reason, fail to submit the reports to the Speaker as is required by law.

The enactment of the Public Audit Act, 2008 enhanced the operational independence of my Office in the fulfillment of my constitutional mandate. The operational independence of my Office is expected to enable me to acquire the necessary controls over all the resources available for the office including human and financial resources, which will enable my Office to perform its tasks without being under the undue influence and control of any person or authority including those that I audit.

The legislation has broadened the scope of the audit to be conducted by my office by mandating me to carry out Performance, Specialised,

Environmental and Special Audits in addition to the normal Financial and Compliance Audits we have been conducting over the years.

In essence, this report has enabled me to provide the necessary independent assurance to Parliament concerning the proper use and accountability, transparency and probity in the use of public resources on construction contract management of urban water projects, control of water abstraction from the water sources, provision of sewage services in urban areas, management of water supply projects from borehole sources and management of water projects in rural areas in Tanzania.

The main objective of conducting these audits was to examine the identified problems in the respective area; establish whether allocated resources have been spent with due regard to economy, efficiency, and effectiveness as intended and appropriated by Parliament in the above-mentioned areas.

It is worth noting that, while my Office conducts audits and reports on the performance of various Central, Local Government and Public Bodies programs and activities based on various laws, rules and regulations, the ultimate responsibility for ensuring that there is economy, efficiency and effectiveness in the use of public resources lies with the respective Accounting Officers. At the same time, it is the responsibility of the Accounting Officers to ensure that the observations and recommendations raised by the Controller and Auditor General are acted upon.

Parliament looks upon the Controller and Auditor General and the National Audit Office for assurance in regard to financial reporting and public resources management in MDAs, LGAs, Public Authorities, and Other Bodies, particularly regarding the economy, efficiency and effectiveness in various programs implementation. My Office contributes through recommendations given towards improvements in the public sector performance.

In this regard, the Central, Local Governments and Public Authorities and my Office each has a role to play in contributing to parliamentary and public confidence-building in the better use of public resources with a view of speeding up the development process of the country and its people. However, while the roles of public sector entities and the National Audit Office of Tanzania (NAOT) may differ, the desire for efficient utilization of public resources remains a common goal.

In order to meet the Parliamentarians' expectations and, more broadly, of the public at large, NAOT continually reviews its audit approaches to ensure that the audit coverage provides an effective and independent review of the performance and accountability of public sector entities. Moreover, we seek to ensure that our audit coverage is well targeted and

addresses priority areas to maximize our contribution towards improving public administration. Hence, our work acts as a catalyst in improving the efficient utilization of public resources.

I would like to acknowledge the commitment of my staff in achieving our goals and undertaking the work associated with meeting our ambitious audit programs, even though they have been working in very difficult conditions marked with insufficient funding and working tools, and sometimes working in very remote and inaccessible locations.

I hope that the National Assembly and the public at large will find the information in this report useful in holding the Government to account for its stewardship of public funds and its delivery of value-added public services to the Tanzanian citizens.

Charles E. Kichere
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30th March, 2020

ACKNOWLEDGEMENT

I would like to express my gratitude to those who created an enabling environment for me to discharge my constitutional obligations. I would like to thank every member of my staff for their endeavors to once again, meet the statutory reporting deadline. With lots of appreciation, I am obliged to pay tribute to my family and the families of my staff members for their tolerance during our long absence from our homes in fulfilling this constitutional obligation.

I would like to thank the Government and the Parliament of the United Republic of Tanzania for their continued support to my Office in carrying out its duties.

Furthermore, my sincere appreciation is extended to the donor community particularly the Swedish National Audit Office (SNAO), USAID, DFID, AFDB, European Union (EU), Swiss and German Development Cooperation managed by German International Cooperation (GIZ), the World Bank through the Public Financial Management Reform Programme funding and all well-wishers who have contributed immensely towards the transformation of my Office. Their contributions in developing the mental asset, IT systems and physical assets of my office have had a tremendous impact on our success.

I am equally indebted to all our other stakeholders including Accounting Officers of the audited entities for providing full support and vital information needed for the preparation of the individual performance and specialized audit reports which are the inputs to this general report.

My special appreciation is also extended to the academic community and subject matter experts from the University of Dar es Salaam, Ardhi University, freelance experts and retired officers who added value to our reports through critical reviews which immensely improved the output of the individual performance audit reports.

I would also like to pay tribute to the Public Accounts Committee (PAC) to which this report together with the individual reports will be subjected to scrutiny and discussion. We look forward to the PAC inputs and directives emanating from the discussions of this report.

Last but not least, I would like to thank all public servants throughout Tanzania, without forgetting the role of the taxpayers to whom this report is dedicated. Their invaluable contributions in building the nation cannot be underestimated. May the Almighty God bless you all as we commit ourselves to promote greater accountability on the use of public resources in the country.

EXECUTIVE SUMMARY

Performance audit seeks to improve accountability and performance of government organizations. It also provides an objective assessment of the extent to which the audited body has used its resources in carrying out its responsibilities with due regard to economy, efficiency and effectiveness. This is based on the mandate given to the Controller and Auditor General through Section 28 of Public Audit Act, 2008 to carry out performance audit.

This general report provides common weaknesses noted, conclusion and recommendations in five performance audits on provision of clean water and sewage services conducted between 2016 and 2019. The report relates to Construction Contract Management of Urban Water projects, Control of Water Abstraction from the Water Sources, Provision of Sewage Services in Urban Areas, Water supply projects from borehole sources and Management of Water Projects in Rural Areas.

Specific focus has been given on assessing the mechanisms for managing the provision of clean and safe water and sewage services in the country in order to improve accessibility and availability of water and sewage services to its citizens. Proper management in the provision of these services facilitates poverty alleviation by enhancing food security, ensuring domestic hygiene and the environmental sustainability.

The general report on water sector provides highlights on the issues revealed in the conducted performance audits against expectations in terms of service delivery. Generally, this report aims at assisting members of Parliament, the government, mass media, the public and other stakeholders to take informed decisions so as to implement the proposals for increased economy, efficiency and effectiveness in the conduct of government business in the water sector.

However, this general report is not intended to substitute the said five individual reports conducted and tabled during the audited financial years. The reader, therefore, is advised to rely on the full individual reports. The report gives insights based on individual performance audit reports on the extent to which government entities manage the provision of clean water and sewage services, and ensure that there is effectiveness in the implementation of its interventions in the provision of water and sewage services to the citizens.

The following were the main findings from the audits conducted:

Inadequate access to clean water

Only 58.7% of the population living in rural areas had access to adequate supply of clean and safe water. Despite the percentage of population in rural areas with access to clean water being 58.7 by 2017/18, it was noted that, not all villages from 12 visited LGAs were having water services. Also, there was insufficient quantity of water supplied in the communities because the Ministry of Water and Irrigation, and PO-RALG had not ensured sufficient supply of quantity of water to the communities.

The noted reason for the inadequate access to clean and safe water was lack of proper planning of the implemented water projects. This resulted in some of the constructed water structures being constructed without ensuring the availability of reliable water supply source, which leads to wastage of resources.

Inadequate quantity of water supplied in the communities

The audit revealed that, the Ministry of Water and PO-RALG had not ensured sufficient quantity of water supply to the communities. This is because; most of the water supply projects implemented in some of the areas within LGAs did not yield the quantity of water that was expected. For instance, it was noted that out of 42 productive borehole projects implemented in the visited three UWSSAs, 7 borehole projects (equivalent to 17%) yielded less than the expected quantity of water.

There was also insufficient quality of water supplied to the communities whereby 709 out of 6,615 borehole water samples analysed, which is equivalent to 10.7%, did not meet the recommended quality standards for domestic use. It was found out that the main constraining quality parameters were high contents of iron, manganese, fluoride, nitrate in some water sources and microbial contamination. Despite the tested water from some boreholes not meeting the quality standards, water from those boreholes which failed the tests was still supplied to the communities.

Further, it was found out that there was inadequate control of water sources because agricultural activities and other human activities such as public toilets were conducted / constructed next to the water sources. These noted activities have contributed to pollution of the water sources.

Inadequate access to sewerage services in urban areas

On average out of 73% of the population served with water, only 9% of them have access to sewer network, whereas 91% depended on vacuum trucks for emptying their pit latrines and septic tanks.

There was unsatisfactory provision of on-site sanitation services that were provided by Local Government Authorities. The audit noted that not all generated sewage was timely collected. This in turn led to overflow of sewage from septic tanks in some of the streets especially from the commercial buildings and in highly populated areas. It also accelerated illegal open discharge of sewage to the environment especially during the rainy seasons.

It was further found out that there was unsatisfactory provision of off-site sewerage services in urban areas by UWSSAs. This was contributed by mal-functioning sewer networks disclosed by the presence of sewer overflows due to frequent sewer pipes blockage which was accelerated by misuse of sewer systems and absence of coordination between LGAs and UWSSAs in controlling damage of the sewer network.

Inadequate planning for water and sewage services

Despite the efforts undertaken by the Ministry of Water and Irrigation in making sure that all projects are well planned there were challenges in their planning. The challenges were found to be in the conducted feasibility studies, demand forecasting for water and sewages projects, design of water projects and preparation of Bills of Quantities for the implementation of water projects.

The feasibility studies were not well conducted as there were weaknesses in the geological surveys whereby the presence of rocks in the pipelines routes was not adequately considered, soil surveys on pipeline routes were not well done to determine chemical properties of the soil. Hydrological surveys to determine the quantity of water to be extracted was also not well conducted. Due to inadequate conducted geological and soil surveys during the planning for water projects, unnecessary additional costs amounting to TZS 2,111 million were incurred. Further, inadequate hydrological surveys were one of the major reasons for having 490 dry boreholes out of 1,485 drilled boreholes.

It was also noted that demand forecasting of both water and sewage projects was not done properly. As a result, a number of additional and new beneficiaries were added in the course of implementation of the project which resulted in the increase in the scope of work, costs of the project and ultimately contributed to delays in the completion of water projects.

Inadequate procurement and contract management of water projects

Improper handling of procurement for water projects

Our audit noted that the Ministry of Water, PO RALG and LGAs have improperly handled the procurement and contracts management of water projects. This was evidenced by awarding contracts to contractors who

could not implement the projects according to the agreed terms. This was attributed to few numbers of contractors undergoing post qualification and inadequate assessment of contractors prior to the issuance of drilling permits.

Similarly, the Ministry of Water and Water Urban Authorities did not adequately monitor the costs of water projects that were implemented by them. This was evidenced by the high costs of drilling boreholes which were above the average drilling costs per meter for the visited LGAs. Also, some of the reviewed projects were implemented at costs that were higher than the originally agreed contract price. The total price increase for all the selected projects was about TZS 30 billion, which represents 28% of the initial contract price.

Further, I noted that, there was inadequate control in the implementation time of water projects which caused delays for the completion of projects as 81% of the sampled contracts for water projects were not completed on time. Delays mainly ranged from 3 months to 4 years. Delays were caused by inadequate supervision of water projects by the Ministry of Water, LGAs and Urban Water Sanitation Authorities. Furthermore, the financial related matters such as delays in paying the contractors and unresolved tax exemptions and lack of construction material were also noted.

Insufficient resources for provision of water and sewage services

Despite the importance of adequate budgeting, allocation and distribution of resources for the provision of water and sewage services, the Ministry of Water did not adequately ensure availability of resources for the provision of water and sewage services to the citizens. It was further indicated that LGAs and Water Supply Authorities lacked sustainable funding mechanisms for water projects. This has resulted into insufficient readily available funds to cater for the preventive maintenance of the boreholes, hence not sufficient to meet the operational and maintenance costs of the infrastructures. As a result, most of the water points' infrastructures for the completed projects are not properly functioning due to lack of maintenance.

Similarly, there was inadequate budgeting for sewage services. A low priority was given on UWSSAs operational activities and little funds were set aside for the expansion of the sewerage networks. It was further indicated that on average the annual budgeted funds for the development of sewer network by UWSSAs was TZS 2.8 billion (equivalent to 9% of the total revenue collected from sewage). Reviewed financial records and MTEF showed that, the allocated annual budget for Ministries and Authorities responsible for water supply and sewage services were receiving not more

than 41% (on average per year) of the budgeted funds except for PO-RALG. As a result, it was noted that some of the water projects were not completed at all. Also, 39% of the reviewed certificates of payments to the contractors experienced delays in the payment which consequently attracted interest costs.

Inadequate coordination and monitoring of water and sewage services

The audit noted that there was inadequate coordination in water and supply services exemplified by lack of stakeholder's involvement in planning for water use. The reason for poor coordination included; inadequate information sharing among actors such as LGAs, UWSSAs and Basin Water Bodies due to different reporting structures, and lack of plans for the involvement of stakeholders in different stages of project implementation.

I also noted that there was inadequate monitoring of the implementation activities for the provision of water supply and sewerage services. Monitoring was not effectively conducted due to lack of key performance indicators, ineffective communication of monitoring results to stakeholders, non-implementation of results from monitoring activities, lack of follow ups on recommendations issued during monitoring and ineffective system for capturing data and information.

Further, the audit found out that there was ineffective monitoring of groundwater resources to measure the quantity of water, abstraction level and quality of groundwater in all 8 Basin Water Boards. This was due to lack of inadequate reporting and follow-up on water resources, and insufficient groundwater monitoring stations

Audit Conclusion

In general, I recognize the government's efforts towards provision of clean water and sanitation services in the country.

However, issues uncovered by the audit reports led me to the conclusion that, the government has not yet met the goal of ensuring that all citizens have access to good quality water and the required sanitation services; which would ultimately effectively ensure that citizens are supplied with clean water and have access to sanitation services in order to improve their livelihood.

I am concerned that the main strategies identified by the Ministry of Water as key for the improvement of supply of clean water and sanitation services were not adequately managed by the Ministry as well as its stakeholders. This is because challenges on the accessibility to clean water and sanitation

services by most of the citizens still exists. In addition, the sector is yet to overcome challenges in planning for provision of water supply and sewage services, procurement and contract Management for water supply and sewage projects, resources for provision of water supply and sewage services and coordination and monitoring of water supply and sewage services.

Audit Recommendations

I recommend the Ministry of Water to ensure that:

1. Feasibility studies for the intended water projects are thoroughly conducted to determine accurate information necessary for design and projection of water quantity and quality so as to minimize cost overruns of projects; while at the same time meeting the demand of water for the desired population throughout the lifetime of the water projects;

2. It develops a functioning mechanism for reviewing feasibility studies, designs and Bills of Quantities of water and sewage projects so as to make sure that water and sewage projects are properly planned so as to minimize unnecessary cost overruns and delays;

3. It establishes and implements effective coordination mechanisms with clear roles and responsibilities for each actor in the provision of Water and Sewerage Services in the country;

4. In collaboration with PO-RALG develops long and short term plans together with sustainable funding mechanisms for the provision of water supply projects and sewage services in the country;

5. UWSSAs develop a well-established model for allocation of financial resources between Water Supply and Sanitation Services in order to cater for both hardware and software requirements for water projects including on-site and off-site sewage services;

6. In collaboration with PO-RALG, implementers of water and sewage services are staffed with required professionals and equipped with all necessary equipment required for fulfilling their roles;

7. In collaboration with PO-RALG, Procuring Entities are capacitated to prepare and review tender documents, evaluation reports and contract documents for water projects prior to awarding the contracts in order to avoid engaging unqualified contractors;

8. Before engaging in the implementation of contracts, there is adequate financial resources sufficient to effectively execute the projects, so as to address problems associated with delay in paying contractors;

9. It strengthens monitoring mechanisms for water and sewerage services from LGAs to a higher level through the development of effective implementation with regards to time, cost and quality;

10. Monitoring and evaluation plans with Key Performance Indicators for measuring the provision of Water and Sewerage Services are developed and effectively implemented;

11. There are mechanisms for follow up on the implementation of recommendations after monitoring of water and sewerage services activities;

12. It develops and implements a risk-based water resources monitoring regime;

13. Basin Water Boards and Urban Water Supply and Sanitation Authorities effectively collect user fees and charges for the provided services. Use the collected fees and charges on activities related to provision of water supply and sewage services such as wastewater treatment plants and Waste Stabilization Ponds among others;

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

15. 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;

16. In collaboration with PO-RALG, LGAs put in place strategies for ensuring effective removal of fecal sludge from communities' on-site sanitation systems; and

17. It develops mechanisms for involving private sector in the provision of sewage services in urban areas.

CHAPTER ONE

INTRODUCTION

1.1 Background of performance audit

Performance audit in a public sector is important since it seeks to improve the accountability and performance of government undertakings so that the citizens receive timely and good services from the government. In Performance Auditing, different factors are considered in selecting areas of focus. These factors include public outcry and the importance of the area in relation to socio-economic development.

Performance audits aim to evaluate whether activities, programmes or projects involving the collection or use of public funds in Ministries, Departments, Local Government Authorities and other public organizations have been managed with regard to the three Es which are; economy, efficiency and effectiveness:

- **Economy** – Minimizing the cost of resources used for an activity, having regard to appropriate quality;

- **Efficiency** – The relationship between inputs and outputs, in terms of goods, services and results, and the resources used to produce them in such a way that minimum inputs are used to produce same outputs or same inputs are used to produce more outputs; and

- **Effectiveness** – The extent to which objectives are achieved and the relationship between the intended impact and the actual impact of an activity.

1.2 Mandate

The Controller and Auditor General of Tanzania draws his legal mandate to carry out performance audits from Section 28 of the Public Audit Act, 2008 which states that:

*"The Controller and Auditor-General shall, for the purposes of establishing the **economy, efficiency and effectiveness** of any expenditure or use of resources of the entities, enquire into, examine, investigate and report, in so far as he considers necessary on:*

(a) The expenditure of public monies and the use of resources by such Ministries, Departments, Agencies, Local Authorities, and all such public authorities and other bodies;

(b) The conduct of the performance of their functions by Accounting Officers, Head of Departments and Chief Executives of all such entities;

(c) Compliance with environmental laws, regulations and internal environmental policies and standards''.

The performance audit attempts to determine whether the initial objectives set at the beginning of an undertaking were achieved. As a consequence of that, it is then deduced as to whether due regard for economy, efficiency and effectiveness were considered. Recommendations for improvement are made in those areas where it is felt that deficiencies occurred.

These performance audits were conducted in accordance with International Standards for Supreme Audit Institutions on performance auditing. Those standards require that NAOT plans and performs the audit to obtain sufficient and appropriate evidence to provide a reasonable basis for the findings, conclusions, and recommendations based on audit objective(s).

1.3 Purpose of this general report

The presentation of this general report aims at assisting Members of Parliament, the Government, Mass Media, the Public, and other stakeholders to make informed decisions in order to implement the requirements for the increased economy, efficiency, and effectiveness in the conduct of various government businesses.

This report provides highlights on the issues revealed in the conducted performance audits against what was expected in the provision of safe and clean water and sewage services in the country, accessibility of water and sewage services, planning for water & sewage services, procurement & contracts management for water and sewage services, resources for Provision of water and sewage services and monitoring and evaluation of water and sewage services in the country. Therefore, this general report is based on the analysis conducted by NAOT from the five performance audits in the water sector. These are performance audits on management of:

a) Construction contract management of urban water projects at the Ministry of Water (2016) which includes its follow-up report (issued in 2020);
b) Control of water abstraction from the water sources (2017);

c) Provision of sewage services in urban areas (2018);
d) Water supply projects from borehole sources in Tanzania (2019); and
e) Water projects in rural areas in Tanzania (2019).

1.4 Focus of this General Report

This report focused on presenting issues regarding the mechanisms of government in managing the provision of clean and safe water and sewage services in the country in order to improve accessibility and availability of water and sewage services to its citizens.

Importance of water

Water is fundamental to life and sustaining the environment and plays a central role in the social and economic development of the country. It touches all spheres of life including domestic, agriculture, livestock, fisheries, wildlife, industry, energy, recreation and other social and economic activities.

Water plays a pivotal role in poverty alleviation through enhancing food security and domestic hygiene security, and the environment for sustainability of ecosystems. The availability of adequate water supply of good quality reduces the time spent in fetching water and increases health standards. The use of contaminated water poses health risks to the population as evidenced by the prevalence of waterborne diseases such as diarrhoea and cholera.

Water Sector stimulates the achievement of National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA), Tanzania Development Vision 2025 and achieving sustainable development goals and management and other economy-wide benefits through an increase in the availability of water supply and sanitation services. Further, the water resources have implications for all water-using key sectors of the economy, such as agriculture, energy, industry, livestock, mining, environment, tourism, and fisheries, as well as for domestic supply.

Despite its importance to human survival and development, water in the country is poorly distributed in time, space, quantity and quality and, generally, it is a finite and vulnerable resource that has to be managed and used on a sustainable basis.[1]

[1] National Water Development Strategy,2006-2015

1.5 Data Validation Process

The audited Ministries, Departments, and Agencies were given opportunities to discuss and comment on the individual audit findings and correct factual misrepresentation.

1.6 Structure of the Report

This general report is structured into eight chapters as follows:

Chapter One provides an introduction to the performance audit, mandate and the purpose of the general report;

Chapter Two focuses on providing brief description of the system for provision of water and sewage services in Tanzania;

Chapter Three provides audit findings on the accessibility to clean and safe water services in Tanzania;

Chapter Four provides audit findings on the accessibility to sewage services;

Chapter Five provides audit findings on the planning for water and sewage services;

Chapter Six provides audit findings on the procurement and contracts management for water and sewage services;

Chapter Seven provides audit findings on the management of resources for the provision of water and sewage services;

Chapter Eight provides audit *findings on the* Monitoring and Evaluation of activities in the provision of water and sewage services*;*

Chapter Nine covers overall conclusion of the report; while

Chapter ten provides recommendations to the audited entities on areas that need improvements in the course of providing water and sewage services to citizens.

CHAPTER TWO

SYSTEM FOR THE PROVISION OF WATER AND SEWAGE SERVICES IN TANZANIA

2.1 Background

Safe drinking water and good sanitation practices are basic considerations for human health. The use of contaminated sources of water poses health risks to the population as evidenced by the incidences of water borne diseases such as diarrhea and cholera. Despite its importance to our lives and development, water is unevenly distributed with great variations in terms of quantity and quality.

Increasing demand for water and sanitation services have been intensified with the increase in population and concurrent growth of economic activities requiring water as an input. Water scarcity is perceived at many places due to unreliable rainfall, multiplicity of competing uses, degradation of sources and catchments.

Despite significant investment in water sectors since early 1970s, water supply coverage is not yet satisfactory. The 1991 National Water Policy set up a goal of providing clean and safe water to the population within 400 meters from their households by the year 2002. However, demand for water is still higher than the installed capacity and production. As of 2017/18, water production from regional water utilities was 307 million m^3; while the installed production capacity was 435 million m^3 and the demand stood at 452 million m^3.

On the other hand, up to 2017/18 for District and Township water utilities, water production amounted to 34 million m^3 while the demand stood at 101 million m^3. Further, only about 50% of the rural population has access to reliable water supply services and most lack treatment facilities. Due to poor operational and maintenance arrangements, over 30% of the rural water schemes were not functioning properly.

Moreover, despite the government's efforts, through different programs such as National Growth and Poverty Reduction Strategy II (NGPRS) and Water Sector Development Program (WSDP I&II); the provision of sewage services in the country remained unsatisfactory. Up to 2016 only 11 out of 26 regions in Mainland Tanzania had sewer networks and approximately 9% of the total population in the country had access to sewerage system. The remaining 14 regions in Mainland Tanzania were not served with sewer networks; hence they depended on on-site sanitation which offer unsatisfactory services.

2.2 History of Water Sector in Tanzania

Water sector in Tanzania has undergone a series of reforms that can be traced back to 1970's to late 1990s. The first National Water Policy was adopted in 1991; to address the shortcomings of previous free water policy that undermined sustainability and contributed to under-investment in both expansion and maintenance of water and sanitation facilities[2]. Major reforms were made in 2002, when the National Water Policy (NAWAPO) of 2002 was introduced aimed at strengthening provisions of water supply and sanitation.

It was during this period, a Sector-Wide Approach (SWAp) was introduced, to improve more coordination of finance for water sector and wide view of performance monitoring and institutional development. In 2006, National Water Sector Development Strategy aimed at promoting integrated water resources management and development of urban and rural water supply was launched. These reforms led to a significant increase of the budget starting in 2006; when water sector was included among the priority sectors of the National Strategy for Growth and Reduction of Poverty (NSGRP).

However, there were still reported challenges related to underutilization of funds allocated for water development. For instance, during 2016/17 budget, only 56 LGAs managed to spend at least 50% of the water development fund; whereas in 2017/18 a total of 131 LGAs spent less than 50% of the water development fund availed to them.

Because of these challenges, on 10th May 2018 the government directed all experts responsible for water management from LGAs' to report direct to the Ministry of Water. This change necessitated the amendment of the Water and Sanitation Act, of 2009; hence in February 2019, the Water Supply and Sanitation Act was revised to provide for sustainable management, adequate operation and transparent regulation of water supply and sanitation services in the country.

[2] Water Sector and Sanitation in Tanzania, 2015

The summary of the reforms made in water sector are as indicated in **Figure 2.1:**

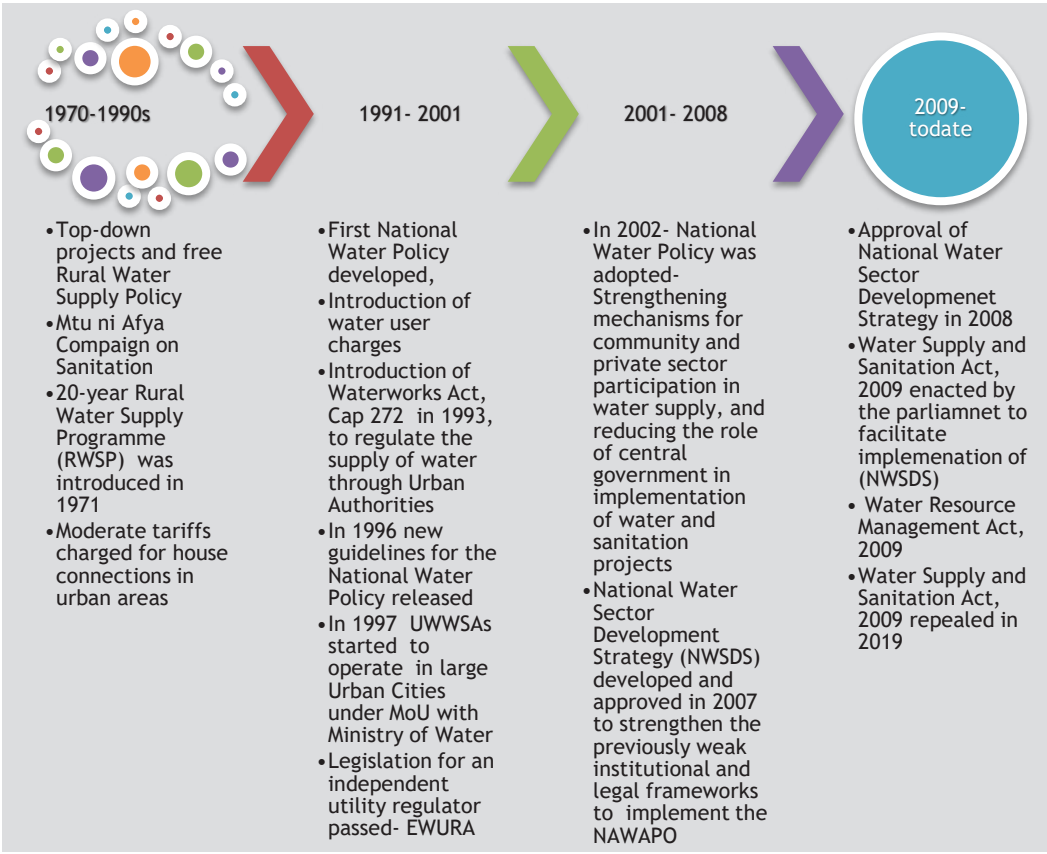


Figure 2. 1: Key dates and reform made in water sector in Tanzania

2.3 Strategies for Development of Water Sector in the Country

Tanzania Development Vision 2025

The Tanzania Vision 2025 aims at achieving a high quality livelihood for its people, good governance through the rule of law and developing strong and competitive economy. Its intention was to increase universal access to safe water, sanitation services and water resource management. It was also focused in ensuring proper maintenance of water and sanitation systems, use of environmentally sound technologies, and effective water tariffs, billing and revenue collection mechanisms.

National Water Sector Development Strategy, 2006

The National Water Sector Development Strategy (NWSDS) 2006 - 2015 sets out a strategy for implementing the National Water Policy (NAWAPO) of 2002. The policy aimed at achieving sustainable development in the water sector through an "efficient use of water resources to increase the availability of water and sanitation services." It is guided by the principles of decentralization and localisation of management and services.

Water Sector Development Programme (WSDP)

The Water Sector Development Programme prioritizes activities and budgets in a three-phased timeline of five years each (first phase 2007-2014; second phase 2014-2019 and third phase 2019-2025). Its implementation follows a Sector Wide Approach to Planning (SWAP), aimed at strengthening sector institutions for integrated water resources management to improve access to water supply and sanitation services.

2.4 Governing Policy, Law and Regulations

Water sector is mainly governed by the National Water Policy of 2002 and National Environmental Policy, of 1997. These policies set objectives on the provision of water and sanitation services. The main objective of the National Water Policy, 2002 was to achieve sustainable, effective and efficient management of water and sanitation services in the country. National Environmental Policy, 1997 stipulates sanitary practices including the provision of community needs of infrastructure for sewage collection, treatment and disposal services. Its objective is to prevent and control degradation of land, water, vegetation and air which constitute of our life support system.

The two policies are supported by Water Supply and Sanitation Act No. 5 of 2019 repealing Water Supply and Sanitation Act, No. of 2009. Other laws include Water Resource Management Act No. 11, of 2009, Environmental Management Act, of 2004 and Local Government Urban Authorities Act, No. 8 of 1982.

2.5 Principles of Management of Water Sector

The management of water sector employs the concept of Integrated Water Resources Management (IWRM). Principally, IWRM addresses both the management of water as a resource, and the framework for provision of water services to all categories of users, while addressing both water quantity and quality.

Integrated Water Resources Management uses three basic pillars namely *enabling environment* of appropriate policies and laws, the *institutional roles and framework*, and the *management instruments*. **Figure 2.2** demonstrates the links of various aspects in Integrated Water Resource Management.

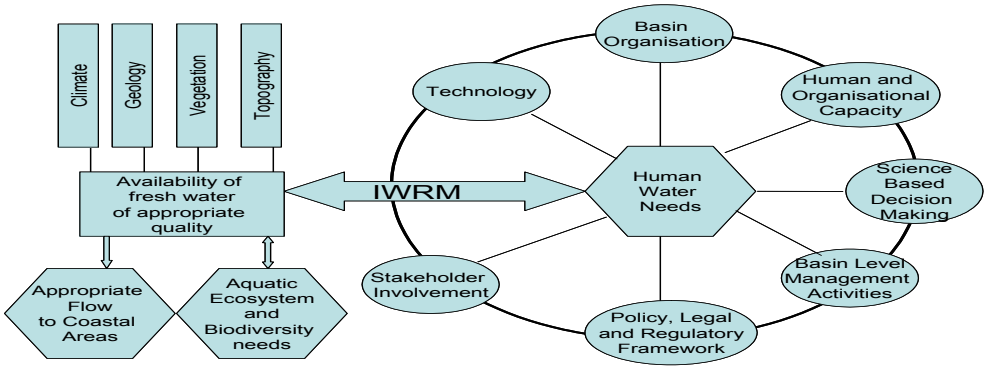


Figure 2. 2**: Intergraded Water Resources Management**

2.5.1 Implementation Process of Water Projects

The provision of water and sewage services is mainly based on projects. Its sequence starts with establishment of demand/need for water, assessment of quantity and quality of demanded water and determining appropriate water source; followed by abstraction or drilling and transportation of water. It is estimated that approximately 80% of water consumed is converted into waste water which then is collected, transported, treated to meet the required environmental standard before its disposal.

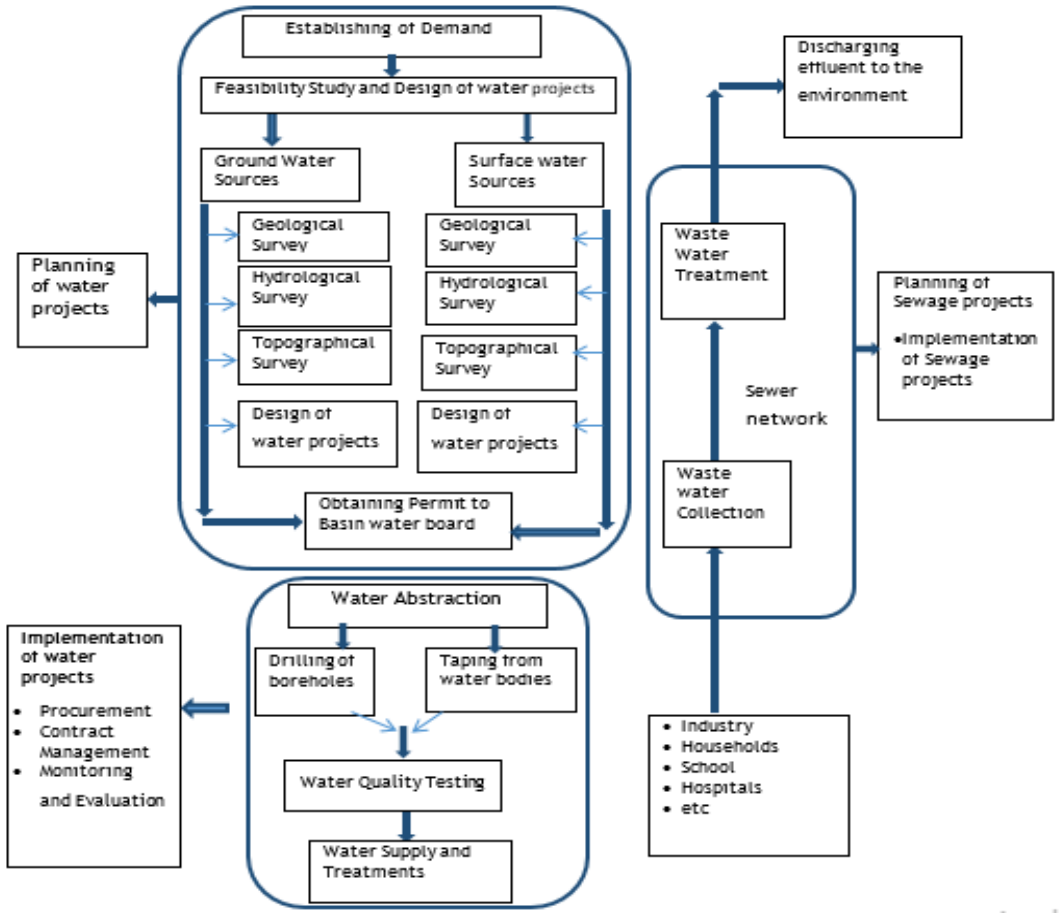


Figure 2. 3: Summarized processes for implementation of Water Projects

Figure 2.3 shows the main activities involved in the provision of water and sewage services which includes planning, implementations and monitoring and evaluation. Planning starts with overall sector plans which requires involvement of various actors within the sector to identify priorities, determine whether investments intended to be implemented are feasible; and how best the projects can be carried out.

Other planning activities include a feasibility study that normally involves identification of water sources, hydro geological, geological and topographical surveys. Demand forecasting is the most critical element in water project planning to avoid over-estimation or under-estimation of water demand.

Generally, before carrying out a detailed topographical survey and the design, hydrological and Hydro-Geological investigations must be

conducted. Topographical Survey is the basis for the design and construction of the proposed water supply project. The completions of these survey activities form a basis for implementation activities that includes project design, procurement, contract management and monitoring and evaluations of the projects.

The five Performance Audits conducted in the water sector; have extensively assessed the element of planning, procurement, contract management and monitoring and evaluation of activities related to the provision of water supply and sewage services.

2.6 Need for Audit in Water and Sanitation Area

National Audit Office of Tanzania decided to carry out five performance audits in the water sector, because access to clean water and sanitation services is one of the priority areas of the Government of Tanzania as stipulated in the National Strategy for Growth and Reduction of Poverty (NSGRP) and Water Sector Development Program. In addition, it directly supports Goal number 6 of the Sustainable Development Goals which emphasizes on ensuring availability and sustainable management of water and sanitation for all. Thus, the performance audits conducted were significant in improving the services in water sectors as detailed below:

First, control of water abstraction is necessary for preventing environmental damage and at the same time ensure sustainable water supply to sufficiently support various economic activities Water sources in Tanzania have been facing different problems that may cause either water depletion (reduction in quantity) or water pollution (deterioration of quality). Thus, if water abstraction is not controlled, there is high risk for depleting water sources resulting in water stress situation where people and the surrounding environment will not have enough water for survival.

Secondly, contract management for construction of water projects is very necessary for effective and efficient provision of water services and eventually reducing financial losses that may arise from poor quality, unnecessary cost increments and delays in completion of projects. In three consecutive years starting from 2010/11 to 2013/2014, on average 27% of the total government procurement budgets amounting to TZS 2.8 trillion (i.e. US $1.24billion) was spent on water projects.

Despite this significantly high amount of funds, implemented projects faced several challenges. Those challenges included insufficient systemic planning, poor monitoring and reporting, inadequate supervision capacity and delays in flow of funds. Furthermore, despite costing enormous amounts

of money, 46% of the implemented projects did not work as intended. Thus, if improvement in contracts management is not done, there is high risk for the government to fail to achieve its goals for improving access to clean water to its citizen.

Thirdly, the management of the implementation of water supply projects from borehole sources was necessary to ensure communities have sustainable access to clean, safe and adequate water. This is to ensure 80% of the citizens who depend on boreholes water to realize the expected benefit from the allocated funds for boreholes water projects.

Likewise, effective management of water projects in rural areas is essential to facilitate availability of clean and safe water so as to minimize water borne diseases, distance walked, and time taken by people to fetch water. Lack of clean and safe water was among the factors that contribute to the high mortality rates due to water borne diseases and wastage of time for searching safe and clean water. Furthermore, it strongly supports the initiative of Big Results Now which targeted to increase rural water supply to reach 74% of the population by 2015.

Fifth, proper management of provision of sewage services is very key in preventing or rather minimizing eruption of sanitation related diseases to the society. Thus, access to sewage services was key in addressing sanitations related diseases and the associated challenges.

2.7 Key Players in the Water Sectors

Key players involved in the provision of water and sanitation services in the country falls into three categories. These are the Sector Ministry, Oversight Institutions and the Regulatory bodies as detailed hereunder:

2.7.1 Sector Ministries

These include the Ministry of Water and President's Office – Regional Administration and Local Government (PO-RALG). The Ministry of Water is responsible for policy, legislative and strategic aspects of water sector. It also provides technical guidance to Water Supply and Sanitation Authorities, Water Resource Boards and Rural Water Supply and Sanitation Agency to enable them to carry out their mandated functions.

According to section 6 of the Water and Sanitation Act, 2019, PO-RALG is responsible for creating a conducive environment for all implementers of provisions of water supply and sanitation services to participate and execute their roles effectively. These implementers include the community and the

private sector, Water Authorities, Rural Water Supply, Sanitation Agency (RUWASA) and Community Owned Water Supply Organizations (COWSOs).

Regional Secretariats (RSs): According to section 7 of the National Water Supply and Sanitation Act, 2019 Regional Secretariats are required to coordinate and follow up the status of planning and implementation of water supply and sanitation services in their regions; and create a conducive environment for water authorities, RUWASA and Community Organizations in the execution of functions connected with provisions of water supply and sanitation services in their region.

Local Government Authorities (LGAs): According to section 8 of the Water Supply and Sanitation Act, 2019, Local Government Authorities are responsible for coordination of physical plans with Water Authorities and Community Organizations; set aside funds from own sources for water supply and sanitation projects and mobilize communities to take over water supply schemes. They are also responsible for making and approving by-laws for protection of water sources and facilitating the registration of Community Owned Water Supply Organizations (COWSOs) in their jurisdictions.

*Water Supply and Sanitation Authorities (WSSAs)***:** According to section 20 of Water Supply and Sanitation Act, 2019, *WSSAs* are responsible for the provision of water supply and sanitation services. They are also required to develop and maintain waterworks and sanitation works; and advise the Government in the formulation of policies and guidelines relating to water and sanitation services.

2.7.2 Regulatory Authorities

There are various Regulatory Authorities responsible for regulating the professional conducts of parties involved in water and sanitation activities and projects. These include:

The Energy and Water Utilities Regulatory Authority (EWURA): It performs its regulatory functions in accordance with Water Supply and Sanitation Act 2019 and EWURA Cap 414. It exercises licensing and regulatory functions in respect of water supply and sanitation services including monitoring of water quality and standards of performance for the provisions of water supply and sanitation services. Other roles include establishing service charge levies, and fees applicable to Water Authority and other sector participants in respect of regulatory activities of EWURA charges in accordance with section 41 of the Energy and Water Utilities Regulatory Authority Act.

Rural Water Supply and Sanitation Agency (RUWASA): This is a regulatory Agency established under the Water and Sanitation Act, 2019. It regulates Community Owned Water Supply Organizations, (COWSOs). According to Section 43 of the Water Supply and Sanitation Act 2019, RUWASA is responsible for development and sustainable management of rural water supply and sanitation projects. Other roles include planning, designing, constructing and supervising rural water supply projects; conduct ground water survey including prospecting and explorations, and undertake drilling operations such as water well flushing and pumping tests, and rehabilitation of water wells, design and construct dams of different types and carry out geotechnical and soil investigation for dam construction and other civil engineering structure. It also monitors and evaluates performance of community organizations in relation to rural water supply and sanitation services.

Basin Water Boards: There are nine (9) Basin Water Boards established by Ministry of Water and mandated to manage and look after all the water sources in the country by carrying out the functions under section 23 of the Water Resource Management Act 2009. Its functions include preparation of basin water resources management plans, budgeting and implementation strategy, monitor and enforce water use and discharge permits and pollution prevention measures of water source. The Boards are also responsible for coordinating the inter-sectoral water resources management at the basin level and serve as a channel of communication between these sectors and water users in general.

2.7.3 Oversight Institutions

These include institutions such as Dams Drilling and Construction Agency (DDCA), Public Procurement Regulatory Authority (PPRA); and Tanzania Bureau of Standards (TBS) which is responsible for testing and approving the quality of materials used in water construction projects. Other oversight institutions include Contractors Registration Board (CRB); Engineers Registration Board (ERB) and Community Owned Water Supply Organizations (COWSOs). It also includes National Environmental Management Council (NEMC) which oversees environmental management issues and advise the Minister responsible for environment, before the commencement of large-scale projects which involve water abstraction.

2.8 Performance Audit Conducted

The National Audit Office conducted five Performance Audits in the water sector; three were focusing on provisions of water services, one on provision of sewage services (both on site and off site); and one was on controls of water sources. The detailed titles of those audits are:

1. *Performance Audit on the Control of Water Abstraction from the Water Sources;*
2. *Performance Audit on the Construction Contract Management of Urban Water Projects;*
3. *Performance Audit on the Management of Water Supply Projects from Borehole Sources in Tanzania;*
4. *Performance Audit on the Management of Water Projects in Rural Areas; and*
5. *Performance Audit on the Management of Provision of Sewage Services in Urban Areas.*

The audit findings and conclusions from these five audit reports have been used to develop a general overview of the water sector in the country which is presented in the remaining chapters of this general report.

CHAPTER THREE

ACCESS TO CLEAN AND SAFE WATER SERVICES

3.1 Introduction

Access to Clean and safe water services is an important aspect towards poverty eradication and attaining a high quality of life for all people[3]. This chapter presents our audit findings on the extent to which the Ministry of Water and Irrigation and PO-RALG have ensured that communities have sustainable access to clean, safe and adequate water.

The chapter is divided into three main parts namely, coverage of water supply services (section 3.2); quality of water supplied to the communities (section 3.3) and control of water sources (section 3.4).

3.2 Inadequate coverage of Water Supply Services

This specific section presents the findings on the coverage of water supply services in the community. The section is sub-divided into four sub-sections namely, access to safe and clean water services (section 3.2.1); quantity of water supplied in the communities (section3.2.2); reasons for inadequate quantity of water supply in the community (section 3.2.3) and consequences for inadequate quantity of water supplied in the community (section 3.2.4).

3.2.1 Inadequate access to safe and clean water services

The review of Performance Reports from the Ministry of Water and Irrigation (2018) revealed that, only 58.7% of the population had access to clean and safe water in rural areas by the year 2017/18. Figure 3.1 provides a trend of percentages of people with access to clean and safe water in rural areas for the period of 5 years i.e. from 2013/14 to 2017/18.

[3] Tanzania's Development Vision 2025

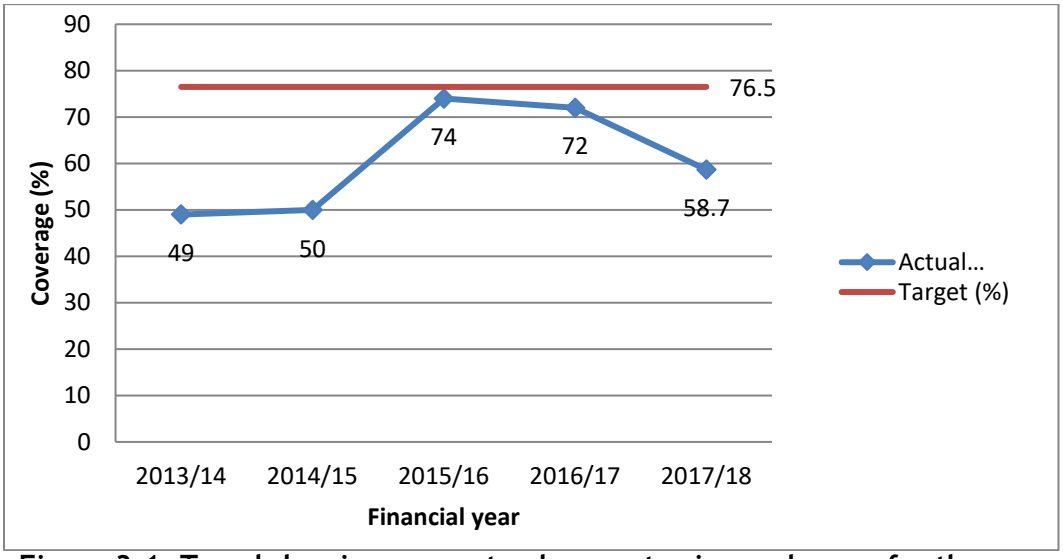


Figure 3.1: Trend showing access to clean water in rural areas for the last five years at National Level

***Source**: Performance Reports from the Ministry of Water (2018)*

Figure 3.1 indicates that the Ministry of Water for the period of five years failed to meet the target of ensuring that the population with access to clean water in rural areas reach 76.5% by 2015. Also, the figure indicates that the maximum accessibility was 74% in the financial year 2015/16 but declined to 58.7% in 2017/18 indicating that people's access to clean and safe water in rural areas has decreased by 13.88 % when compared to the financial year of 2016/17.

Furthermore, the review of water status reports from 12 visited LGAs[4] revealed that all that visited LGAs did not meet the target of 76.5% population with access to clean water in rural areas by 2015. Figure 3.2 shows the percentage of the population with access to clean water as specified in respective LGAs.

[4] Singida DC, Manyoni DC, Mbulu DC, Kiteto DC, Shinyanga DC, Morogoro DC, Mvomero DC, Sumbawanga DC, Nkasi DC, Lindi DC, Nachingwea DC and Kishapu DC

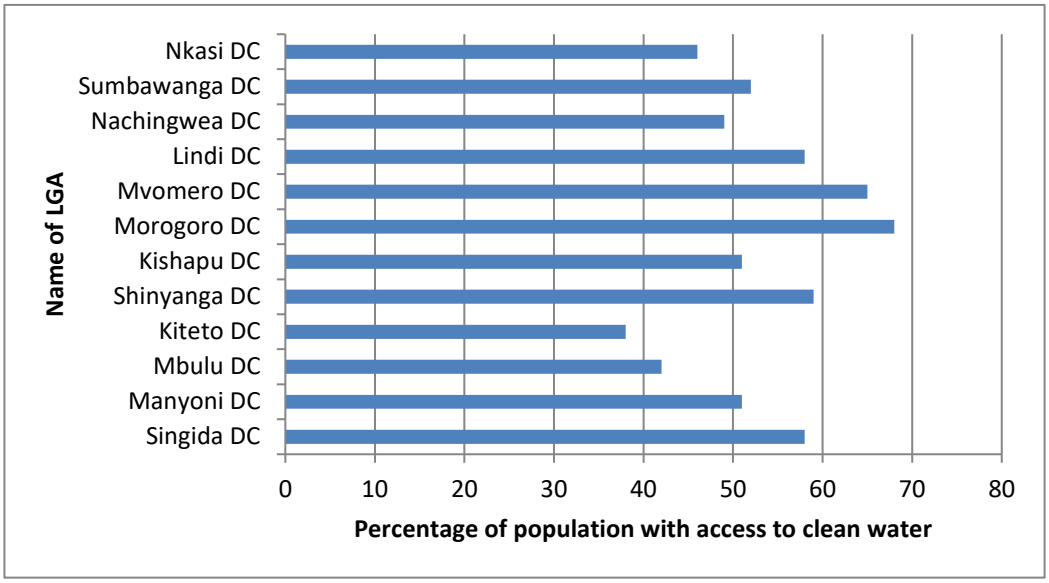


Figure3.2: Percentage of population with access to clean water in visited LGAs

Source: *Quarterly reports from Local Government Authorities (2017/2018)*

Figure 3.2 shows that Morogoro DC had a higher percentage of population with access to clean water of 68% while Kiteto DC had a lower percentage of population with access to clean water of only 38% of the population which is below 50%. Similarly, four (4) LGAs had a low percentage of below 50% of the population with access to clean water.

Despite the percentage of population in rural areas with access to clean water being 58.7 by 2017/18, it was noted that, not all villages from the 12 visited LGAs were having water services. It was further noted that, there is uneven distribution of water services between villages. **Figure 3.3** shows the number of villages with and without water services from the12 visited LGAs.

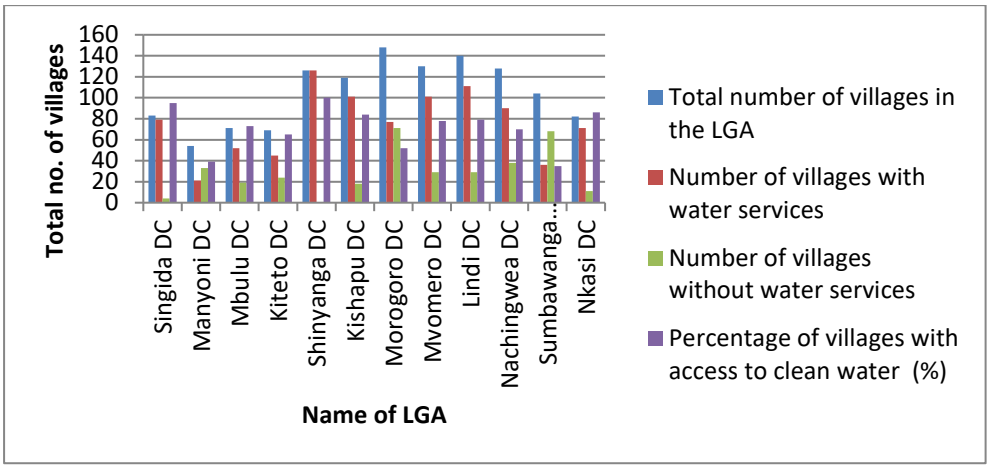


Figure 3. 3: Distribution of water services for the 12 visited LGAs

***Source**: Status Report from twelve visited Local Government Authorities (2018)*

Figure 3.3 shows access to clean water in rural areas village wise. The analysis shows that 7 out of the 12 visited LGAs have access to water services above 76%. Despite the percentage of villages with access to water services being high in these LGAs, the number of people that benefited to water supply remains small due to few and scattered water points in the respective villages.

Also, Figure 3.3 indicates that, on average only 54% of the people in those villages had access to water services. A good example is shown in Shinyanga DC whereby the percentage of villages with access to clean water is 100% while the population with access to clean water is below 50%. It implies that at least in each village there is a water project which supplies water although it does not suffice the needs of the available population.

3.2.2 Insufficient Quantity of Water Supplied in the Communities

The analysis of the information extracted from boreholes water supply projects report from the MIS in July 2018 revealed that, the amount of water being generated from the constructed boreholes did not match with the demand that was expected to be generated and supplied to the communities. It was noted that there were a number of boreholes in which the quantity of water produced was less than what was expected.

It was noted that out of 42 productive borehole projects implemented in the visited three UWSSA, 7 borehole projects equivalent to 17% yielded less

than the expected quantity of water. Figure 3.4 indicates the variation of the expected quantity of water and the actual yield in the two (2) UWASSA.

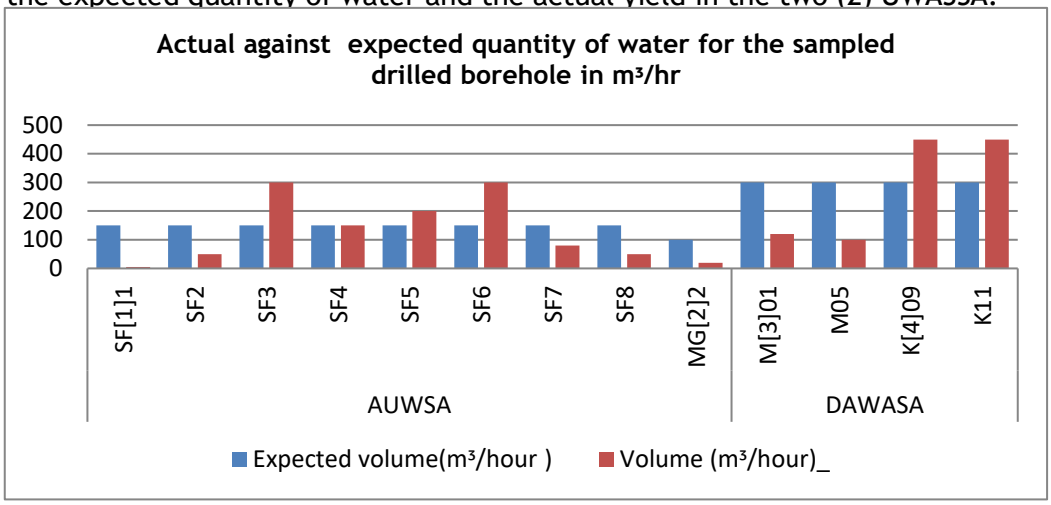


Figure 3. 4: Variation on actual against expected quantity of water for the sampled drilled boreholes

***Source**: Analysis of data extracted from the Boreholes completion reports of the respective UWSSAs*

Figure 3.4 indicates that, there was a significant difference between the actual and the expected amount of water produced. For the case of DAWASA, 2 out of 4 completed boreholes yielded less than the expected quantity whereby the variance was 180m^3 and 200m^{3}respectively. Also, two borehole projects yielded more than the expected quantity of water with a variance of 150m^3 for each.

3.2.3 Reasons for not meeting the target for water supplied in the communities

The following were the reasons for inadequate access to safe and clean water services:

a) Lack of geological and hydrogeological survey prior to drilling of boreholes

It was noted that, some boreholes were found to have a large amount of water during the period of implementation and later the amount of available water supplied started to dry out. This problem was attributed to inadequate geological and hydrogeological survey prior to drilling of

boreholes to detect the availability of ground water before starting implementing the project.

b) Established water infrastructures which are not supplying water

The review of progress reports (2018) from the visited Local Government Authorities revealed that, some of the constructed water structures were white elephants in the sense that they have been constructed without ensuring the availability of reliable water supply sources. We noted some cases where water supply networks/infrastructures were in place with dry water source.

3.2.4 Consequences for not meeting the target for supplying water in the communities

Failure to meet the target of supplying water to the communities had the following consequences:

a) Failure of the beneficiaries to enjoy intended benefits of the constructed projects; and

b) Loss of Government funds that have been spent in the construction of those water projects. For example, analysis of the boreholes water supply projects report extracted from the MIS in July 2018 noted that, a total of TZS 674,956,367 was lost in executing boreholes water supply projects which were dry and did not yield the intended results in the visited LGAs. Figure 3.5 shows the amount of funds spent on dry boreholes in the visited LGAs.

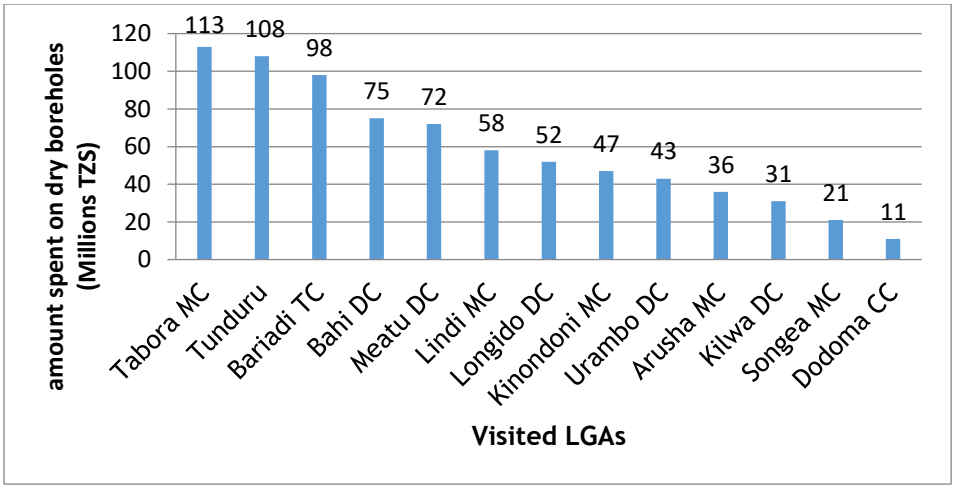


Figure 3. 5: Costs of the Total Dry Boreholes in the Visited LGAs

Source: Analysis of the Boreholes water supply projects report extracted from the MIS in July 2018

As indicated in Figure 3.5, the visited LGAs spent between TZS 11 to TZS 113 million for boreholes water supply projects which did not yield the intended results. The highest amount of funds spent was noted in Tabora MC.

3.3 Inadequate Quality of Water Supplied to the Communities

The review of Water Sector Status Report (2016) pointed out that, 709 out of 6,615 boreholes water samples analyzed, which is equivalent to 10.7%, did not meet the recommended quality standards for domestic use.

The report further revealed that the main constraining quality parameters were high content of iron, manganese, fluoride, nitrate in some water sources and microbial contamination. Through the review of the WSDP II monitoring report of Zone 55 the audit noted that, the groundwater was loaded with fluoride, alkaline and high concentration of manganese contrary to the recommended water quality standard.

The details of the parameters that were found to be high than the recommended standard are as presented below:

[5] Kagera, Simiyu, Singida, Mara, Shinyanga, Kigoma and Tabora

3.3.1 Water with high Concentration of Manganese

The review of individual LGAs and UWSSA boreholes water supply projects completion reports from 2015-2018 indicated that, the quality of water in the drilled boreholes was not satisfactory due to high concentration of Manganese. Table 3.1 indicates the level of Manganese present in the water for the sampled boreholes in the visited LGAs and UWSSAs.

Table 3. 1: Sampled Boreholes with High Concentration of Manganese

Name of the LGA's /UWSSAs	Number of productive Boreholes	Average Manganese concentration for the sampled Projects (mg/l)	Number of projects with high content of manganese above national standards[6]	Number of projects with manganese above WHO standards[7]
UWSSAs				
AUWSA	13	Not reported	Not reported	Not reported
DUWASA	5	0.01	0	0
DAWASA[8]	-	-	-	-
LGAs				
Tunduru DC	3	1.55	1	1
Tabora MC	2	0.66	2	2
Bariadi DC	7	0.16	Nil	7
Meatu DC	4	0.15	Nil	4
Longido DC	5	Nil	Nil	Nil
Arusha CC	12	Nil	Nil	Nil
Songea MC	39	Nil	Nil	Nil
Lindi MC	7	1.6	1	1
Kilwa DC	20	1.75	2	2

***Source**: Extracted from Individual LGAs Boreholes Completion Reports, 2015-2018*

From **Table 3.1,** 6 out of 99 productive boreholes from the 9 visited LGAs had high manganese contents (above the national standards) which is 0.5mg/l; while 17 out of 99 boreholes projects had manganese contents above the WHO standards which is 0.1 mg/l. The case was different for those sampled from 4 visited UWSSAs' where 5 out of 18 sampled projects were within both national and WHO standards.

[6] *National standard 0.5*

[7] *WHO standard 0.10*

[8] *They don't have completed water projects from borehole sources that have undergone pump test*

3.3.2 Water with high concentration of fluoride

The review of individual LGAs and UWSSA boreholes water supply projects completion reports, 2015-2018 indicated that, the quality of water in the drilled boreholes was not satisfactory due to high concentration of fluoride. Table 3.2 present the level of fluoride in water for the sampled boreholes in the 12 visited LGAs.

Table 3. 2: Sampled Projects with high concentration of Fluoride in the Visited LGAs

Name of the LGA and UWSSA	Number of productive Boreholes	Number of projects fluoride above national standard[9]	Number of projects with above WHO standard[10]	Average Fluoride concentration for the sampled Projects (mg/l)
UWSSAs				
AUWSA	13	8	8	5.5
DUWASA	5	0	0	0.35
LGAs				
Meatu DC	4	4	4	4.5
Bariadi DC	7	6	7	5
Arusha CC	12	3[11]	11	5.5
Longido DC	5	5	5	1.43
Total	**41**	**26**	**35**	

Source: *Extracted from the individual LGAs and UWSSAs boreholes water supply projects completion reports, 2015-2018*

From Table 3.2, 26 out of 41 sampled completed boreholes water supply projects equivalent to 58.8% had high concentration of fluoride above the national standard. It also shows that 35 out of 41 sampled boreholes water supply projects which is equivalent to 82% had high concentration of fluoride above the WHO standards.

Despite those boreholes water having high concentration of manganese or fluoride which were above the national and WHO standards, still the water was supplied and used by the communities.

[9] 4.0mg/l

[10] 1.5mg/l

3.3.3 Reasons for supplying poor quality of Water

The audit further noted the following to be the main reasons for having poor quality of water supplied to the communities.

Inadequate testing for Boreholes Water Projects

It was noted that, LGAs implemented water projects without testing for the quality of water to be supplied to the community. Table 3.3 shows the number of water projects without water test reports in the 12 visited LGAs.

Table 3. 3: Analysis of water test reports on the implemented water projects

Name of LGA	Number of Water Projects reviewed	Number of Projects without water test reports	Water projects without water test report (%age)
Singida DC	8	2	25
Manyoni DC	3	2	67
Mbulu DC	5	2	40
Kiteto DC	5	2	40
Shinyanga DC	5	2	40
Kishapu DC	3	0	0
Morogoro DC	5	N/A	N/A[12]
Mvomero DC	5	1	20
Lindi DC	5	0	0
Nachingwea DC	5	0	0
Sumbawanga DC	5	N/A	N/A[13]
Nkasi DC	5	1	20

Source: *Water Project Files from respective LGAs (2018)*

Table 3.3 indicates that 12 out of 59 water projects in those 12 visited LGAs (equivalent to 20%) had no water test reports regarding the quality of water in their areas of jurisdictions. This means that 20% of the sampled water projects were being consumed in the communities without the assurance of its quality.

[12] *No borehole, only surface water*
[13] *Reviewed water project was for surface water*

a) Absence of technology that provides accurate results for quality of water

The audit report noted that poor quality of water was associated with the absence of technology to correctly ascertain the quality of water to be drawn from the ground.

b) Inadequate consideration of Nature of Drilling sites

Unsatisfactory quality of groundwater was due to implementation of WSDP I in ten village projects which did not consider the geological nature and parent rock materials of the areas before drilling the boreholes. For instance, the program covered Arusha, Urambo and Bariadi and other volcanic terrain regions where the groundwater is challenged by high fluoride and manganese concentration.

c) Few geological and hydrogeological survey prior to drilling of boreholes

Moreover, the audit revealed that, poor quality water supplied to the communities was attributed to inadequate geological and hydrogeological survey prior to drilling of the boreholes.

In addition, the audit also revealed that, the quality of groundwater was mainly affected by the nature of parent rocks, climate conditions, stream flow, human effects such as improper disposal of both solid and liquid wastes and major economical practices performed around the area, possibility of seawater intrusion due to over pumping, over extraction/exploitation of groundwater sources and less recharge of aquifers caused by climatic changes especially to the uppermost aquifers.

If these factors are not well captured during the identification of drilling points, they are likely to provide a big chance ending up with water which does not meet the required standards.

3.3.2 Consequences of supplying poor quality of water

We noted that some boreholes were abandoned or closed due to unsatisfactory quality of water that was characterized as not fit for human consumption. This had the following effects:

a) Loss of costs spent for the constructed borehole water supply projects.

The audit noted that the government lost a total amount of TZS 764 million that was used for construction of 13 drilled boreholes water supply that were abandoned/ closed due to unsatisfactory quality of water as shown in Table 3.4.

Table 3. 4: Percentage of Drilled Boreholes that was abandoned due to unsatisfactory Quality of Water

Name of the LGA/UWSSA	Number of Productive boreholes	Abandoned/closed projects due to unsatisfactory quality of water	Percentage of the abandoned/closed boreholes
Urambo DC	2	0	0
Tunduru DC	3	0	0
Temeke MC	13	0	0
Tabora MC	8	1	13
Songea MC	39	0	0
Meatu DC	4	3	75
Longido DC	5	3	60
Lindi MC	7	0	0
Kinondoni MC	17	2	12
Kilwa DC	20	0	0
Dodoma CC	12	0	0
Bariadi MC	7	0	0
Bahi DC	4	0	0
Arusha CC	13	4	31

Source: Analysis of data extracted from Boreholes water supply projects progress reports

Furthermore, during the site visit conducted at Mwamishali and Mwambiti villages in Meatu district on 19th February, 2019, we noted boreholes water supply projects which were abandoned due to unsatisfactory quality of water as shown in **Photo 3.1.**

Photo 3.1: *An abandoned borehole at Mwamishali and Mwambiti-villages in Meatu as taken on 19th February, 2019.*

Source: *Field observations by audit team*

b) Failure of the beneficiaries to enjoy intended benefit of the project

The shortage of water in the communities has continued to persist. This is because the water supplied by the remaining borehole is not sufficient to meet the demands of the whole community as planned before.

3.4 Inadequate Control of Water Sources

This specific section provides the findings on the extent to which the Ministry of Water and PO-RALG have adequately controlled water sources. It has been sub-divided into four sub-sections namely, control of over abstraction of water sources (section 3.4.1); control of water sources pollution (section 3.4.2); reasons for inadequate control of water sources pollution (section 3.4.3) and consequences for the inadequate control of water sources pollution (section 3.4.4).

3.4.1 Inadequate control of over abstraction of water sources

Site visits conducted by the auditors at Morogoro (Wami Ruvu Basin Water Board) and Kilimanjaro (Pangani Basin Water Board) noted that there were illegal abstractions of water from the water sources. Photo 3.2 below shows the illegal abstraction of water from the water sources.

Photo 3.2: shows the illegal abstraction of water which as observed at Wami and Pangani Water Basin on 14th November 2016 and 31st January 2017respectively.
Source: *Field observations by audit team*

3.4.2 Inadeqaute Control of Water Sources pollution

Our visit at Kigugu water projects in Mvomero DC, found out that, members of the community were washing their clothes at the water intake point. Furthermore, according to the report there were agricultural and other human activities such as public toilets near the water sources. Photo 3.1 below shows the activities which were going-on at the water intake at Kigugu water project.

Photo 3.3 shows the activities which were going-on at the intake of Kigugu water project
Source: *Field observations by audit team*

3.4.3 Reasons for inadeqaute Control of Water Sources Pollution

a) Few inspections conducted on illegal water sources abstractions

It was discovered that inadequate control of water sources was contributed by few inspections at water sources by the Basin Water Boards. It was further noted that the BWBs conducted less inspections to water sources which is contrary to the requirement of the Board Strategic plan which requires BWBs to conduct inspections four times a year.

b) Lack of follow-up to determine actual abstraction Level from the water sources

Our audit noted that, there was no follow up conducted to determine whether water users abstracted the required amount of water. The audit further noted that inadequate follow up had contributed to the increased number of illegal abstractors.

c) Non-application of proper sanctions

The audit revealed that persistency of illegal abstraction was also attributed to non-application of proper sanctions to defaulters. It was further noted that the nature of sanctions was that, once an illegal abstractor is caught, the sanction imposed was to give them knowledge on the importance of

having permit, convince the person to apply for permit and on some rare cases their infrastructures were destroyed. Failure to take proper actions was seen as legalizing this illegal abstraction of water at their water sources.

3.4.4 Consequences inadequate Control of Water Sources pollution

a) Reduction in quantity of water from water sources

Our audit noted that, availability of water in some sources of water has been diminished in some of the areas. For example, the rivers such as Msimbazi and Mlalakuwa in Dar Es Salaam are experiencing water shortage. It was noted that their levels of water have been going down especially during the dry season.

b) Deterioration of quality

The review of monitoring report of Gombe water project in Ulanga DC in Morogoro region dated June, 2016, noted that water sources for two water projects namely Gombe and Lukande were being polluted due to inadequate control.

CHAPTER FOUR

ACCESS TO SEWAGE SERVICES

4.1 Introduction

This chapter presents findings on the extent to which the Ministry of Water and PO-RALG have ensured that the sewage generated in the communities is being collected, transported and disposed-off without degrading the environment.

The chapter is divided into three main parts namely, coverage of Sewage Services (section 4.2); provision of off- and on-site sewage services (section 4.3) and quality of sewage discharged to the environment (section 4.4).

Access to sewage services is an important aspect towards preventing sanitation related diseases as well as preventing the environment from being polluted by sewage generated from the communities. It also helps to eradicate poverty and attaining a high quality of life for all people14.

4.2 Insufficient coverage of Sewage Services

This specific section presents the findings on the coverage of sewage services in the communities. The section is sub-divided into four sub-sections namely, access to sewage services (section 4.2.1); availability of faecal sludge emptying trucks (section 4.2.2); quantity of sewage collected from the communities (section 4.2.3); and reasons for inadequate coverage of sewage services in the communities (section 4.2.4).

4.2.1 Inability to acccess Sewage Services

From the review of Annual Performance Report 2012-2017 from UWSSAs, EWURA and the National Bureau of Statistics (2018) we noted that, the access to sewerage services by the population living in urban area is still low and has not improved over time. The reports indicated that more than 70% of the urban dwellers could not access the sewer networks in their respective urban centres. Figure 4.1 shows the percentage of population in the visited urban areas served with Sewer Network for the period 2012/13 up to 2016/17.

[14] Tanzania's Development Vision 2025

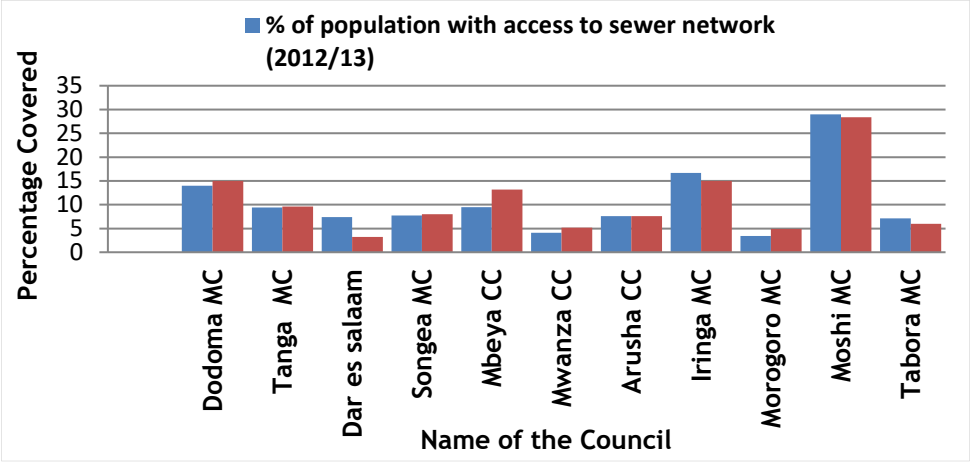


Figure 4. 1: Percentage of population in urban areas served with Sewer Network

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

From Figure 4.1, it can be seen that in Dodoma CC, Morogoro MC, Songea MC, Tanga CC, Mbeya CC and Mwanza CC, the average access to sewer network has increased by at least 1.3% for the period of 4 years from 2012/13 to 2016/17 while the average population growth rate is 2.4%. This increase was mainly attributed to the increased number of connections which stood at a minimum of 387 connections in each of the municipality or city.

On the other hand, Arusha City and the municipalities of Iringa, Moshi and Tabora recorded a slight decrease in the percent of population with access to sewer network by at least 1% for the period from 2012/13 to 2016/17. This is simply because there was an insignificant increase the number of sewer connections compared to the increased population in their areas. During the period the population increased at an average rate of 2.5%.

Furthermore, in Dar Es Salaam City, the average access to sewer network by the population has decreased from 7.4% in 2012/13 to 4.2% 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% per annum.

Moreover, the review of the aforesaid reports also indicated that, on average over 50% of the population living in the areas with sewer network were not connected to sewer network. Table 4.1 shows the percent of the

population which was in close proximity to sewer network in the visited UWSSAs connected or not connected to a sewer network.

Table 4. 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)	% age population not connected to sewer
TANGA UWSA	34,545	12,737	63
SOUWASA	25,200	16,344	35
MWAUWASA	337,384	196,000	42
MBEYA UWSA	15,142	2,166	86
DUWASA	42,000	27,350	35

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

Table 4.1 indicates that, even though Dodoma CC has high population living in a close proximity to sewer network compared to other UWSSAs, only, 65% of its population was connected to sewer network. Meanwhile, Mbeya CC has a better performance as it has low population living in the area with sewer network while a significant proportion (86%) have been connected to sewer network.

4.2.2 Inadequate availability of faecal sludge emptying trucks

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

It was noted that 7 out of 11 visited LGAs have no vacuum trucks. The remaining 5 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. 2: Number of vacuum trucks available for the collection of sewage and their operational status

Name of LGA	Number of Trucks	Status (Grounded)
Tanga CC	2	1
Songea MC	0	0
Sengerema DC	0	0
Mwanza CC	2	1
Mpwapwa DC	0	0
Mbinga MC	0	0
Mbeya CC	1	0
Kinondoni MC	1	0
Kigoma MC	0	0
Kasulu DC	0	0
Ilala MC	0	0
Dodoma MC	1	1

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

Table 4.2 indicates that 5 out of 12 visited LGAs have emptying trucks. Two LGAs namely, Dodoma CC and Tanga CC have none in use since they are grounded due to mechanical problems. The remaining 7 LGAs which is equivalent to 58% of all the 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 are grounded use private service providers or UWSSAs.

On the other hand, the review of LGAs budget for the last four years indicated that all 12 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.

4.2.3 Inadeqaute Quantity of Sewage Collected from the communities

A review of Annual Report 2012 - 2017 from UWSSAs and EWURA (2018) noted that, the amount of sewage collected and transported to treatment plants was very low. The audit noted that 0.1 and 7 percent of the generated sewage was collected and transported by trucks and sewer networks respectively.

Table 4.3 provides the extent to which the generated sewage is effectively collected and transported to the disposal sites in the visited six (6) urban areas.

Table 4. 3: Amount of sewage generated and collected in the visited LGAs for 2016/17

Name of LGAs	Estimated amount of sewage (Thousands Cubic Metres/Year)				Percentage collected (%age)
	Sewage generated	Collected by sewer network	Collected by vacuum trucks	Total collected by sewer network and trucks	
Tanga CC	8,180	700	20	720	9
Songea MC	2,340	530	10	540	23
Sengerema TC	400	-	0.17	0.17	0.04
Mwanza CC	23,600	6,870	250	7,120	30
Mbinga TC	400	-	0.12	0.12	0.03
Mbeya CC	12,480	430	280	710	5.69
Kigoma MC	2,050	-	0.96	0.96	0.10
Kasulu TC	480	-	0.12	0.12	0.03
Dodoma MC	11,290	800	110	910	8.06
Dar es Salaam CC	98,960	3,990	440	4,430	5

***Source**: Data extracted from Annual Report 2012*

Table 4.3 shows that Mwanza CC was the most efficient as it collected 29% of its waste through the network. Mbinga TC, on the other hand was the least efficient as it collected only 0.03%. This indicates that large amount of generated sewage is not managed adequately and not known where it is disposed off.

Furthermore, from Table 4.3 above it is estimated that Dar es Salaam CC produced about 98.96 million cubic metres of sewage for the period of 2016/17. Out of this, DAWASA through sewer system and vacuum trucks collected only about 4.43 million metres cubic (equivalent to 5%) of sewage for treatment. This is caused by the fact that only 3.2% of population in Dar es Salaam CC is connected to the sewer network.

Meanwhile, about 440,000 cubic metres of sewage is collected through trucks. It was estimated that 94.53m3 of sewage remains uncollected and its disposal depends on the decision of the individual household or community.

4.2.4 Reasons for inadequate coverage of sewage services in the communities

The audit identified various factors contributing to the failure of coverage of sewage services. The details for each factor are as presented below:

a) Low coverage of sewer network

It was noted that low coverage of sewer network is one of the factors that have contributed to inadequate collection of sewage from the communities. The analysis shows that up to the time of the audit the accessibility to sewerage services by population on average was only 7.5% of the population living in urban areas.

b) Inaccessibility to some of the areas

Most of the urban areas are not well planned and thus affected the ease of extending sewer network to those areas. Also, in some cases the emptying trucks cannot easily access area requiring the emptying services. As a matter of fact, it was noted that only 20% of LGAs was planned and the rest are unplanned areas, this was caused by deficient conditions for putting in place adequate system for the collection and transportation of sewage to the disposal sites.

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

c) Unavailability of faecal sludge emptying trucks

The review of registration ledger of emptying trucks in all the 12 visited LGAs indicated that, there was a problem of availability of faecal sludge emptying trucks in LGAs and this problem has contributed to the inadequate collection and transportation of sewage. This problem was mainly because of:

i) Huge investment needed in acquiring the emptying trucks and their operational cost;
ii) Failure to meet operational costs due to inability of most of the people to pay for emptying services; and
iii) Inadequate budgeting for sewerage services.

The review of Medium Term Expenditure Frameworks for 2012/13 – 2016/17 indicated that, UWWSA allocated insufficient funds (i.e. an average of 8.8% of their annual budgets) to support the activities aimed at improving the provision of sewerage services in their respective areas.

Table 4.4 shows the amount of actual revenues received from sewerage services versus actual expenditures spent on maintenance and expansion of sewerage networks.

Table 4. 4: 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
DAWASA	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

Name of UWSSA	Financial years	Actual collections (Million TZS)	Actual expenditures (Million TZS)	%age of actual collection spent on sewerage services
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 4.4 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 2015/16 spent more than 90% of the collected sewerage revenues and in 2016/17 spent 100% 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%in 2013 to 10% up to the time of this audit.

Furthermore, Table 4.4 indicates that, between 2012/13 and 2013/14 DAWASA spent less than 3% of the collected sewerage revenues to improve the sewerage infrastructures even though waste water stabilization ponds were in poorest condition. DAWASA was however collecting more than 8 billion Tanzania shillings of sewerage revenues in 2015/16.

4.2.7 Consequences for inadequate collection of sewage from the communities

Our audit noted that inadequate collection of sewage from the communities has contributed to the increase of illegal discharge of sewage to the environment especially during rainy seasons. Discharge of untreated sewage to the environment associated with the following consequences:

a) a risk of sanitation related diseases;
b) the Government of Tanzania incurs high costs for healthcare of the people affected by communicable diseases arising from poor sewage management in urban areas. According to the study carried-out by the Water and Sanitation Program (WSP) in 2012, the Government spent almost TZS 301 Billion (equivalent to USD 206 Million, or USD 5 per person each year. This is approximately 1% of the national Gross Domestic product (GDP); and
c) also, 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.

4.3 Inadequate provision of off sewage services

This specific section presents the findings on the efficiency and effectiveness of the sewerage services on transportation sewage from the point of generation to the disposal site. The section is divided into three sub-sections namely, unsatisfactory provision of off-site sewage services (section 4.3.1); reasons for inadequate provision of offsite sewage services (section 4.3.2) and consequences for inadequate collection of sewage from the communities (section 4.3.3).

4.3.1 Unsatisfactory provision of off-site Sewage Services

According to Section 20 of the 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.

During the inspection of sewer networks from (6) visited UWSSAs, the audit observed that, the sewer networks were not functioning well. Inadequate functioning of sewerage system was evidenced by the following factors:

a) Presence of Sewer Overflows

Through physical observations to the existing sewer networks from 6 visited UWSSAs and the review of incidences register books of the respective UWSSAs, the audit noted that, sewer networks at Dar Es salaam City (managed by DAWASA), Dodoma CC (managed by DUWASSA) and Tanga City (managed by TUWSSA) were not functioning well. These were due to frequent re-occurrences of sewage overflows along the sewer lines and

sometimes flooding of sewage in cities/town centres. Photo 4.1 indicates flooding of a sewage system in one of the streets in Tanga city.

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

Source: *Field observations by audit team*

b) 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 are presented in Table 4.5

Table 4. 5: 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
TANGA UWSA	425	534	205	954	988
SOUWASA	213	274	263	440	482
MWAUWASA	720	780	840	960	1044
MBEYA UWSA	45	45	40	35	42
DUWASA	1630	1289	561	213	91
DAWASA	1863	-	2,247	2,201	2,799

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

Tables 4.5, indicates that the number of blockages for all UWSSAs has been increasing for the whole period of four years from 2012/13 to 2016/17. Also,

the number of blockages seemed to be very high in Dar es Salaam CC, especially in Kariakoo and the city centre areas where there are high commercial activities and huge number of people during the day.

4.3.2 Reasons for inadequate provision of offsite sewage (sewerage) Service

The audit further noted several reasons that contributed to the failure to provide adequate sewerage services. These included but not limited to:

a) 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 of residents of dumping solid waste into the sewer network. Photo 4.2 (a&b) shows unwanted materials removed from the sewer networks.

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)

b) Overloading of the sewer systems

The review of progress reports revealed that, overflows of sewage in the environment was also caused by overloading of the sewer systems. The audit noted that the overloading of sewer network in most cases was caused by storm water which runs into the sewer system when it rains. The sewer networks in all visited UWSSAs were designed to accommodate only sewage and not storm water.

c) Lack of frequent maintenances of the aged sewer network

The review of UWSSAs progress reports and interviews held with the sewage Engineers from the 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 lives.

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

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

It was also noted that only Songea and Mbeya UWSSAs whose sewer networks are still new since they were built between 2008 and 2014, are operating within designed recently 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 4.5 shows the number of incidences/occurrences of bursting/collapse of sewer lines from the visited UWSSAs.

Table 4. 6: 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
TANGA UWSA	8	18	10	2	6
SOUWASSA	-	2	-	-	1
MWAUWSSA	0	0	0	0	0
MBEYA UWSA	0	1	3	3	3
DUWASA	2	2	1	1	1
DAWASA		8	15	-	-

Source: Annual Report, 2012-2017 (2018)

Table 4.6 shows that in some UWSSAs the problem of bursting/collapse of sewer lines is increasing while in others the situation remained relatively the same. This means that there are no noted improvements.

e) Lack of frequent maintenance and rehabilitation of deteriorated sewer pipelines

As noted above, most of the sewer infrastructures in the 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 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 6 visited UWSSAs, the audit team noted that most authorities mainly conduct maintenance of the sewer pipelines based on the reported breakdown incidences.

4.3.3 Consequences for Inadequate collection of Sewage from the communities

The audit observed the following consequences caused by the poor provision of offsite (sewerage) services:

a) During physical visits in some of the streets from different LGAs at UWSSAs the audit noted bad smells due to scattered sewage originated from sewer pipes as seen in Photo 4.3 which was taken in Tanga.

Photo 4.3: Spread sewage in the street due to malfunctioning of sewer lines as taken on 10/10/2017 in Tanga

b) Inability of the system to effectively collect all sewage generated from the communities the audit noted that, people from some LGAs such as Tanga and Mwanza Cities were not interested to be connected to sewer network because the system was not adequately functioning as it was characterized by frequent blockage.

4.4 Inadequate Provision of On-Site Sewage Service

This specific section present the findings on the provision of sewage service to the communities not connected to a sewer network.The section is also sub-divided into three sub-suctions namely, inadequate collection of sewage from the communities with no access to sewer netwik(4.4.1); reason for inadequate provision of on-site sewage service(4.4.2) and consequences for inadequate collection of sewage from the communities (4.4.3).

4.4.1 Inadequate collection of sewage from the communities with no access to sewer network

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:

The review of the progress reports from the 12 visited LGAs; showed that not all generated sewage was timely collected from the customers (households, businesses etc.) who are not connected to sewer networks. Table 4.7 provides statistical information regarding the analyzed situation from the visited LGAs.

Table 4. 7: Amount of Sewage Collected in the Visited LGAs for period from 2012/13 – 2016/17

Name of LGA	Amount of faecal sludge needed to be collected by Trucks (m^3)	Amount of faecal sludge collected by vacuum truck (m^3)	%age collected by vacuum truck
Tanga CC	8,176,000	2,304	0.03
Songea MC	2,336,000	1,152	0.05
Sengerema TC	400,000	168	0.04
Mwanza CC	23,600,000	25,248	0.11
Mpwapwa DC	280,000	98	0.04
Mbinga TC	400,000	120	0.03
Mbeya CC	12,480,000	2,784	0.02
Kigoma MC	2,048,000	960	0.05
Kasulu TC	480,000	120	0.03
Dodoma MC	11,288,000	10,512	0.10
Dar es Salaam CC	98,960,000	438,000	0.44

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

Table 4.7 indicates that, in all (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.

4.4.2 Reasons for inadequate provision of on-site sewage service

The audit noted several reasons that contributed to the failure to provide suitable onsite sewage (cesspits emptying tracks) services. These includes but not limited to:

a) Inaccessibility to some of the areas

It was noted that most of the urban areas are not well planned in such a way that the emptying trucks cannot easily access areas requiring the emptying services. Some example of not easy to access areas including Manzese, Keko in Dar es Salaam and Mwanjerwa, Mabatini in Mbeya where trucks had hard time to access due to absence of access roads.

b) Lack of emptying trucks

The audit noted that, lack of emptying trucks in the visited LGAs has prohibited provision of onsite sewage collection services. Due to that some LGAs have delegated their responsibility to private service providers to provide the services. However, it was also noted that most of the private services providers were providing services without being controlled or regulated by LGAs.

c) Affordability

The audit noted that, the cost of transporting sewage on average ranged between TZS 80,000 and 100,000/- in the visited LGAs. This amount seemed to be un-affordable by some of the people living in rural areas.

4.5 Poor quality of effluent discharged to the environment

Through reviews of EWURA Regional Water Annual Performance Reports for the period from 2012/13 to 2016/17 the audit revealed that, the effluent discharged to the environment by most of the 6 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 the visited UWSSAs pollute the environment.

The details of the parameters that were found to be high than the recommended standards are as presented below:

4.5.1 Biochemical Oxygen Demand (BOD)

Analysis of the level of BOD revealed that, most of the visited UWSSAs discharged effluent to the environment contained higher level of BOD than the recommended limit of 30mg/. Figure 4.2 shows the levels of BOD for each UWSSA.

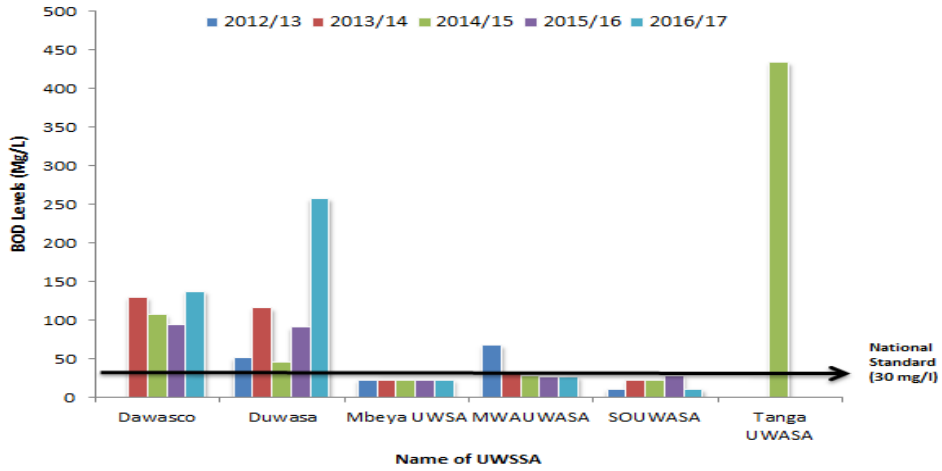


Figure 4. 2: Levels of BOD released to the Environment for the Period from 2012/13 to 2016/17

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

Figure 4.2 indicates that, DUWASA, Tanga UWASA and DAWASA their BOD levels in effluent discharged were above 30mg/l. A higher BOD has a negative impact on the environment since it depletes the oxygen thereby increasing the organic load, increase of PH, introduction of pathogens and toxic substances to the water bodies and the like. All these pollutants have great adverse effects to the aquatic ecosystem and make water bodies unsafe for use by human beings.

4.5.2 Chemical Oxygen Demand (COD)

The Analysis of COD levels) revealed that 2 out of 5 UWSSAs had their effluents discharging to the environment contained higher level of COD than the recommended limit of 60mg/. Figure 4.3 shows the levels of BOD for each UWSSA.

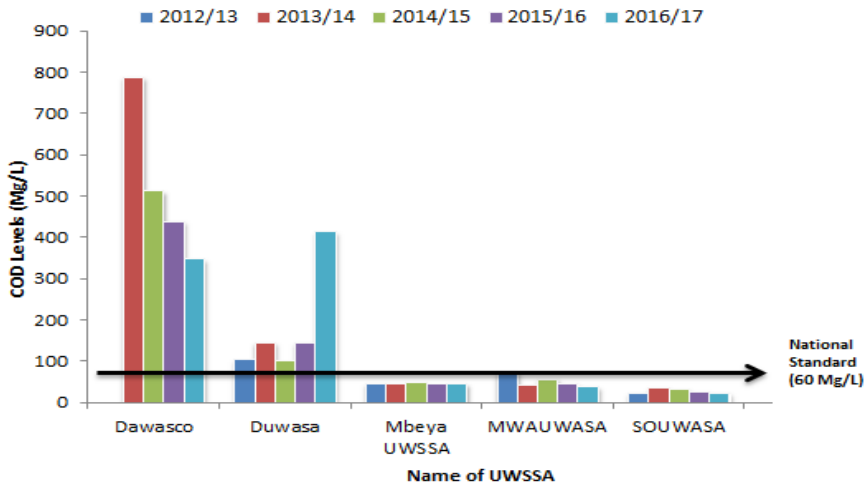


Figure 4. 3: Levels of COD released to the environment for the period from 2012/13 to 2016/17

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

Figure 4.3, indicates that, DUWASA and DAWASA COD's levels in effluent discharged were above the recommended limit. On the other hand, TAUWSSA did not measure its COD level for the period under review. A higher COD has a negative impact in the environment since it reduces the dissolved oxygen and may lead to anaerobic conditions, which is deleterious to higher aquatic life forms.

4.5.3 Total Suspended Solids (TSS)

Analysis of the levels of TSS revealed that, the effluents released to the environment by most of the UWSSAs contained high Total Suspended Solids (TSS) contrary to the recommended limit which is 100mg/l. Table 4.8 shows the levels of TSS for each UWSSA.

Table 4. 8: The levels of BOD Released to the Environment 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)				
TANGA UWSA	-	-	-	-	-
SOUWASA	586	-	-	-	599
MWAUWASA	44	17	62	53	72
MBEYA UWSA	-	-	-	80	70
DUWASA	-	-	-	68	94
DAWASA	-	720	566	276	515

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

Table 4.5 shows that DAWASA's TSS level was about five folds above the recommended limit for the period under review, while DUWASSA's TSS level was within the required limit. TAUWSSA did not measure its TSS level for the period under review. A higher TSS has a negative impact on the environment since it reduces light penetration and kills the existing aquatic species.

4.5.4 pH Level

Finally, the analysis of the levels of acidity and alkalinity in the effluent released to the environment revealed that, 4 out of the 5 visited UWSSAs had levels of pH exceeding the recommended range which is 6-7.5.

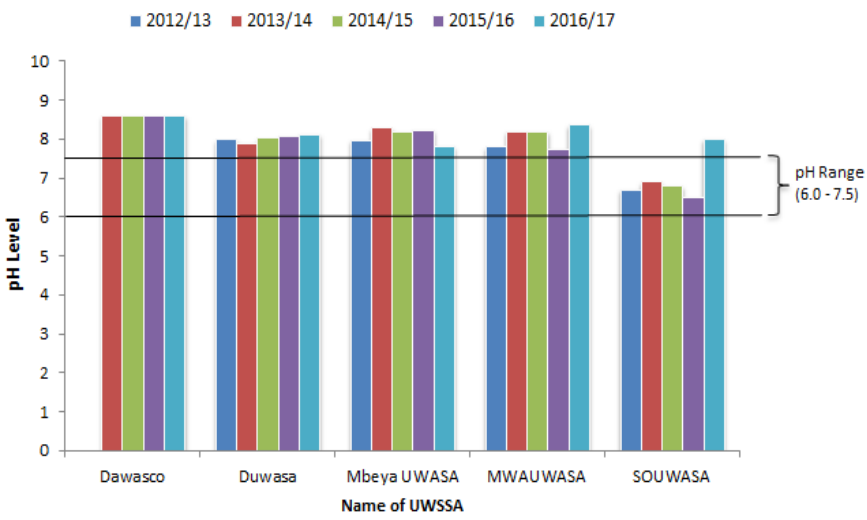


*Figure 4. 4: Levels of BOD Released to the Environment for the Period from 2012/13 to 2016/**17***
***Source**: UWSSAs' Annual Performance Reports - 2012/13 to 2016/17 (2018)*

Figure 4.4 indicates that for DUWASA, TAUWSSAs and DAWASA, the pH levels in effluent discharged were above the recommended limit. A lower and higher pH has a negative impact on the environment since it affects the existing aquatic species.

4.5.5 Reasons for failure to meet the national Effluent Standards

The audit noted several reasons that contributed to the failure to meet the national standards. These includes but not limited to:

a) Sewage waste treatment ponds operates beyond their designed capacity

The audit noted that, most of the treatment facilities (.e.g. waste stabilization ponds (WSP) in the visited UWSSAs were operating beyond their capacities. For example, DAWASA's Waste Stabilization Ponds operated beyond their designed capacity. The waste stabilization ponds serve a larger portion of Dar es Salaam resident, received 21% above its designed capacity of 1843 cubic metres. Due to receiving a high volume of sewage than its

capacity, the pond has decreased the flow retention time of sewage and hence reduced the treatment efficiency.

b) Inefficiencies in removing sludge/desludging of Ponds

The audit noted that poor quality of effluent released to the environment was also attributed by inadequate desludging or removing the aged sludge from the 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 a long period of time without desludging them. The last time these ponds were de-sludged was in 2007. Photo 4.4 below shows the status of the ponds.

Photo 4.4: Solid substances in the ponds at Vingunguti in Dar es Salaam.

c) Absence of stringent controls of illegal dumping into treatment facilities

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 was attributed to absence of stringent control of dumping unwanted substances. Photos 4.5 (a&b) below show the status of the ponds. Consequently, all these have adversely affected the operational capacity and efficiency of the sewage treatment infrastructures.

Photo 4.5(a): Solid substances in the ponds of Vingunguti in Dar es Salaam: (Photograph was taken on 02/10/2017)

Photo 4.5(b): Solid substances in the ponds of Kurasini in Dar es Salaam: (Photograph was taken on 02/10/2017)

4.5.6 Consequences of Discharging/ Releasing Poor Quality of Effluent to the Environment

The audit revealed that, the effluents discharged by most of the visited UWSSAs contaminated the environment and hence poses risks to the receiving bodies such as the survival of aquatic species due to depletion of oxygen.

Similarly, the audit noted that, in Dar Es Salaam City, the release of untreated domestic sewage has contaminated the Msimbazi and Mlalakuwa rivers and degraded the existing aquatic ecosystem.

CHAPTER FIVE

PLANNING FOR WATER AND SEWAGE PROJECTS

5.1 Introduction

Generally planning is an initial stage prior to the implementation of water and sewage projects. It involves proposal preparation which provides a way on how the end product of the project will be achieved. It involves identifications of service needs, selection of the technology, definition of work tasks (scope) and estimation of required resources.

Good planning provides greatest opportunity for delivering water and sewerage services at the lowest cost while also meeting social and environmental requirements.

This chapter presents finding on planning for provision of water supply and sewage services. The chapter is divided into three sections: section 5.2 covers the adequacy of feasibility studies; section 5.3 presents the estimation of demands and section 5.4 covers the finding related to design of water projects. Section 5.5 presents the preparation of Bills of Quantities.

5.2 Inadequate Feasibility Study for Water Projects

A feasibility study is an early stage of project design which includes conducting analysis that takes all project's relevant factors into account. These factors are such as economic, technical, legal, and scheduling considerations to ascertain the likelihood of completing the project successfully. It eliminates unnecessary cost increase, time overruns and quality problems of the completed work.

According to design manual[15] Ministry of Water and PO-RALG (implementer of water projects) are required to ensure that prior to implementation of water and sewage projects, feasibility studies are conducted. The weaknesses related to feasibility studies were such as following

[15] Design manual for water supply and waste water disposal third edition volume I design section of 2007

5.2.1 Inadequate Geological Surveys

The review of *Tender Board meeting minutes, variation orders and contract BoQs* from PO-RALG and the Ministry of Water, indicated that the Ministry of Water and PO-RALG did not ensure that LGAs and UWSSAs conduct adequate geological surveys prior to the implementation of water projects.

The audit noted that there were inadequate geological surveys conducted to identify presence of rocks along the pipeline route so as to accurately determine the nature of excavation and types of pipes to be used

The audit noted that the Ministry of Water and PO-RALG did not ensure that LGAs and UWSSAs conduct adequate geological surveys prior to implementation of water projects. This caused LGAs to propose inappropriate pipes to be used in areas with rocks and excavation in rock area not to be identified. According to the tender board meeting Minutes, variation orders and contract BoQs of 4 projects implemented in 4 out of 12 visited LGAs; experienced additional cost amounting to TZS 241.25 million resulted from rock blasting along the pipeline route and change of specification of pipes passing through rock areas.

Similarly, there was inadequate geological study for Bukoba and Musoma projects. As a result, during construction the quantity of rocks to be blasted for Musoma was found to be 350% more than what was included in the detailed design and bills of quantities. Thus, this caused additional costs amounting to TZS 1870 million to accommodate the variations. It also resulted into an additional time of two (2) months for blasting the rocks. The summary of the identified gaps due to inadequate geological surveys is as presented in Table 5.1.

Table 5. 1: Cases of inadequate geological survey and associated Cost Overrun

Name of the Performance Audit	Areas Affected	Cost Implication (Million TZS)
Management of Water Projects in Rural Areas	Inadequate geological survey leading to inaccurate specifications and estimation of pipes for 4 projects implanted in 5 LGAs	241
Construction Contract Management of Urban Water projects	Inadequate geological study for Bukoba and Musoma projects.	1,870
Total		**2,111**

Source: *Tender board meeting minutes, variation orders and contract BoQs*

The audit noted that inadequate geological survey was associated with wrong estimation of quantity for rock blasting and Inadequate Material Specifications

5.2.2 Inadequate soil survey

Our review of Tender Board meeting minutes and variation orders revealed that soil surveys were not properly conducted which caused LGAs to fail to specify the type of pipes to be used. For example, at Hydom in Mbulu District Council, pipes were changed from Steel pipe to plastic pipe so as to avoid rusting of pipes due to presence of salt in the soil. This resulted from non-consideration of soil properties survey during the feasibility study.

These changes caused cost reduction for some items amounting to TZS 30.14 million. This shows that if the situation was not be identified the project could have lasted for a very short due to rusting of pipes.

5.2.3 Inadequate Hydrological Survey

According to the Groundwater (Exploration and Drilling) Licensing Regulations, 2013 the Ministry of Water is required to conduct geological, hydrogeological and geophysical surveys prior to the drilling of boreholes for the projects undertaken by the Ministry and its Agencies.

The audit noted through the review of hydrological survey reports that LGAs and UWASSA conducted both geophysical/hydrogeological surveys. However, the audit review of the geophysical and hydrogeological survey process in the visited LGAs and UWSSA noted the following weaknesses:

a) The hydrogeological survey reports were not submitted to the Basin Water Boards

The audit noted that the, consultants who carried out the hydrogeological surveys did not submit the results to the Basin Water Board offices for review and updating the database for future groundwater assessment. This is contrary to the requirement of Regulation 11(2)23 which requires the consultants to perform the hydrogeological survey and submit a copy of the report to the Basin Water Office.

b) There was insufficient consultation made to the Basin Water boards

The audit review of project files revealed that consultants who conducted hydrogeological surveys rarely consulted the Basin Water Boards who had the knowledge and experience of the suitability of a proposed site for exploration of groundwater. This is contrary to Regulation 9(1)24 which requires a person who intends to undertake groundwater exploration to consult the respective Basin Water Board prior to commencing of exploration. As a result, Basin Water Boards could not provide their inputs regarding their plans for development of boreholes based on the results of the surveys.

c) Inadequate technical review of hydrogeological surveys/geophysical surveys

The audit noted through the review of hydrogeological survey reports submitted to the LGAs that there was no technical review of hydrogeological surveys conducted by consultants. Inadequate supervision of hydrogeological and geophysical surveys was caused by lack of hydro - geologists in the LGAs. Similarly, the audit noted that LGAs did not have hydro geologists who could interpret geophysical survey reports before drilling of boreholes. This led to lack of assurance on whether the appropriate sites for the boreholes water supply projects were identified prior to drilling.

Consequences of inadequate hydrological survey

The audit review of water sector implementation reports 2014-2015, showed that 490 out of 1,485 boreholes drilled from 2014 to 2015 during the implementation of WSDP I and WSDP II were found to be dry and unproductive. In the 7 visited regions during the audit it was found that 193 out of 545 implemented boreholes were dry.

Similarly, the review of Boreholes Water Supply Projects Completion Reports by two Water authorities DAWASA and AWSSA noted some projects that were producing less quantity of water than it was planned. At DAWASA, 2 out 4 boreholes were producing less quantity and at AWSSA 5 out of 13

boreholes were producing less quantity of water. This huge variation led to failure to supply the expected water to the intended beneficiaries.

We noted through the review of progress reports from the visited Local Government Authorities that weaknesses in conducting hydrological surveys in rural water projects resulted to a total of 10 implemented borehole water projects that were unable to produce any water. This situation was reported to be caused by the current technology used in hydrogeological surveys to provide an indication of the possibility of having groundwater in the respective surveyed areas, however, it could not give any assurance of the availability of enough quantity of water. This situation has caused the implemented projects not to attain its objective of supplying water to the community.

5.3 Incorrect demand forecasting for water and sewage projects

The design manual requires the following to be covered during the feasibility study; area or consumers to be covered, population projections, demand projections, and planning period of the project. The three Performance Audit reports showed that Ministry of Water did not adequately forecast demand of water and sewage projects.

These were reported in Performance Audit Report on Construction Contract Management of Urban Water Projects through the review of variation orders which indicated that there is a challenge in forecasting water demand to the available population in the respective area.

As a result, during implementation of Chalinze water projects several beneficiaries who were not included in the forecasts were added as described in Table 5.2

Table 5. 2: Additional beneficiary during project implementation

Project	Details	Cost (Million TZS)
Chalinze projects (Package F &H)	Matuli site ground water Tank to water kiosk No.1 Masai village	6.7
Chalinze projects Lot 2	Additional 14 water kiosks to serve population of Kiwangwa township	226.1
Chalinze projects Lot 4	• Additional water Kiosk to serve the pastoralists community which were not allocated with water kiosk during design stage • Break pressure Tank to save the community at Vigwaza, Visezi and Buyuni it was	26.70

Project	Details	Cost (Million TZS)
	requested by client to reduce pressure to make possible to convey water to the community. • Pipeline to cattle troughs at Mjinomwema, Idarayamaji and Sweet Corner areas which was not provided in BOQs.	
Total		**259.5**

Source: *Variation orders*

Table 5.2 indicates that there was additional cost for the added beneficiaries which caused extension of distribution network hence additional cost of project implementation amounting to TZS 259.5 million. This happened to 1 package and 1 lot for Chalinze projects. This was caused by failure of the Ministry to include all communities in the respective area during feasibility study, whereby during implementation, it was found out that if part of the community is not provided with water it will be a source of conflicts and vandalism of the projects.

We also noted that due to failure to forecast for the demand of water by the community during project implementation, a number of consumers were skipped which necessitated to be added later. This was revealed through our review of project contracts for additional work, payment certificates, variation orders and addenda for 5 (five) implemented water projects in Shinyanga, Morogoro and Nkasi District.

Additional consumers resulted into additional cost amounting to TZS 11.07 billion. These additional costs affected the implementation of the projects as the additional cost was not in the plan and caused delay of payment to contractors.

Further review of progress reports from DAWASA it was revealed 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. Up to the time of the audit the ponds were receiving about 2,246 cubic metres of sewage which is an addition of 397 cubic meters of sewage per day equivalent to 21%above its designed capacity. As a result, efficient treatment of disposed sewage was affected 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.

These were caused by unrealistic estimation of population to be served with Sewage services for the design period of the projects.

5.4 Inadequate Design of water projects

The audit noted through the review of project files (Variation orders, addenda and revised contract) that some projects were not adequately designed which resulted into several design weaknesses as detailed in **Table 5.3**.

Table 5. 3: Design problems reported

Design Element	Design Weakness
Design of Tank	Absence of top reinforcement in the tank slab, absence of ring beam, cross beams and column at the centre of the tank.
Inake design	Intake was located at an area where it could tap water
Reducing valves	The designed valve could not reduce water pressure to the required pressure
Domestic Point	The domestic point was located at an area where they did not receive water as per the required pressure
Booster pump	There was no booster pump which caused water not to reach the tank
Pipe design	Inadequate design which caused bursting of pipes due to high pressure in some areas
Absence of stop valves	Lack of stop valves which causes some difficulties when technicians needed to do some maintenance in case of any breakage.
Inadequate Conditional Survey	In adequate conditional survey on the existing pipe networks which was not considered to be replaced. During implementation it was found that it cannot perform and hence was replaced with new pipe.
Additional Tank	Initially the tank was not in the design but it was added to reduce water pressure to avoid bursting of pipes.

***Source**: Auditors' analysis from project files*

Table 5.3 shows various noted weaknesses in the design of water projects for 11 out of 12 visited LGAs in the country. Design weaknesses were noted in the distribution system, construction of water intakes and water tanks for the reviewed water projects. The identified weaknesses caused additional cost amounting to TZS 275.40 million as shown in **Appendix 1.**

Further, it was observed, that water supply project designs did not consider the terrain of the area. As a result, special pipes to cross rivers for Arri, Harsha, Yaenda Ampa and Hayeseng Water project in Mbulu District Council had to be used since during project implementation, the designed pipes were found unsuitability. The project then opted to use plastic pipes (HDPE) instead of Steel pipe which caused additional cost amounting to TZS 95.57 million so as to cross the rivers.

Further through review of variation orders and monthly progress reports for Construction of Urban Water Projects it was found that several variations were caused by inadequate designs. The design weaknesses and their cost implications which were observed in Musoma and Chalinze water projects are described in **Table 5.4**

Table 5. 4: Design weaknesses reported

Name of Project	Design weakness	Additional Cost (Million TZS)
Chalinze (Package F&H) and Musoma	Necessary equipment was not included	1,421.40
Chalinze project Lot 4 and 5	Soil investigations not adequately done and the ground level on the actual site did not match with the provided drawing	1,930
Chalinze project Lot 5	Topographical survey not adequately done	266.60
Chalinze Project Package F&H	Necessary structure not included and work for Swampy crossing, rock areas and road culvert outlet were not considered	476.94
Chalinze project (Lot 3,4 and 5)	Works for river crossing was not considered	394.60
Chalinze project (Lot 1, 2, 3, 5 and 6)	Distance from the distribution main to water kiosks was not realistic	2270
Chalinze Projects (Lot 1, 4 and 6)	The number of water kiosks, washout pipes and storage tanks were not sufficient	2460
Chalinze Projects Lots 1 and Lot 3	Omission of Marker posts in the design	52.50
Total		**9,272.04**

Source: *Variation orders*

Table 5.4 indicates that reported design weaknesses included omission of necessary equipment from the design such as inadequate soil bearing investigations, omission of some key items, inadequate number of water kiosk and water tanks. Moreover, topographical features were not considered during design and non- consideration of necessary structures which together resulted into additional cost amounting to TZS 9,272.04 million.

This situation was due to inadequate investigations by consultants at the respective construction sites to ascertain the nature of the project.

The review of variation orders found out that as a result of inadequate design there were changes in specifications of some items for Chalinze water projects as described in **Table 5.5.**

Table 5. 5: Additional cost due to change of specifications

Project	Reason for Variation	Cost (Mill. TZS)
Lot 2	Additional work on pipeline system arising from request to increase HDPE distribution pipeline system with the necessary fittings, manhole, chambers and pipe marker posts	910.3
Lot 4	Roof structures for guard house and water kiosk as it was not explicit on the type of roof to be adopted and the ceiling boards.	4.8
Package F &H	Generator house modification in Ubenazomozi. The reason for modification is change of generator from 50KVA to 110KVA	4.5
Package F &H	Change of cement using the approved 42.5 instead of the 32.5 type as per contract	11.3
Total		**930.9**

Source: *Extract from the Respective Performance Audit Reports, 2020*

Bills of Quantities did contain all the relevant items for construction, installation, testing and commissioning of work to be done by the contractor.

5.5 Inadequate preparation of Bills of Quantities

This section presents findings from two performance audits. The details of each is as detailed below.

The performance audit report on management of water projects in rural areas through the review of contract documents of implemented water projects in rural areas. The audit noted various weaknesses regarding preparations of BoQs. This was observed in 13 projects implemented in 9 out of 12 visited LGA. There was underestimation of quantities, drawings and BoQs were not tallying, repeating the same item twice in the BoQs and Omission of items in the BoQs as detailed in Table 5.6.

Table 5. 6: Additional resulting from inadequate BoQs preparation

Weakness observed	Number of LGA	Number of projects affected	Additional cost (Million TZS)
Underestimation of quantity	5	5	186.93
Drawing and BoQs were not tallying	1	1	56.02
Repeating the same item twice in the BoQs	2	2	72.7
Omission of items in the BoQs	4	5	135.43
Total			**451.08**

Source: *Contract information from projects implemented by 12 Visited LGAs (2018)*

Table 5.6 indicates that there was a problem in BoQs preparation which resulted in additional cost amounting to TZS 451.08 million during implementation of water projects as detailed in **Appendix 2**.

The audit noted through the review of variation orders of construction of urban water projects that there were cases for missing and underestimation of items. For example, in Chalinze (lot 2 to lot 6, Package (F&H)), Bukoba and Musoma water projects BoQs did not tally with drawings. This was evidenced by the differences between the billed items with quantities derived from drawings and what was actually implemented at the site. Further, to amend these errors there was a change in scope of the works which resulted to a cost increase amounting to TZS 16.311 billion. This situation was caused by failure of the consultant to prepare realistic estimates for the works and inadequate review of BoQs by the Ministry of Water and PO-RALG.

CHAPTER SIX

PROCUREMENT AND CONTRACT MANAGEMENT FOR WATER AND SEWAGE PROJECTS

6.1 Introduction

This chapter presents findings on the effectiveness of procurement and contract management during the implementation of Water and Sewage Projects. The effectiveness of the implementation of procurement and contract management was assessed throughout the entire procurement cycle (plan for procurement, tendering and award, contract administration and closure stages).

This chapter has been structured in five (5) main sections, namely, handling of procurement (section 6.2), quality control (section 6.3), cost control (section 6.4), time control (section 6.5) and supervision and monitoring of water and sewage project (section 6.6).

This assessment was done based on the three performance audit reports which were issued in March 2016 and 2019. These are performance audits on:

a) Management of water projects in rural areas;
b) Management of water supply projects from borehole sources; and
c) Management of construction contract on water projects at the Ministry of water.

The following are the main audit findings that were reported in relation to the procurement and contract management of water and sewage projects:

6.2 Inadequate Implementation of Procurement

Planning for the supervision of contract is a fundamental requirement of the quality management system[16].The Ministry through the Urban Water Supply and Sanitation Division and the Procurement Management Unit (PMU), Tender Board (TB) and Accounting Officer (AO) plays a great role in executing procurement of water projects.

Section 4A (3) of Public Procurement (Amendment) Act No.5 of 2016, requires Procuring Entities to strive to achieve the highest standard of equity during the execution of procurement by taking into equality, fairness and need to obtain value for money for each procurement undertaking.

[16] Quality management systems laid down in ISO 9001:2008

The adequacy of procurement undertakings in the implementation of water supply and sanitation projects was assessed by checking various processes to ensure that procurement and management of contractors and consultants for the implementation of water and sanitation, projects and programs are adequately adhered to. The following weaknesses were noted:

6.2.1 Awarding contracts to unqualified contractors

The audit noted that, the Ministry of Water, PO RALG and LGAs awarded some contracts for the implementation of water projects to unqualified contractors.

For example, review of the progress reports for 20 boreholes drilling projects at Kimbiji and Mpera in Kigamboni MC revealed that, contractors with insufficient capacity were awarded contracts. This is contrary to Regulation 116 (1)(a) of the PPR,2013 which requires a tenderer to possess the necessary professional and technical qualifications, financial resources, equipment, managerial capability, reliability, experience and reputation, in order to qualify for awards.

Further analysis of 20 boreholes drilling projects at Kimbiji and Mpera in Kigamboni MC, Chalinze and other LGAs water projects is presented in **Table 6.1**.

Table 6. 1: Contractors weakness in implementation of water projects

Identified weakness	Name of Project
Inadequate financial capacity	i. 20 boreholes drilling project at Kimbiji and Mpera in Kigamboni MC; and ii. Water projects for visited LGAs such as Sawala water project at Mufundi DC iii. Chalinze water project
Inadequate Managerial and Managerial Capacity	i. Chalinze water project there was lack of contractor's key personnel at site to supervise the construction ii. Water projects for visited LGAs such as Ikilimilinzowo water project at Mufundi DC

Source: *Reviews of site visit and water project progress report*

Table 6.1 indicates that, financial and managerial capability limits contractors to execute water projects as agreed.

Likewise, review of the contracts and registration status of contractors as provided by the Contractors Registration Board (CRB) showed that, contractors for package F, H and Chalinze Project Lot 4 were awarded contracts at prices above their registered contract limit as indicated on **Table 6.2**.

Table 6. 2: Contracts awarded to contractors above their class of registration

Contractor for Chalinze water supply	Class of registration for civil works	Contract Class limit amount (TZS Million)	Awarded contract price (TZS in Million)	Difference In TZS
M/s Mega Builders Ltd (Package F)	Six	300	999	666
M/s Mega Builders Ltd (Package H)	Six	300	10,297	9,997
M/s Building Water Earthwork Construction Company (Lot 4)	Four	1,500	3,774	2,274

Source: *Respective contracts and CRB classification of contractors*

Table 6.2 showed that, contractors with limited capacity according to their registration status were awarded a huge task ultimately delays in the completion of the water projects.

Adverse impact of using unqualified contractors to implementation of water projects includes:

a) Delays in the completion of projects due to contractors' lack of capacity in terms of finance and technical skills which affected the intended objectives of the individual water projects; and
b) It may lead to poor quality of water projects implemented by water authorities and LGA.

6.2.2 Inclusion of performance security and advance payment bond in the contract cost amounting to TZS 201 Million

Through reviews of contract documents in the 10 visited LGAs it was noted that, performance bonds and advance payment bank guarantees costs were included in the calculation of the contract cost. This is contrary to the requirement of clause 54 and 55 of the General Condition of Contracts (GCC) for works, which states that, costs of advance payment guarantee and performance bond should be incurred by contractors as security for securing advanced amount and performance of contracts respectively.

This increased the cost of projects by TZS 201 Million which could have been avoided, refer Table 6.3.

Table 6. 3: Water projects with inclusion of performance security and advance payment into contract

LGAs	No. of water project affected	Provision of performance Bond (Mil. TZS)	Advance payment Guarantee (Million TZS)	Total in (Million TZS)
Mbulu DC	6	21.1	14.5	35.6
Kiteto DC	3	12.0	6.0	18.0
Manyoni DC	1	2.5	0	2.5
Singida DC	4	10.0	8.0	18.0
Shinyanga DC	5	11.0	0	11.0
Kishapu DC	1	1.9	10.0	2.0
Morogoro DC	5	21.5	25.0	46.6
Lindi DC	4	17.0	25.5	42.5
Nachingwea DC	4	7.5	7.0	14.5
Sumbawanga DC	5	8.0	2.8	10.8
Total	**38**	**112.5**	**88.9**	**201.4**

***Source**: Payment certificate evaluation and Contract BoQs*

Table 6.3 showed that, in 38 projects from 10 visited LGAs had at least one project in the sampled water projects, where cost of performance bond and advance bank guarantees were included in the contract sum.

The inclusion of performance and advance payment guarantee was caused by inadequate review and approval of payment certificates to the contractors. If the Water Engineers and Accounting Officers would critically have reviewed the contract agreements before making the decision this could not have happened.

6.2.3 Few numbers of Contractors underwent post qualification

The audit noted that, most of the contractors who implemented water projects were awarded contracts without having undergone post qualification which aimed at assessing whether the contractor has adequate financial, technical and legal capacity to undertake these projects assignments.

Audit review of the project files at the visited LGAs, i.e. Kinondoni MC, Temeke MC and Dodoma CC noted that post qualification/due diligence of the bidders for boreholes water supply projects were not carried out as required.

DAWASA Officials revealed that, in some instances DAWASA awarded tender to the contractor on the basis of past experience. For instance, DAWASA awarded a contract of executing Kimbiji and Mpera projects to M/s Serengeti in Joint Venture with NSPT LTD on the basis that the contractor successfully completed other DAWASA projects without conducting post qualification/ due diligence on his capacity. This resulted into the project being stalled due to contractor's inability to fully sustain the completion of work.

Nevertheless, the Water Sector Development Programme (WSDP) implementation report of 2015 indicated that post qualifications that have been done in the water project did not always reveal the true picture of the contractor's capacities. **Table 6.4** illustrates the number of projects on which post qualification to the bidders were not conducted particularly for those involved in the implementation of boreholes water projects as detailed in ***Appendix 3***.

Table 6. 4: Extent of Post Qualification of Bidders across LGAs

Post Qualification	Number of LGAs/ UWSSAs	Number of projects	Name of LGAs/ UWSSAs involved
Conducted	2	6	Bariadi DC, Longido DC, AUWSA
Not Conducted	13	34	Dodoma MC, Bahi DC, Arusha MC, Tabora MC, Urambo DC, Bariadi DC, Meatu DC, Kinondoni MC, Temeke MC, Songea MC Tunduru DC, Lindi MC Kilwa DC, DAWASSA

Source: *Auditors' analysis of the information extracted from projects file contract document, 2019*

As shown in **Table 6.4** post qualification was done in only 6 out of 40 contracts which were equal to 15% of all the awarded contracts.

The adverse impacts of using contractors who have not undergone post qualification include:

a) It limits PEs to scrutinize in detail the financial, technical and legal capability of contractors who will implement the projects as a result awarding contracts to contractors who fail to successfully execute the awarded contracts; and

b) It leads to additional costs for supervising these contractors which ultimately affects the overall project completion timeframe.

6.2.4 Infrequent assessment of contractors prior to the issuance of drilling permits

The Ministry of Water is required to assess the capacity of the contractors before issuing the drilling permit. The audit noted that, assessment of boreholes drilling companies prior to the issuance of drilling permits was not adequately done. This is evidenced by the fact that, assessment of the drilling companies to ascertain the capacity of each drilling company regarding resources such as human, financial and availability of drilling tools and equipment was noted to be conducted rarely.

Review of the Ministry of Water drillers' registry revealed that a total of 66 drilling licenses were issued to the groundwater drillers from 2015/16 to 2017/18 but no assessment was conducted to ascertain the capacity of the licensed drilling companies.

Water Resource Division officials at the Ministry of Water and Irrigation (MoWI) revealed that insufficient assessment of drilling companies was due to lack of financial resources for visiting and verifying their performance and competence. Further review of the Water Resource Division annual plans and budgets from MoWI's Water Resource Division revealed that MoWI did not plan for this particular activity.

The effect of issuing licenses to the drilling companies without prior assessment to measure performance possesses risk for licensing unqualified and poor execution drilling companies consequently affecting the overall quality of the executed projects.

6.3 Ineffective cost control for water projects

The Ministry of Water and Irrigation was supposed to monitor the cost of works with regard to quantities and the quality specified in each contract. In this regard, the Ministry was responsible for ensuring that works are completed within the agreed timeframe and contract price. The Ministry of Water is required by Item 3.2.3 (d) of the WSDP I to ensure that water supply facilities are effectively and efficiently implemented. We noted several cost overruns for various water projects as detailed hereunder:

6.3.1 Cost of drilling boreholes was above average drilling cost per meter

Review of the budgets and boreholes completion reports of 10 village boreholes water projects noted that, drilling cost was above the average drilling cost for most of LGAs. A comparison of the cost of drilling boreholes in the 14 visited LGAs and respective UWSSAs in the same LGAs using the

depth per cost for specific boreholes against the LGAs average was made. For the Six visited UWSSAs all sampled projects were implemented within the average drilling cost. However, to some extent the situation to LGAs was different in the visited LGAs; see **Table 6.5**.

Table 6. 5: Percentage of Boreholes with above Drilling Cost per Meter in the visited LGAs

Name of the LGA	Average drilling cost per meter (TZS)	Average Percentage of projects below average	Average Percentage of implemented projects above the average drilling cost/ meter
Songea MC	213,448	12	88
Dodoma CC	137,582	20	80
Longido DC	115,912	20	80
Kinondoni MC	137,237	33	67
Urambo DC	220,139	40	60
Temeke MC	214,442	47	53
Arusha MC	242,999	50	50
Tabora MC	226,137	50	50
Bariadi DC	134,416	50	50
Lindi MC	236,198	50	50
Kilwa DC	349,749	50	50
Bahi DC	137,582	0	0
Meatu DC	157,437	0	0
Tunduru DC	No Records	No Records	No Records

Source: *Budget and boreholes completion reports of 10 village boreholes*

Table 6.5 shows that, the implementation costs in a significant number of projects in the visited LGAs were higher than the average cost. The percentage of the boreholes water supply projects that were above the LGAs average costs were 67 and 80 percent in Kinondoni and Dodoma Municipalities respectively.

6.3.2 Water Supply Projects were implemented beyond Budget

Review of the project's budget allocation and implementation report of one project implemented by DAWASA revealed that, the project cost went up to TZS 1.3 billion higher than other UWSSA projects. This price variation was attributed to delays in projects implementation.

Likewise, review of progress projects' reports showed that, 8 out of 9 reviewed projects were implemented at costs that were higher than the

originally agreed contract prices. The cost overrun, in this regard, ranged from 10% to 229% of the respective original contract prices as presented in **Table 6.6**.

*Table 6. 6: **Increase in contracts prices from the original price***

Contract/Lot	Initial Contract Price (Mil. TZS)	Final Contract Price (Mil. TZS)	Price Increase (Mil. TZS)	Increase in Percentage
Chalinze Project Lot 1	6,423	6,355	(68)	(51)
Chalinze Project Lot 2	8,369	10,611	2,242	27
Chalinze Project Lot 3	7,940	9,486	1,546	19
Chalinze Project Lot 4	3,819	4,280	461	12
Chalinze Project Lot 5	3,181	10,480	7,299	229
Chalinze Project Lot 6	5,520	7,392	1,872	33
Chalinze Project Package F & H (Remaining works)	5,843	12,158	8,547	146
Musoma Project	40,624	44,851	4,227	10
Bukoba Project	27,535	31,432	3,897	14
Total	109,254	137,045	30,023	28

Source: *Water project progress report*

The total price increase for all these selected projects was about TZS 30 billion, which represents 28% of the initial contract prices. The audit further noted that cost overruns was caused by:

Changes in specifications

Review of variation orders and original BoQs noted that, there were changes in specifications during the implementation of water projects. For instance, during the implementation of Chalinze water project transmission pipes were changed from steel pipes to plastic pipes. These changes resulted to an increase in cost amounting to TZS 2.776 Billion.

The whole process of changing pipes delayed the project for about 11 months out of which 6 months were spent for approval and 5 months for the delivery of the pipes. These delays caused additional cost to the Government especially on supervision which was paid based on time, and the preliminaries and general items that were paid to the contractors. The actual cost attributed to these changes for supervision was Euro 295,992 (about TZS 888 million) for Lots 1 to 6.

Likewise, through the review of Tender Board meetings, variation orders and contract documents from 12 visited LGAs, we noted that there were changes in the specifications of pipes for different reasons. However, these

reasons were not taken onboard during the feasibility studies. The additional works caused cost increases by TZS 426.7 million for 5 out of 12 visited LGAs.

a) Changes in the scope of works

Review of site meeting reports from the projects implemented in 12 visited LGAs, had an increase in the scope of works, which led to increasing cost for the projects for around 13 billion due to different reasons in individual water projects. The main reasons for changing the scope of work were increasing the number of beneficiaries, addition of missed items and construction of water tanks and pumps. These are detailed in **Appendix 4** to this report.

Generally, changes in the scope led to increased cost during the implementation of water projects in rural areas. Likewise, there was additional project implementation costs due to increase in scope of work amounting to TZS 3.9 Billion.

b) Increased costs due to improper dealing with exchange rates and Interest rates

Exchange rate and interest rates changes contributed to increase project costs. For instance, contractual terms and conditions for Chalinze water project required half of the contract price to be paid in TZS and the remaining in US$. However, the Ministry did not maintain a Dollar account thus had to buy US Dollars (50%) every time payments were made to contractors.

Since the exchange rate between US Dollars and TZS has been increasing, the Ministry ended up paying the contractors more (in TZS) than that was stated in the original contract. Review of Certified IPCs and their respective payment vouchers noted that, the Ministry paid an additional TZS 1.762 billion due to improper handling of the exchange rates.

The same was noted from water projects which were being implemented by LGAs whereby a review of raised certificates and payment records revealed that there were delays in paying contractors which resulted into an overpayment of TZS 544 million as detailed in Table 6.7 in case contractors claim interest on delayed payments.

Table 6. 7: Interest the government supposed to pay contractors

Name of LGA	No. of Projects with delay in payment	No. of Certificates with delays	Total Outstanding Amount to (TZS)	Average delays (Days)	Interest Amount (TZS)
Mbulu DC	5	14	1,066,521,054	174	108,498,064
Kiteto DC	2	2	278,066,595	64	9,728,848
Kishapu DC	5	7	1,076,861,021	132	66,032,113
Morogoro DC	5	14	2,866,192,816	72	102,657,780
Mvomero DC	4	5	391,132,208	90	21,885,827
Lindi DC	5	5	552,533,884	176	47,656,546
Shinyanga DC	5	9	782,204,238	166	81,073,699
Nkasi DC	2	3	1,467,473,593	81	83,430,262
Sumbawanga DC	2	3	210,770,550	160	15,784,871
Manyoni DC	1	1	225,182,350	59	7,046,457
Total					***543,794,468***

Source: *Review of payment certificates and payment vouchers, 2019*

Table 6.7 shows that, there is a significant risk for Government to incur extra cost for project located in Mbulu DC followed by Morogoro DC if contractors claim outstanding amount.

c) Increased costs due to change of alignment of water pipes network

Change of alignment of water pipe networks was also seen to contribute to the cost increase. This is exemplified by the projects implemented by the Ministry and LGAs as explained below.

The design manual of the Ministry of Water requires avoiding areas with compensation requirement and ensuring structures were clear off road and railway reserve areas. However, review of Variation Order No. 1, 4 and 5 for Package F & H found that, 19 Water Kiosks and a segment of transmission pipe, in the Chalinze water project were built in the TANROADS' road reserve. These structures were then relocated from the road reserve at a cost of TZS 199.4 million.

In addition, the Ministry of Water paid the contractor TZS 41.3 million as refund (payment) for work done, which was then abandoned because the areas were within TANROADS reserved areas. Also, review of a letter from the contractor dated 1st June, 2018 with Reference Number

MGT/TNG/2018/206 noted that, there was a change in the pipeline route and location of water points for the Kaloleni water project in Kiteto DC.

Those changes caused an additional cost of TZS 18 million. The change in water pipe routes were caused by inadequate coordination between Kiteto DC and responsible authorities for road construction.

d) Termination of contracts without valuation of completed work

Another factor which also contributed to the cost increment of water projects is the termination of contractors without valuation of completed work. The valuation could allow the Ministry and LGA to know the actual cost incurred before handing over the project to a newly procured contractor. This is exemplified by the following examples.

Through the review of letter with Reference Number MDC/DED/WI/2/VIII/160 to the contractor noted that, Mbulu DC terminated contract for failure to implement water projects at Mongahay Tumati due to failure to perform. We requested the valuation of the work done after termination but Mbulu DC did not provide the valuation report. Interviews held with technicians at Mbulu DC revealed that Mbulu DC did not conduct any valuation after the termination.

Failure to conduct the valuation including the level of completed work against the amount paid to the contractor poses the risk of Mbulu DC to forego its rights especially when the contractor was supposed to pay some compensation after default.

Moreover, despite engaging another contractor to finish the remained work there was no basis for the contract price for the remaining work since no valuation was done.

6.4 Inadequate Quality Control for Water Projects

During site visits to the selected water projects, the audit team noted that 10 out of 12 visited LGAs had quality problem issues relating to the implemented water projects (**Appendix 5**). These problems associated with bursting of pipes, water tank leakages, using wooden stick instead of air valves, presence of low pressure to some domestic points and failure of water to reach domestic points as detailed below:

6.4.1 Bursting of Water Pipes

Review of monitoring reports from 6 visited Regional Secretariats in 2018 showed that, 7 out of 17 water projects in the visited Regional Secretariat

namely, Singida, Manyara, Shinyanga and Morogoro had water leakage problems. For example, in Mlali-Kipera water projects in Mvomero DC, a lot of water was being wasted from the pipes which were supplying water from the intake to water tanks, see photo 6.1.

Photo 6.1: *Mlali Kipera water project (Photo was taken on 29/11/2018)*

6.4.2 Laying pipe on the ground

Our audit noted that pipes were laid on a bare surface of the ground for the Olichornyori Water Supply Project in Simanjiro DC as shown in Photo 5.2. This was contrary to the requirement in the project contract (Specification and BoQs) which required pipes to be laid deep at least one meter below the ground. The contractor did it intentionally since there was no supervision at all and he knew that it was not acceptable and contrary to the requirements of the contract.

Photo 6.2: ***Pipe laid on the ground instead of being one meter below the ground***

The same situation was also noted for Chalinze water project, water pipes were not laid within the specified depth and were protected through backfilling; as a result, they were burnt by fire.

6.4.3 Leakage of the constructed water tanks

During the site visits to Mbulu DC, Lindi DC and Mkalama DC, the audit noted leakages of water tanks. This implies that, some aspects of quality were not taken care of during the construction of the aforesaid water tanks. Some of the water projects which experienced leakages of water are presented in **Table 6.8.**

Table 6. 8: Water leakage from Tank for visited LGAs

Name of LGA	Name of water projects	Weakness observed
Mbulu DC	Haydom water project	Leakage of water from the newly constructed water tank
Lindi DC	Nyamangala/Litipu/Nahukahuka water project	Water was leaking from the tank-Nangamala Water was leaking from the tank-Litipu
Mkalama DC	Gumanga water supply project	Leakage of water in the Water Storage Tank

Source*: Auditors' observation during site visits (2018)*

Causes for problems associated with quality of water project are detailed in subsequent sections

Reviews of inspection reports from DWEs noted that, problems associated with leakages of water pipes, water tanks, poor workmanship which results to leakages, using non- specified materials or using poor quality of materials were caused mainly by inadequate supervision by respective employers or consultants.

Similarly, the reviews of project information noted that one contractor with lower class (registered under class 6) was awarded a contract which was supposed to be executed by contractors registered under class 4 and above. This caused the contractor to execute poor quality of work.

In addition, failure by the contractor to employ required key personnel as per the contract affected the quality of work done. For example, in one of the water projects, there was only 1 site manager doing all the work without any assistant. Other key staffs were engaged only during site meetings.

6.5 Inadequate Time Control

Procuring entities are required to monitor the progress and timely completion of works in accordance with the terms of each contract and ensure that it meets its contractual obligations by ensuring timely payments are made to the contractors and consultants and ensure that commitments are recorded against voted funds[17]. The audit revealed the following:

6.5.1 Untimely completion of the contracts for water Projects at the LGA level

Review of contracts completion clause in the specific sampled water project noted that, 81% of sampled contracts for water projects were not completed on time. From 23 visited LGAs[18], 107 out of 132 sampled contracts for water projects were not completed on time. This indicates that, there had been significant delays in completion of the projects. **Table 6.9** presents the percentage of delayed contracts for water projects implemented both in rural and urban areas.

Table 6. 9: Delayed contracts for water projects

Year	No. of Sampled water project	No. of delayed water project	Percent of delayed projects (%)
2019	74	54	73
	58	53	91
	132	**107**	**81**

Source: *Auditors' analysis of completion time of water projects from LGAs (2018)*

Table 6.9, showed that, overall 81% of the sampled contracts for water projects were not completed on time.

Further reviews of approved letters of extension of time for completion of water projects for the 12 visited LGAs in rural areas, revealed that delays were caused by reasons categorized into 5 groups as detailed below:

a) Financial resources related factors

It includes inadequate disbursement of funds for water projects which led to late payment of raised payment certificates. The delayed payments also resulted from unsolved exemptions of tax issues.

[17] Regulation 114(b) of the Public Procurement Regulations, 2013
[18] Names of LGAs are indicated in Appendix 6

i) Late payment of raised payment certificates

For the last five financial years under the scope of the audit, water projects experienced delays in payment of raised certificates in all 12 visited LGAs. Reasons given being lack of adequate funds to pay all the raised payment certificates.

For example, in the financial years 2016/17 and 2017/18 the budget to implement water projects were estimated at TZS 373 billion and TZS 220 billion respectively. The National Water Investment Fund collected around TZS 137 billion and TZS 150 billion respectively.

The committed and used funds for the two financial years were only 37% and 68% of the demand respectively. While the collected funds could not meet committed obligations, the Ministry of Water kept on approving implementation of more water projects which lacked committed funds.

ii) Unsolved exemptions of tax issues

During the implementation of WSDP I & II, the government allowed VAT exemptions to purchase materials used in implementing water projects. Despite that this fact is known, the audit team noted requests from contractors for extension of time due to failure of LGAs to facilitate procedures for acquiring exemptions of VAT from TRA in order to purchase materials for the construction of water projects in rural areas. This fact was noted in 3 out of 12 visited LGAs.

b) Availability of construction material related factors

The construction material related factors include unavailability of construction materials whereby some contractors extended their projects completion time due to unavailability of construction materials. Also, ordering of materials outside the country took very long thus affecting the project completion time.

c) Contractor's capacity related factors

Factors related to the capacity of contractors to perform were also noted to contribute to the delayed completion of projects. These include sickness of technical staff, long illness of top management staff of the construction company, changing of administration of the construction company.

d) Ineffective supervision and Monitoring related factor

Failure to conduct supervision effectively due to absence of plans and budgeted funds set aside for supervision of water projects, insufficient number of qualified personnel, and delays to respond to letters of requests for approval of works at various stages from contractors, and negotiation with the community for land to establish water infrastructures. These are some of the supervision and monitoring factors that contributed to the delayed completion of water projects.

e) Unforeseen events related factors

Unforeseen event related factors were also noted to affect a couple of water projects that were implemented by LGAs. These involves weather conditions specifically heavy rainfall, construction of road (i.e. Interference of either construction of road or destruction of road also was noted to contribute in extension of completion time for water projects), missing of ground water source, and presence of rock which result to change of scope.

6.5.2 Delayed project completion of water projects

It was noted that most of the water projects implemented by the Ministry and those by LGAs suffered delays in their completion. For instance, the audit for 9 projects implemented by the Ministry noted that none of the 9 reviewed contracts was completed within its original contractual period. It was noted that there were substantial delays in the projects' completion time. Contracts were extended by periods ranging from 9 months to almost 4 years.

The additional time in the selected projects varied from half to more than two times of the agreed time in the original contract period. Analysis of the additional time to the projects at the time of audit revealed, that the average delay was more than 2 years whereas about 78% of the water projects delayed for at least one year. Further analysis also revealed that half of the projects were delayed for at least 2 years.

The same level of delays was also noted on the water projects that were implemented by LGAs. For instance, from the 12 visited LGAs, a total of 53 out of 58 water projects were delayed by a range of 95 to 1299 days.

Major reasons for the extension of time in the selected water projects were the failure to adhere to updated programs of work, weaknesses on requests and approvals of extension of time to contracts, delay in deciding on the change of pipes from steel to plastic and delay in giving site possession.

6.5.3 Untimely payments to contracts

Analysis of payments made to the contractors and consultants revealed the following:

a) Delays in paying contractors by the Ministry of Water

Review of raised payment certificates for water projects implemented in visited LGAs[19], noted that, there were delays in paying contractors who were implementing those projects.

The audit noted that the Ministry of Water did not pay certificates of payments approved by LGAs timely. Most of the approved payment certificates by LGAs were not paid within 28 days, a period stated in the contract between LGAs and Contractors.

In each of the 12 visited LGAs, and a number of projects whose payments were delayed, it was found out that 5 out of 12 water projects from visited LGAs delayed in paying contractors on the raised certificates. In all the 12 visited LGAs at least 40% of the reviewed water projects had delayed payments for the raised certificates. Similarly, the percentage of projects that were delayed was 71.4%. The delays were ranging between 2 and 627 days.

On the other hand, delays in paying contractors is identified as the main cause for delays in the completion of the water projects, since, delayed payments significantly affected the implementation of projects as it affected the contractors' cash flows.

b) Delays in paying advance payments

According to the contracts[20], the Ministry is required to pay advance payment at a specified percentage within 45 days after submission, by the contractor, of unconditional acceptable bank guarantee of the same amount.

Review of consultants' monthly progress reports, consultants' evaluation of requests for time extension, and payment vouchers for advance payments for 8 contracts of water projects revealed that, in all the selected water projects, there were delays in paying the advance payments.

[19] Singida DC, Manyoni DC, Mbulu DC, Kiteto DC, Shinyanga DC, Morogoro DC, Mvomero DC, Sumbawanga DC, Nkasi DC, Lindi DC, Nachingwea DC and Kishapu DC

[20] Clause 51.1 of GCC for Chalinze contracts and selected contracts between LGAs and contractor 12 visited LGAs

It was further noted that delays in paying advance payments varied from about 3 months to more than 18 months. Delay in paying advance payments was attributed mainly to insufficient preparation by the Ministry of Water and LGAs in ensuring the availability of funds before signing of contracts.

6.6 Inadequate supervision of water projects

Project supervision is a part of monitoring mainly through site visits, inspections of on-going works, taking measurements on completed work and ensuring that supervision reports are produced. A review of project files noted that there was inadequate supervision of water projects as follows:

6.6.1 Inadequate supervision of boreholes water supply projects due to lack of competent personnel/consultant

Review of geophysical survey reports recommended that supervision of the boreholes should be done by hydrogeologists. Review of project documents and files noted that boreholes water supply projects were not adequately supervised by competent personnel from LGAs and UWSSAs.

The situation in the visited LGAs indicated that, 6 out of 14 visited LGAs managed to conduct supervision of the projects during the construction stage. The supervision of projects in the remaining 8 LGAs were not done by competent personnel. This was caused by absence of plans and budgeted funds for supervision of borehole water supply projects and insufficient number of qualified personnel.

6.6.2 Non-adherence to Work Programmes

Review of contract terms and conditions for water projects noted that, the work programmes that are prepared by the contractors to guide the construction work were not strictly adhered to by the contractors and consultants. Work programmes usually became unrealistic because they were not regularly updated to take onboard changes that took place during the construction stage.

There were also weaknesses in administering time extensions to the contracts, whereby contractors did not timely submit their requests and the Ministry of Water also took a long time to decide on time extensions.

6.6.3 Inefficient supervision of water projects

Through site visits, the audit noted inadequate supervisions which resulted to leakages of water from water pipes and water tanks. Occurrences of poor workmanship which result to leakages, using non-specified materials instead of specified materials or using materials with inferior quality as noted in implemented water projects in rural areas were caused by inefficiencies in supervisions.

For instance, in Shinyanga DC the audit team noted that Shinyanga DC did not conduct supervisions at all for the completed water projects at Didia. This was manifested by the correspondences of the communication between the LGA and the contractor when the contractor wrote to Shinyanga DC requesting for his retention money. In their reply Shinyanga DC claimed that the contractor had not finished some of the works like installation of a sim tank with the capacity of 3000 litres and building of a jar with the capacity of 1000 litres.

This implies that there was no close supervision during the implementation of Didia water project until the contractor finished his work, the defect liability period expired and then decided to request his retention money. The claim reminded Shinyanga DC to conduct inspections regarding the constructed water project at Didia.

CHAPTER SEVEN

RESOURCES FOR PROVISION OF WATER SUPPLY AND SEWAGE SERVICES

7.1 Introduction

This chapter describes the performance of the government through Ministry of Water and PO-RALG in planning and budgeting, allocation and distribution, collection and utilization of resources for provision of water and sewage services in the country. The resources covered in this chapter include financial, personnel, equipment and working tools necessary for implementation of activities related to the provision of water and sewage services.

The chapter is divided into four Sections covering planning and budgeting for resources (Section 7.2); allocation and distribution of resources (Section 7.3); collection of fees from the recipient of water and sanitation services (Section 7.4); and utilization of the allocated resources (section 7.5).

7.2 Planning for resources for provision of water supply and sewage services

Section 5 of Water and Sanitation Act of 2019 requires Ministry of Water to coordinate planning and resources mobilization for water and sanitation services. It was also required to coordinate and provide financial support for water supply and sanitation services. The audit identified the following weaknesses in planning and budgeting for resources for provision of water supply and sewage services:

7.2.1 Unreliable budget for provision of water and sewage services

The audit noted, through the reviewed Water Sector Status Reports of 2014/15 and 2016/17, that LGAs and Water Supply Authorities lacked sustainable funding mechanisms for water projects from boreholes sources contrary to Item 4.4.2 of the National Water Policy, 2002 which requires the Ministry of Water to have sustainable plans for development of water resources. These were the funds required for financing operations and maintenance cost of completed boreholes water supply projects. Instead, funds to cover maintenance of boreholes depended mainly on the contribution from the community which in most cases were not reliable.

As a result, maintenance of completed water projects from boreholes sources were not done adequately, leading to a significant number of boreholes being abandoned as they were not functioning as presented in Chapter Three.

Similarly, the performance Audit Report on *Provision of Sewage Services* reported that, the reviewed UWSSAs' budget indicated inadequate budgeting for sewage services. We noted that less priority was given on operations of UWSSAs related to sewage services; whereas little fund was set for the expansion of the sewage networks. The reviewed UWSSAs' budget records indicated that for five years, on average the budgeted funds for the development of sewer network by UWSSAs was TZS 2.8 billion which is equivalent to 9% of the total revenue collected from sewage. The set amount was insignificant for expanding sewer networks within the areas of jurisdiction of individual UWSSAs; since construction of 1 km of sewer network cost an average of TZS 635 to 750 million.

On the other hand, the reviewed activity plans of 12 visited LGAs for the financial years 2013/14 to 2016/17, did not integrate onsite sanitation services such as collection, transportation and disposal of sewages in their plans as well as budget. The LGAs were not giving priority to the activities during planning stage.

Inadequate budgeting for the activities related to provision of sewage services were mainly caused by:

i) Less priorities given to sewage services when compared to water supply activities;
ii) Poor planning of LGAs' officials responsible for implementation of water and sewage services hence excluding some important activities like operation and maintenance of boreholes and water quality monitoring.

7.2.2 Inadequate planning for human resources/ personnel

The audit noted through the reviewed LGAs human resource reports that 14 visited LGA's did not have Hydrologists in their areas. Hydro geologists were also lacking despite being necessary for interpreting the geophysical survey before drilling boreholes. LGAs did not include hydrologists in the organization structure as well as in the personnel emolument. Absence of Hydrologists resulted into inadequate technical review of hydrogeological/geophysical surveys in LGAs, and eventually some of the drilled bore holes did not yield the intended results. For instance, in Kinondoni MC, a drilled borehole at aquifer of Msumi area did not achieve the required quantity of water due to lack of geophysical survey prior to drilling.

7.3 Distribution and Allocation of Resources

This section is divided into the following parts: disbursement of funds for provision of Water Supply and Sewage services (7.3.1); allocation of human resources for implementation of water supply and sewage services (7.3.2); and allocation of tools and equipment for Implementation of water supply and sewage services (7.3.3).

7.3.1 Inadequate disbursement of Budgeted fund

This part shows the budgeted and disbursed fund for implementation of water supply and sewage services in the country.

Reviewed financial records from Ministry of Water, PO-RALG and Water Supply and Sanitation Authorities showed that, for the financial years covered by 5 Performance Audits conducted in Water Sector, the disbursed fund was less than 50% of the budget except for PO-RALG. Table 7.1 presents the percent of disbursed funds to each entity:

Table 7.1: Percentage of Disbursed fund of Approved Water and Sewage

Name of audit	Ministry/Agency	Average budget per year-TZS in million		Percent Disbursed (%)
		Approved budget	Disbursed Amount	
Provision of Sewage Services in Urban Areas	Ministry of Water	258,066	103,374	40
	PO-RALG	173	145	84
Management of water projects in Rural areas	Ministry of Water	331,000	133,000	40
Control of Water Abstraction from the Water sources	Basin Water Boards	3,164	646	20
Management of Water Projects from Borehole Sources	Ministry of Water	331,000	133,000	40
Construction Contracts Management of urban Water Project	GoT	133,775	55,325	41
	Development Partners	286,375	7,305	3
Total		***1,343,553***	***432,795***	***32***

Source: *Financial records from Ministries and UWSSAs*

Table 7.1 shows that in average, fund disbursed was 32% of the approved budget for all water sector activities covered in the five performance audit reports. It shows that, only 20% of the budgeted amount was disbursed for control of abstraction from water sources; while for management of water

project from boreholes sources and management of water project in rural areas were 40% of the budget.

Consequences of disbursement of insufficient fund for provision of water Supply and sewage services

There were various consequences resulting from inadequate disbursement of fund for provision of water and sewage services in the country. The consequences reported by five performance audits on water sector include:

(i) Failure to complete initiated water projects due to insufficient fund eg. In Morogoro region, three projects namely water projects for 9 boreholes in Manyoni DC, Kifindike and Gwata water project in Morogoro DC;

(ii) Delayed payment of contractors and consultants e.g. 68 out of 175 reviewed certificates on Management of Water Projects in Rural areas, (which is equivalent to 39%) experienced delays in payment. Similarly, there were delayed payments totaling TZS 10 billion to contractors who were implementing water projects from bore holes sources. More details are as described in Table 6.7 under Chapter Six above;

(iii) Delay in completion of implemented water projects for both provision of water supply whereby 81% of the projects implemented in LGAs were not completed on time. The delays ranged from 9 months to 4 years as detailed in Section 6.5 in Chapter Six above due to unsteady disbursement of fund from depended development partners.

(iv) Increased cost due to attracted interest cost from late payment of certificates. The reviewed 63 certificates and financial records from the visited 12 LGAs showed that the government was exposed to interests amounting to TZS 543 million due to late payment of raised certificates by contractors and consultants who were implementing water projects in rural areas. Moreover, the contractors and consultants who were engaged in constructions of urban water projects claimed a total of TZS 828 million and USD 842,000 due to late payment on the raised certificates. The claimed interest was raised from the implemented contracts of 6 lots of Chalinze projects. For detailed information on the effect of disbursement refer Chapter 6.

7.3.2 Inequitable allocation of Human Resources

Inadequate allocation of human resources for implementation of water and sewage services was reported in 3 out 5 performance audit reports on water sector. Review of staffing establishment from Ministry of Water noted deficiency of shortage of staff ranging from 26% to 50% of the required

engineers and water technicians for implementing water projects. As a result, there was high workload which affected the performance of the available personnel as well as the quality of the completed water projects. The details of the shortage is as presented in **Table 7.2**:

Table 7. 2: Workload Ratio of staff responsible for managing water projects in Rural Areas

Name of water project	No. of LGAs visited	No. of staff available		No. of projects 2017/18	Ratio	
		Engineers	technicians		Engineers/No. of projects	Technicians/No. of projects
Management of Water Project in rural areas	12	15	45	46	1:3	1:1
Management of Water Project from boreholes sources	14	28	41	203	1:7	1:5

***Source**: Staffing establishment and contracts documents from visited LGAs*

Table 7.2 shows the ratio of human resources for water projects in rural areas and boreholes sources. In regard to Management of Water projects in rural areas there was noted a ratio of 1 Engineer to 3 water projects. On the other hand, 1 technician was handling 1 project. The condition was different in implementation of water project from boreholes sources whereby 1 Engineer was handling 7 water projects; whereas, 1 technician was handling 5 water projects.

Moreover, the Ministry of Water did not employ required number of staff to facilitate control of water abstraction from water sources. See Figure 7.1 for detailed information

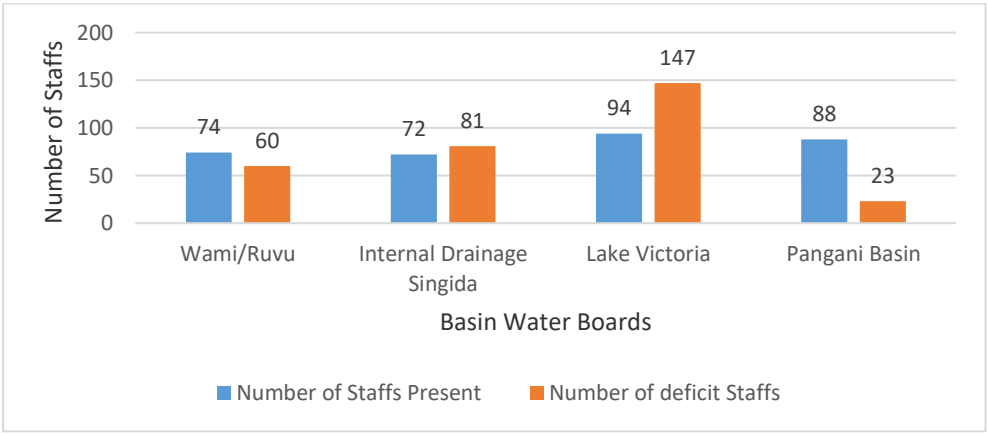


***Figure 7. 1**: Number of Staff present versus deficit*
***Source**: Data from Basin Water Boards*

Figure 7.1 shows that all Basin Water Boards did not have required number of staff compared to their establishment. The highest deficit was noted in Lake Victoria Basin with a deficit of 147 staff, followed by Internal Drainage Singida with a deficit of 81 staff. Pangani Basin was noted to have better staffing level compared to all four basins with a noted deficit of 23 staff.

Consequence of inadequate allocation of human resources for implementation of water supply and sewage services

Inadequate allocation of human resources for implementation of water and sewage services resulted into:

(i) Few inspected water projects which contributed to illegal and undefined boreholes. E.g Inspection done at Ilala by Wami/Ruvu Basin Water Board in 2015 revealed that, there were 2626 unregistered and 330 undefined boreholes, which eventually lead to poor implementation of boreholes projects, lack of sufficient information for monitoring of boreholes and also affect collection of revenues from the water users.

(ii) Delay in verification of the work done: It was further noted that in rural areas, there was a notable delay in verification of work done by contractors and consultants in ongoing water projects due to inadequate number of human resources in LGAs.

7.4 Ineffective collection of fees and charges from water services

Despite experiencing inadequate allocation of financial resources for the implementation of water projects, there were noted weaknesses in collecting fees and charges for the provided water supply and sewage services to users.

According to Section 25(a) of Water Resources Management Act, 2009 Basin Water Bodies are required to collect fees and charges from all water users before issuance of operation permits. The audit noted through the review of financial records from Basin Water Boards of Water Users Database which showed that, for five financial years starting from 2011/12 to 2015/16, Basin Water Boards were not effectively collecting fees from water users. This resulted to debt of about TZS 5,093 million as detailed in **Table 7.3** hereunder:

Table 7. 3: Percentage of Uncollected Water fees and charges by Basin Water Boards (TZS in million)

Financial year	Total Debt	Total amount Collected	Percentage of Uncollected amount (%)
2011/12	470	334	29
2012/13	481	312	35
2013/14	805	426	47
2014/15	1,604	636	60
2015/16	1,734	779	55
Total	***5,093***	***2,488***	***45***

Source: Water Users Database from BWBs

Table 7.3 shows that for a period of five financial years under the audit, Basin Water Boards, did not manage to collect 45% of the total debt.

Similarly, the reviewed minutes from National Water Boards dated April, 2016 revealed that, among the reason for ineffective collection of fees was shortage of Water User Association (WUA) compared to the demand, which was noted in all 4 visited Basin Water Boards. Water Users Association (WUA) was supposed to assist Basin Water Bodies in collecting water user fees on their behalf, as per Section 80(1) of Water Resource Management Act of 2009.

Table 7.4 presents the percentage shortage of the Water User Associations.

Table 7. 4: Percent Shortage of Water User Association in each BWBs

Basin	Planned No. of WUA	Present No. of WUA	Percentage Shortage (%)
Internal Drainage Basin	18	3	83
Lake Victoria Basin	29	7	76
Pangani Basin Water Board	30	13	57
Wami Ruvu Basin Water Board	33	15	55

Source*: Data from Basin Water Boards*

Table 7.4 shows that for the 4 visited BWBs, there were shortage of WUAs ranging from 55% to 83%. This resulted in failure to effectively collect water user fees.

7.5 Inadequate utilization of disbursed funds allocated for water projects

Analysis of the collected revenue from fees and charges on the provision of sewerage services and accompanied expenditure from the visited UWSSAs showed that, UWSSAs spent the collected revenue in other activities which

are not related to provision of sewerage services. For detailed information see Figure 7.2.

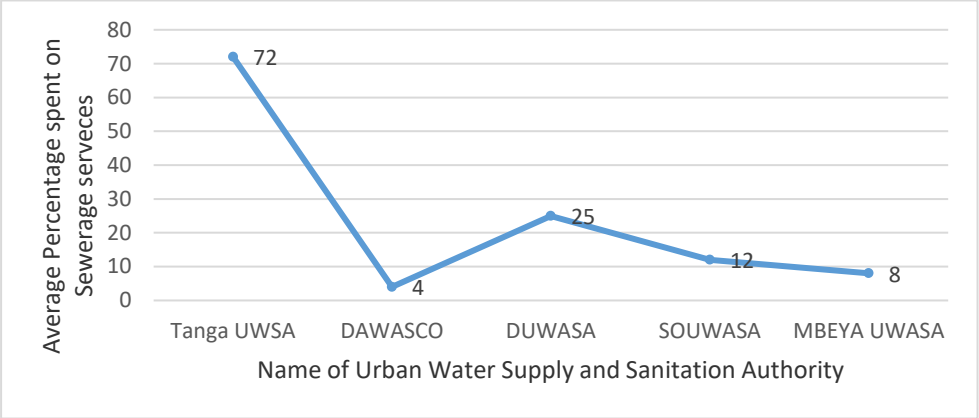


Figure 7. 2: Shows average percentage of collected revenue spent on sewage services

Source: Auditors' analysis of the provided financial records from visited UWSSAs

Figure 7.2 shows that for the period of five financial years 2012/13 to 2016/17, on average, Tanga UWSAs managed to spend more than 70% of the collected revenue from sewerage charges and fees for activities related to provision of sewerage services. Other authorities were noted to spend around 26% of the collected fees or less on activities related to provision of sewerage services like maintenance, rehabilitation, and expansion of sewerage network.

Moreover, there were noted inadequate utilization of dumping fees in servicing the waste stabilization ponds by DAWASA. Through the reviewed data on the amount of dumping fees charged to the private vacuum trucks operators, it was noted that, DAWASA collected at least 1.7 billion from 2012/13 to 2016/17 as dumping fees from Vingunguti and Kurasini ponds. However, DAWASA did not prioritize on maintenance of ponds when spending the collected fees.

Similarly, review of projects budget allocations and implementation reports from UWSSAs and LGAs, noted that there were water projects from boreholes sources which were implemented at a cost that was higher than the agreed contract price. 1 out of 26 reviewed sampled water projects from 2 UWASSA namely DAWASA and DUWASA had a cost variation of 30% beyond contract cost. Moreover, implementation of water projects from borehole sources in the visited LGAs, had increase in cost amounting to TZS 3.3 billion as detailed in **Table 7.5**.

Table 7. 4: Utilization of fund by LGA in implementing boreholes water supply projects

Name of the LGA/UWSSA	Number of boreholes contracts reviewed	Number of boreholes projects that exceeded the contract cost	Total Amount over utilised billion (TZS)	Average percentage excess from the original contract for the sampled contract (%age)
Longido DC	7	2	1.9	51
Lindi MC	10	3	0.9	22
Kilwa DC	2	1	0.2	21
Dodoma MC	11	5	0.2	18
Bariadi DC	6	1	0.1	12
Kinondoni MC	2	0	0	0
Temeke MC	10	0	0	0
Arusha CC	6	0	0	0
Tabora MC	2	0	0	0
Urambo DC	0	0	0	0
Songea MC	11	0	0	0
Tunduru DC	9	0	0	0
Meatu DC	3	0	0	0
Bahi DC	11	0	0	0
	91	12	3.3	13

***Source**: Auditors' analysis of the projects budget and implementation report*

Table 7.5 shows that for 91 reviewed boreholes contracts from 14 LGAs, 12 contracts equivalent to 13 % from 5 LGAs over utilized the budget to the tune of TZS 3.3 billion. The noted causes for increased contracts price was change of plan and design of water projects. Moreover, the reviewed water projects files revealed that there were delays in implementation of water projects which further led to increased contract costs due to increased material prices and interest and supervision cost of the consultants.

Consequences of inadequate utilization of available resources for provision of water supply and sewage services

(i) ***Low improvement of water and sewerage infrastructure***: In this regards the contribution of collected fund from charges and fees on improvement of sewage services was low due to using collected fund to activities which are not relating to provision of sewage services.

(ii) ***Risk of failure to implement water projects from boreholes sources***: in this regard, there is a risk of failure to implement water projects due to increased cost. Moreover, when implemented there is the risk of not having required fund timely.

CHAPTER EIGHT

COORDINATION AND MONITORING OF WATER AND SEWAGE SERVICES

8.1 Introduction

This chapter presents findings on coordination, monitoring and evaluation of activities in the provision of water and sewage services in the country.

The chapter is divided into three main parts namely inadequate coordination between stakeholders (section 8.2), monitoring of water and sewage activities (section 8.3) and monitoring of water resources (section 8.4).

8.2 Inadequate coordination between stakeholders

This section presents findings on the coordination between stakeholders on water and sanitation services. The findings are subdivided into coordination between Ministry of Water and PO-RALG (8.2.1), involvement of stakeholders in planning for water use (8.2.2), coordination between actors in water and sewage service activities (8.2.3), coordination between Basin Water Bodies and LGAs (8.2.4), reasons for inadequate coordination (8.2.5) and lastly consequences of inadequate coordination.

The National Water Policy of 2002 requires institutions responsible for water and sewerage service to develop a strong coordination and collaboration mechanism to enhance the effective provision of water and sewerage services in the country.

The audits reported that there was inadequate coordination at different levels of the government. This was manifested by inadequate cooperation among institutions responsible for water and sewerage services and insufficient involvement of different players and stakeholders in the provision of water and sewerage services in the country during the design, implementation and r operations. These are further discussed below:

8.2.1 Inadequate coordination between the Ministry of Water and PO-RALG

According to Section 5(c), (e) and 6(b), of Water Supply and Sanitation Act of 2009, the Ministry of Water and PO-RALG were required to coordinate planning and implementation activities in the provision of water and sewerage services including the installation of infrastructures and providing services after the installation of the infrastructural system.

The audit noted that there was inadequate coordination in the provision of sewage services due to lack of information sharing about planning and budgeting for sewerage services. It was further noted that PO-RALG and the Ministry of Water did not share information with regards to the performance of UWSSAs in the provision of sewerage services in the country.

8.2.2 Lack of stakeholders' involvement in planning for water use

Section 3.1(vi) of the National Water Policy 2002 requires the involvement of stakeholders in planning and making decisions on water use. Stakeholders who were supposed to be involved included Water User Association (WUA), NGOs, LGAs, Basin Water Boards (BWBs) and the concerned ministries.

However, the audit noted that Basin Water Boards (BWB) lacked plans for stakeholder's involvement in planning for water use contrary to the requirements of the National Water Policy of 2002, thus there was no involvement of stakeholders such as communities and LGAs in the process of planning for water use.
The audit highlighted that the stakeholder's involvement would be effective as part of the implementation of Integrated Water Resource Management and Development Plans (IWRMDP).

8.2.3 Inadequate Coordination between actors in Water and Sewerage Services activities

The National Water Sector Development Strategy (2006-2015) required LGAs to coordinate with UWSSAs on issues pertaining to physical planning and development of water and sewerage infrastructure.

The audit noted that UWSSAs and LGAs did not coordinate the implementation of activities regarding the provision of sewerage services which resulted into the destruction of sewer networks during the implementation of road construction projects.

The review of PO-RALG's and Ministry of Water's budgets revealed that there was ineffective budget coordination between the Ministry of Water and PO-RALG during the implementation of rural water projects. The two Ministries had two contradicting budgets on the same water projects as indicated on Table 8.1 below.

Table 8. 1: Budget for the Ministry of Water and PO-RALG for financial year 2017/18

Name of LGA	Budget submitted to PO-RALG (in million TZS)	Budget given by the Ministry of Water (in million TZS)
Singida DC	400	860
Manyoni DC	334	612
Mbulu DC	386	2,091
Kiteto DC	2885	708
Shinyanga DC	901	1,344
Kishapu DC	1,175	1,858
Morogoro DC	759	1,764
Mvomero DC	447	1,593
Lindi DC	224	1,310
Nachingwea DC	3,026	586
Sumbawanga DC	163	919
Nkasi DC	1,385	1,385

***Source**: Budget for two Ministries from Respective Local Government Authorities*

Table 8.1 shows that 11 out of 12 visited LGAs had two different budgets submitted to two Ministries. The budgets which were submitted to the Ministry of Water were always higher compared to the ones submitted to PO-RALG with except for Nkasi, Kiteto, and Nachingwea DCs.

The audit noted the lack of communication between the Ministry of Water and PO – RALG regarding the planned number of water projects to be implemented in rural areas. It was noted that the ineffective coordination of these two Ministries hindered the smooth execution of water projects and thus delayed execution of rural water projects for the period between 95 to 1299 days.

8.2.4 Inadequate Coordination between Basin Water Bodies and LGAs

According to section 16 (g) of the Water Resources Management Act, the Ministry of Water through its Directorate of Water Resources was required to supervise and co-ordinate the activities of Basin Water Boards and serve as a link or a channel of communication between these bodies and the Government. Also, Section 23(l) of the same Act required the Basin Water Boards to coordinate with other stakeholders such as LGAs and communities to serve as a channel of communication between the sectors.

The audit noted lack of information sharing between Basin Water Boards and LGAs. The audit reported that Basin Water Boards (BWB) lacked full support from LGAs and other communities which are the main actors and recipients of provided water and sewage services to ensure that water sources are maintained and protected.

8.2.5 Reasons for inadequate coordination between stakeholders

The following were the reasons for inadequate coordination among different stakeholders:

a) ***Inadequate information sharing due to different reporting structures***

The review of the reporting structures of LGAs and Basin Water Boards revealed that there was inadequate coordination between LGAs and the Ministry of Water due to different reporting channels. The LGAs report to the President's Office- Regional Administration and Local Government (PO-RALG) while the Basin Water Boards report directly to the Ministry of Water. The differences in reporting structure contributed to challenges in information sharing between LGAs, BWBs and the Ministry of Water which resulted in poor information flow among these key actors.

b) ***Lack of plans for the involvement of stakeholders in different stages of project implementations***

Through the reviewed plans of Basin Water Boards for the period of 2011/12 to 2015/16, the audit noted that Basin Water Boards didn't plan for involvement of stakeholders in planning for water resources contrary to the requirement of the National Water Policy of 2002. The Policy requires BWBs to involve stakeholders such as LGAs and communities in the planning for water use.

8.2.6 Consequences for inadequate coordination

The inadequate coordination among actors in the provision of water and sewerage service had several negative impacts as discussed below:

a) ***Conflict among water users***

The audit noted that inadequate coordination led to conflicts among resource users. For example, the review of the Pangani River Water Basin progress report revealed that there were conflicts between MUWASA and Kilema Kusini Project in Moshi, Longuoa Water Supply against other water users in Moshi, and users of Kiseiya Furrow against those of Nambala Furrow. These conflicts were about water use rights from the sources.

Similarly, the audit noted that there were conflicts between upstream and downstream users in Hai DC due to an irrigation scheme that was built without consultation between Hai DC and Pangani Basin Water Board.

b) *Destruction of sewer network during the implementation of construction projects*

The audit noted incidences of the destruction of sewer networks in various areas due to poor coordination among actors. The audit observed blockage of sewer systems at Kinyonga Street in Dodoma City which resulted from road construction work in that area. These indicated poor coordination between Dodoma City Council and DUWASA during the planning and implementation of road construction projects.

Similarly, the review of incidences Logbook of DAWASA indicated similar cases in Dar es Salaam whereby several cases of destruction of sewer networks due to construction projects which were taking place near sewer lines. This indicated that the Dar es Salaam City Council does not liaise with DAWASA when it comes to construction projects that could impact the sewer network.

Further, through the review of correspondences on the implementation of water projects, it was noted that there were changes for water pipelines and water points to pave way for road construction. The audit noted that this was the result of poor coordination between LGAs and the concerned Road Authorities namely TARURA and TANROADS. For example, there were changes in the route of water pipelines as a result of poor coordination between Kiteto DC and TARURA, which resulted to additional cost amounting to TZS 18 Million to the total project cost. This additional cost would have been avoided if TARURA and Kiteto DC were coordinated in the planning and implementation of their construction projects.

8.3 Monitoring of Water and Sewerage Services

This section presents findings on monitoring of activities on the provision of water and sewage services. The findings are subdivided into four main parts which are monitoring of water and sewerage services activities (section 8.3.1), technical supervision and audits (section 8.3.2), reasons for ineffective monitoring of water and sewerage activities (section 8.3.3) and consequences for inadequate monitoring and evaluation (section 8.3.4).

8. 3.1 Monitoring the implementation of activities for provision of Water and Sewerage Services

The Water Supply and Sanitation Act 2009 required the Ministry of Water and PO-RALG to develop plans and monitor the performance of UWSSAs and LGAs on the provision of water and sewage services in urban areas.

The audit noted that PO-RALG has not effectively monitored the performance of LGAs with regards to provision of onsite sewage services. Consequently, weak monitoring contributed to failure of PO-RALG to understand the extent at which LGAs were performing in the area of on-site sewerage service.

The reviews of monitoring reports revealed that monitoring was not adequately conducted by all actors such as LGAs, PO-RALG, and Ministry of Water during the implementation of rural water supply projects. The audit noted that the Ministry of Water only covered 25% of the required monitoring on rural Water Projects that were executed from 2013/14 to 2017/18.

Moreover, review of monitoring plans revealed that monitoring for the boreholes water projects was not adequately conducted by PO-RALG due to lack of sufficient performance indicators.

8.3.2 Inadequate Technical Supervision / Audits

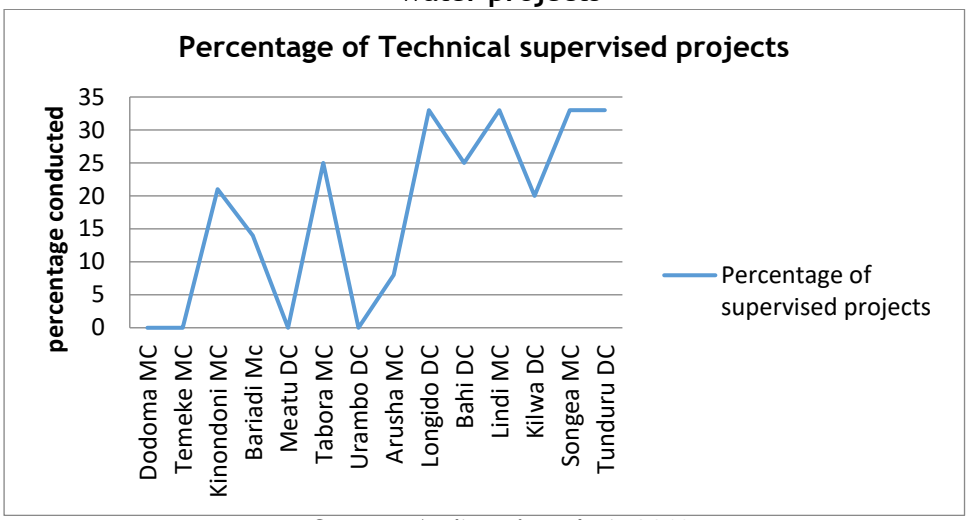
Technical supervision is important in order to ensure smooth progress of the water projects. According to WSDP (II), the Ministry of Water is supposed to conduct at least three rounds of technical audits visits for each water project.

Technical audits are normally done in the middle of implementation of projects to validate if the project implementations adhere to the agreed technical specifications of project deliverables. The performance audit on water supply from boreholes water projects reported that technical supervision audits were not conducted regularly by the Ministry of Water as was required.

The audit noted that there were inadequate technical supervisions carried out for the 80 boreholes water projects implemented by LGAs.

The audit analysis of the project files in the visited LGAs revealed that the Ministry of Water carried out only 12% of the required technical supervisions (audits) during implementation of boreholes water projects.

Figure 8. 1: Extent of technical supervision conducted on boreholes water projects



***Source**: Auditors' analysis 2019*

From **Figure *8.1*** it can be noted that the number of technical supervisions carried out ranged between 0 and 33%.

The impact of not conducting technical audits/ supervisions resulted into the failure to gauge and predict if the final output would have value for money. The other notable impact of not conducting enough technical supervision (audits) included poor executions of boreholes water supply projects and poor performance of boreholes water supply projects.

8.3.3 Reasons for ineffective monitoring of water and sewerage activities

The audits identified several factors which contributed to inadequate monitoring of activities of the provision of water and sewerage services. These factors included:

a) ***Lack of Monitoring Plans***

According to the National Water Policy of 2002, the Ministry of Water and PO-RALG are required to develop plans for monitoring of activities for the provision of water and sewerage services executed by LGAs and UWSSAs.

The audit noted that monitoring plans of the executed water projects were not adequately prepared at all levels of supervision of water projects such

as the Ministry of Water, PO-RALG, Regional Secretariats and LGAs during implementation of rural water supply projects.

For the provision of sewerage, the audit further noted, that PO-RALGs monitoring and evaluation plans had not integrated on-site sanitation services such as collection, transportation and disposal of sludge.

Similarly, the audit noted that due to failure of the Ministry of Water and PO-RALG to prepare plans, monitoring of the water projects was conducted in ad-hoc manner which negatively impacted the implementation of rural and urban water projects.

Consequently, it was noted that, the monitoring that were conducted by the Ministry of Water, PO-RALG and Regional Secretariats were found to be weak and not addressing critical issues necessary for successful implementation of activities on the provision of water and sewage services activities.

Further, the review of monitoring plans of PO-RALG revealed that, the plans did not cover the provision of onsite sanitation services such as collection; transportation and treatment of sewage. The plans focused on building onsite sanitation facilities such as latrines, toilets in the public institutions, schools and education on hygiene and sanitation.

b) *Lack of key performance indicators*

Performance indicators are key components of any monitoring and evaluation framework since they act as a benchmark for measuring the attainment of set targets or objectives. Thus, the Ministry of Water and PO-RALG were required to develop key indicators to measure the performance of UWSSAs and LGAs in the provision of water and sewerage services in their respective area of jurisdictions.

The audit noted that the Ministry of Water, PO-RALG and Regional Secretariats failed to develop key performance indicators to measure the level and status on the implementation of rural and urban water projects. The audit highlighted that the lack of indicators increased inefficiencies during monitoring and evaluation of rural water projects.

Similarly, the audit noted that Monitoring and Evaluation plans lacked indicators for measuring performance of LGAs in the provision of sewage services in urban areas which involved collection, transportation and disposal of faecal sludge.

Furthermore, the audit noted that the Ministry of Water used the Performance Benchmarking Guidelines for Water Supply and Sanitation Authorities (2014) to evaluate the performance of water and sanitation authorities. However, the analysis of the Key Performance Indicators revealed that they were linked to the provision of offsite sewage services, but silent about onsite sewerage services which are used by most Tanzanian citizens.

The audit also noted that through the use of these KPIs, EWURA had been evaluating performance of UWSSAs on annual basis. However, the targets set were far below the National Strategy for Growth and reduction of Poverty targets.

For the boreholes water projects, the audit noted through the review of monitoring plans of Ministry of Water that the performance indicators set for monitoring the provision of water projects were general for all projects. None of them was specifically for monitoring the progress of the implementation of boreholes water projects. This implies that, although boreholes water projects had unique features compared to other water projects, this phenomenon was not considered.

c) ***Ineffective communication of monitoring results to Stakeholders***

According to Section 5(f) and 26 (1), Water Supply and Sanitation Act of 2009, the Ministry of Water and PO-RALG were required to ensure that the monitoring results and recommendations issued are correctly reported to UWSSAs and LGAs for effective implementation.

The review of monitoring reports revealed that monitoring results were not adequately communicated to stakeholders at all levels. The audit noted that the Ministry of Water failed to issue written recommendations from its monitoring activities in all 12 sampled LGAs which consequently affected the LGAs ability to make follow ups on area noted to have weaknesses from monitoring and evaluation conducted by the Ministry.

Moreover, it was noted through the review of progress reports of PO-RALG, that LGAs and Regional Secretariats did not receive any recommendations with regards to monitoring and evaluation of onsite sanitation services from PO-RALG.

This situation made it difficult for PO-RALG to make follow ups on the level of implementation of water projects at Regional and LGAs levels.

d) ***Non-implementation of recommendations from monitoring activities***

The review of EWURAs' Annual Regional Water Report (2018) revealed that UWSSAs inadequately implemented the issued recommendations from the monitoring conducted by EWURA. The recommendations were regarding the need to increase the proportion of population connected to sewerage system and decreasing blockage of sewer-system.

Similarly, the Ministry of Water failed to provide written recommendations to the Regional Secretariats and LGAs regarding the provision of onsite sewage services. The recommendations could allow them to make follow ups with an intention of rectifying all noted weaknesses during the provision of sewage services in their respective LGAs.

Similarly, audit review of water test reports revealed that only 11 out of 20 issued recommendations regarding water quality were implemented by the respective LGAs.

The remaining 9 out of 20 issued recommendations that were not implemented are as indicated in **Appendix 7**.

The audit noted that the reason for none implementation were high costs involved in addressing those recommendations. For example, Singida and Nachingwea DCs failed to implement the recommendations which required them to use reverse osmosis for treatment of unsafe water due to high cost of implementing such a process.

e) ***No-follow up of recommendations issued during monitoring***

The audit noted that the Ministry of Water did not conduct adequate follow-ups of the noted weaknesses during monitoring.

The audit noted that the Ministry conducted follow-up through telephone communication with the Regional Secretariats on the noted weaknesses during the monitoring activities conducted in LGAs, and not through physical verifications on the level of implementation of the issued recommendations.

Furthermore, the audit noted that LGAs did not conduct follow-ups on the implementation of recommendations that were issued to the contractors and consultants during the implementation of various rural water supply projects.

Similarly, for the management of sewer networks the audit noted that the Ministry of Water failed to ensure that DAWASA implemented the monitoring

recommendations that were issued by EWURA. As a result, DAWASA continued to perform poorly in terms of complying with effluents standard, increasing accessibility to sewer network and reduction of sewer blockages.

f) *Ineffective system for capturing data for Monitoring and Evaluation*

According to Water Sector Development Strategy (2006-2025), Water Sector Management Information System (MIS) is the tool that was supposed to be used to monitor and evaluate the success of the implementation of Water Sector Development Projects. The water sector Management Information Systems (MISs) were supposed to be used to collect, store, analyze and disseminate information and data on the water sector sub-projects.

The audit noted through the review of the Water Sector Management Information system managed by the Ministry of Water that the system lacked the monitoring and evaluation component for boreholes water supply projects.

The review noted that the Management Information System (MIS) of the water sector is not integrated with the monitoring and evaluation function of the Ministry of Water. That hampered this constant updating of data on the physical progress of the water project, contract payments data and addenda, supervision and reporting on the implementation of boreholes water projects executed by the Ministry of Water.

The audit also noted that lack of M&E component in the MIS hampers the ability of the Ministry to capture information on the implementation and functioning of water projects using water sources.

Similarly, the audit noted that data in the Management Information System was not regularly updated by the LGAs due to the fact, some of the projects were initiated at the national level and LGAs lacked information to update.

8.3.4 Consequences of ineffective Monitoring of Water and Sewerage services activities

The audits identified several negative impacts which resulted from ineffective monitoring of water and sewerage services. The following were the consequences:

a) Implemented water projects failed to timely identify and rectify anomalies

The review of water projects files from the selected LGAs indicated that inadequate monitoring of water projects resulted in redesigning of water projects. For example, in Nkasi DC, 11 water supply projects were redesigned due to ineffective monitoring. The redesigning of the projects resulted in higher cost. Specific water projects that were redesigned in Nkasi DC resulted in cost increase from TZS 1.2 Billion to TZS 7.0 Billion. The Ministry of Water failed to identify the anomalies of differences in the contract cost which was higher than the Engineer's estimates due to poor monitoring.

b) *Delays in the completion of water projects*

The review of LGA's annual reports indicated that inadequate monitoring was among the factors that contributed to delays in the completion of rural and urban water projects. The audit noted that there were delays during the implementation of water projects as discussed in Chapter 5 of this report.

c) Cost overrun of projects

The audit noted that there were cost overruns as a result of lack of monitoring. This is following the fact that various issues that contributed to cost overrun were not monitored closely and ultimately contributed to cost overruns. The number of water projects that had cost overruns are indicated in ***Table 8.2***

Table 8. 2: Number of water projects with cost variations from visited LGAs

Financial year	Total Number of water projects implemented	Total Number of completed water projects	Number of water projects with cost overruns	Percentage of water projects with Cost overruns (%)
2013/14	66	37	16	24
2014/15	43	9	25	58
2015/16	31	9	14	45
2016/17	28	5	14	50
2017/18	46	7	9	20

Source: Reviewed Water Project Files from visited LGAs (2018)

Table 8.3 indicates that in the period from the financial year 2013/14 to 2017/18, more than one-third of the water projects experienced cost overruns. During the same period, the number of water projects which had

cost overruns was between 9 and 25 (equivalent to between 20% and 58%) of the total water projects implemented by LGAs.

d) Poor quality of completed water projects

The audit team made physical observations at various water projects and noted that there were leakages of water from water pipes and water tanks that were caused by insufficient supervision. For example, the audit noted that poor supervision during the implementation of the Didia water project in Shinyanga DC contributed to the poor workmanship which resulted into leakages. Also, use of construction materials that were not specified or using materials with low or inferior quality were noted as some of the factors for the poor quality of completed water projects mainly in rural and urban areas.

8.4 Monitoring of Water Resources

This section covers issue related to water resources monitoring such as monitoring of groundwater resources (Section 8.4.1), inspection of water sources (Section 8.4.2), follow-up and reporting of water resources (Section 8.4.3), reasons for inadequate monitoring of water resources (Section 8.4.4) and consequences of monitoring of water resource to determine actual abstraction levels, reports on the state of water sources (Section 8.4.5).

According to Integrated Water Resources Management and Development Plans (IWRMDP) water resource monitoring involves collecting regular time series data on water levels, water abstraction; and water quality.

Assessment of water quality trends in water sources in urban and rural water supply systems is paramount in quantifying levels of natural and human-induced contaminants for public health and ecosystem management interests. The conducted performance audits noted the following weaknesses with regards to water resources monitoring:

8.4.1 Ineffective Monitoring of Groundwater Resources

There is ineffective monitoring of groundwater resources to measure the quantity, abstraction level and quality of groundwater in all eight Basin Water Boards.

The audit review of Basin Water monitoring reports revealed that Basin Water Boards did not effectively conduct groundwater monitoring to measure the quantity of groundwater abstraction and groundwater quality. The audit noted that basin water bodies did not conduct regular monitoring.

The audit also noted that all Basin Water Boards either did not or rarely conduct groundwater monitoring. The audit noted that Lake Tanganyika and Lake Victoria Water Basins did not conduct groundwater level and groundwater abstraction levels.

Moreover, the review of LGAs annual reports revealed that in the visited LGAs groundwater monitoring was measured during the construction of the boreholes but after that, there were no routine monitoring to check changes in water quality, water levels and groundwater abstraction rate of drilled boreholes.

Moreover, through the review of annual inspection reports, Basin Water Boards (BWB) did not conduct sufficient inspections to ascertain water abstraction by clients in different sources which resulted into people abstracting water in unauthorized areas such as at upstream rivers.

8.4.2 Inadequate reporting and follow up on water resources

The National Water Policy of 2002 mandated Basin Water Boards to strengthen, enforce and follow up on existing legislations, regulations and operating rules governing Basin Water Boards. Similarly, Section 23 (o) of the Water Resources Management Act of 2009 requires Basin Water Boards to report on water resources in their Basins and submit that report to the Ministry of Water.

There was ineffective reporting on water levels. The review of monitoring reports of Basin Water Boards revealed that only 25% of the required reports were submitted during the period from 2011/12 to 2015/16. Similarly, the audit noted that no follow-ups were made to ensure that users with permits extract water in the amounts agreed.

8.4.3 Few Inspection of Water Sources by Basin Water Boards

According to Section 18(1) of the Water Resource Management Act of 2009, each Basin Water Board is required to appoint an authorized officer to carry out routine inspections of water uses.

The audit noted that inspections on water sources were not adequately conducted because Basin Water Boards only conducted 25% of the required inspections in water sources in the last five years.

8.4.4. Reasons for Inadequate Monitoring of Water Resources

The following were the reasons for inadequate monitoring of water resources in the country:

a) Insufficient groundwater monitoring stations

There were insufficient groundwater monitoring stations in the country. The review of Basin Water Boards annual reports noted that there were 80 groundwater monitoring stations out of the required 291 groundwater monitoring stations in the country. This implied that there was a deficit of 211 groundwater stations across all Basin Water Boards in the country as indicated in Table 8.3 below:

Table 8. 3: Availability of groundwater monitoring stations across Basin Water Boards

Name of the Basin Water Board	Number of required groundwater monitoring stations	Number of available groundwater monitoring stations	Deficit	Percentage missing
Lake Nyasa	10	0	10	100
Lake Rukwa	21	0	21	100
Lake Tanganyika	30	0	30	100
Lake Victoria	20	0	20	100
Pangani	50	10	40	80
Ruvuma	21	6	15	71
Internal Drainage	31	9	22	71
Ruvu	60	27	33	55
Wami Ruvu	48	28	20	42
Total	291	80	211	73

Source: Auditors' analysis of the data extracted from the BWBs annual reports

From **Table 8 4** it can be inferred that the country lacked 73% of the required 291 groundwater monitoring stations. Further analysis shows that the availability of groundwater differs across Basins Water Boards which ranged between 42% and 100%.

Similarly, the audit noted that contrary to the Integrated Water Resources Management Plans, 2014 which requires groundwater monitoring stations to be placed in high-risk areas, most of the stations were placed in low-risk areas.

b) Non-functioning of groundwater monitoring stations

Through the review of annual reports of Basin Water Boards, it was noted that the available groundwater monitoring stations in Water Basin were not adequately functioning. The audit noted that 51% of the available

groundwater monitoring stations in Basins was not functioning as indicated in Table 8.4:

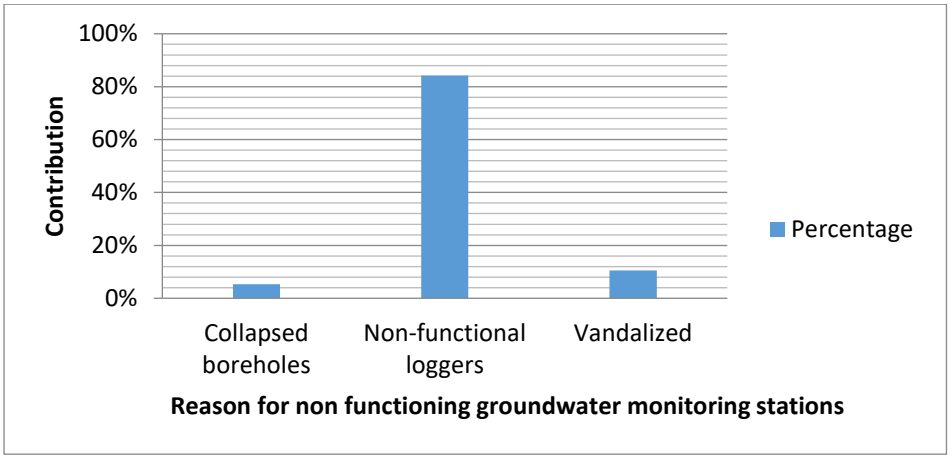
Table 8. 4: Status of the Present Ground Water Monitoring Stations

Name of the Basin Water Board	Number of the available	Number of working groundwater monitoring stations	Number of non-working stations	Percentage not working
Ruvuma	6	6	6	100
Ruvu	27	7	20	74
Wami Ruvu	28	18	10	36
Internal Drainage	9	6	3	33
Pangani	10	8	2	20
Total	80	45	41	51

Source: Auditors' analysis of the data extracted from the BWBs annual reports

Table 8.4 indicates that 41 out of 80 groundwater monitoring stations, equivalent to 51% of the available groundwater monitoring stations, were not working. The reasons for the non-functioning of groundwater monitoring stations are presented in Figure 8.2 below:

Figure 8. 2: Reasons for non-functioning of Groundwater monitoring stations



Source: *Auditors' analysis 2019*

From Figure 8.2 it can be deduced that the main reason for the non-functioning of groundwater monitoring stations was non-functional of loggers for automatic collection of groundwater data and information (84%). Other factors that were noted include vandalism on water stations (12%) and the collapse of monitoring boreholes (4%).

Moreover, through the review of Lake Victoria Basin annual reports, the audit noted that 10 out of the 12 groundwater monitoring station were not working since 2014. Further, 8 out of 18 weather stations installed in Lake Victoria Basin Water Board were not working.

c) Lack of water monitoring resources

The audits noted that one of the reasons for inadequate water resources monitoring was due to insufficient allocation of funds for its operations.

The analysis of financial reports of Basin Water Board noted that Basin Water Boards received only 13% of the required TZS 63 Billion for its activities. However, the audit review of Water Basin Boards annual reports revealed that they failed to collect around TZS 2.6 Billion debt from water users which could have helped them to cover the financial resource gap.

Similarly, the review of LGAs budgets for the past three years (2015/2016, 2016/2017 and 2017/2018) noted that there was no fund allocated for the monitoring of the groundwater quality which indicates that the LGAs did not prioritize this activity.

Further, through the review of human resources reports the audit noted that the sampled Basin Water Boards had only 48% of 639 required staff. Hence, they had a limited number of staff who could be deployed to manage the daily operations of groundwater monitoring stations.

8.4.5 Consequences of inadequate monitoring of water resources

The following were the consequences of the inadequate monitoring of water resources;

a) ***Increase in illegal water abstraction***

The reviews of Wami Basin Water Inspection reports revealed that there were illegal abstractions due to inadequate inspection for monitoring water resources. The audit noted that there were 2626 unregistered boreholes and 330 undefined boreholes as a result of poor inspections in water resources.

Similarly, the audit noted through physical observations that there was illegal water abstraction in the upstream of the Mgolole River leaving the downstream users without water. Further, the audit through physical observation at Pangani Water Basin Board found out that several water pumps were used to abstract water from different water sources illegally.

b) ***Unavailability of information on Groundwater Quality and Quantity***

The audit further noted that the quality of water from boreholes was low quality due to lack of appropriate and enough information on boreholes water sources. This resulted in boreholes that were drilled in areas that did not have sufficient water in terms of quality and quantity.

CHAPTER NINE

CONCLUSION

9.1 Introduction

This chapter presents conclusions drawn after a review and analysis of findings from five Performance Audit reports discussed in this report.

9.2 General Conclusion

We acknowledge efforts made by the government through Water Sector Development Programme I and II towards improving the provision of water supply and sanitation services and maintaining sustainable water sources. However, the Ministry of Water and President's Office – Regional Administration and Local Government Authority need to improve its strategies for implementation of water and sanitation interventions.

The audit concludes that, the government through Ministry of Water and PO-RALG has not effectively and efficiently ensured availability of clean water and sewage services through effective management of water projects and water sources.

This is because the Ministry of Water controls water abstraction and collects water fees from the authorized users. Similarly, 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.

Our audit noted that a very small percentage of the population served with water have access to sewer network.

9.3 Specific Conclusions

9.3.1 Inadequate access to clean and safe water services

The Ministry of Water and PO-RALG, through UWSSAs and LGAs respectively, do not adequately manage the provision of water supply in the communities. This is because only 58.7% of the population living in rural areas has access to adequate supply of clean and safe water. Inadequate access to water supply is attributed to the fact that several water projects had not been productive as they don't meet the demand of the population.

Insufficient quantity of water supplied to the communities is caused by the fact that water supply projects in some cases failed to achieve the intended

demands which is attributed to lack of hydrological surveys to determine quantity of water to be drawn from the sources before starting the implementation of the projects. Also, it is attributed to the MoW through BWBs not adequately controlling water abstraction in the country, as a result, there had been an increase in illegal abstraction.

9.3.2 Lack of access to sewage services

Provision of onsite and off-site sewer services has remained to be a challenge to the community, and this is because the Ministry of Water and PO-RALG have not assured proper access to sewage services to the communities. On average out of 73% of total population served with water, only 9% have access to sewer network, whereas 91% depends on Vacuum trucks for emptying their pit latrines and septic tanks. These contribute to pollution of the environment as most of them discharge untreated sewage to the receiving bodies especially during rainy season.

Significant amounts of the estimated generated faecal sludge are not collected and disposed off through the officially recognized waste water treatment plants/stabilization ponds. Furthermore, waste water treatment plants in most of UWSSAs were not working efficiently; as the effluent discharged to the environment do not meet the national effluent quality standards. Therefore, there is a 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 result in frequent blockages and collapses.

9.3.3 Inefficient procurement and contract management of water projects

Procurement and contract management of water projects executed both in rural and urban areas are not effectively implemented. This is simply because most of the water projects experienced huge delays in their completion while being characterized by cost increase and questionable quality. This is due to insufficient supervision of water projects done by the Ministry of Water, LGAs and UWSSAs.

9.3.4 Inadequate planning of resources for provision water supply and sewage services

The mechanisms of the Ministry of Water to ensure there is adequate funding for water supply and sewage is not working effectively. This was due to many incidences of late payments of raised certificates and completion of water projects.

This has implication on the overall cost of the water projects due to exposure to interest rate for late payment to contractors and consultants. Moreover, the costs for materials for delayed projects are subjected to price increase. In this regards the overall cost of the projects is likely to substantially increase.

9.3.5 Ineffective coordination and monitoring of the provision of water and sewerage services

MoW has failed to ensure that there is effective coordination between actors and stakeholders in water and sewerage services in the country. The sharing of information between BWBs and other actors is not smooth as there have been contradicting decisions between BWBs and other stakeholders such as Ministry of Water, LGAs and UWSSA. This is a result of different reporting structures between actors such as Basin Water Boards, UWSSAs and LGAs. Ineffective coordination attributed to occurrence of conflicts among water users and the destruction of water and sewerage infrastructures during the implementation of the construction of projects.

Moreover, the Ministry of Water does not have an effective monitoring mechanism to ensure that water and sewerage services are of required quality and quantity. This is because there are no plans and performance indicators for tracking the performance of providers of water and sewerage services in the country. This poor monitoring in turn led to poor quality, high cost and delayed completion of water projects.

Further, there are no risk-based inspections and water resource monitoring plans coupled with insufficient and obsolete water monitoring stations for monitoring of water resources in Basin Water Boards. This makes it difficult for Water Boards to have sufficient data for water quality, water quantity, and levels of abstraction of water across Basin Water Boards.

9.3.6 Inadequate Planning for water and sewage services

Planning for water and sewage projects has not been done adequately. This has contributed to several challenges such as delays in completion of water projects, cost overruns and impaired quality of water infrastructures.

This is attributed to inadequate feasibility studies in most of the water projects to establish conditions necessary for proper design and implementation of water projects.

The Ministry of Water and PO-RALG do not ensure that LGAs and UWSSAs conduct adequate soil and geological surveys prior to implementation of water projects. This caused LGAs to propose inappropriate pipes to be used in areas with rocks and excavation in rock areas not to be identified hence, contributing to delays and cost escalation due to rock blasting along the pipeline routes and change of specification of pipes passing through rock areas.

It was also revealed that there are inadequate hydrological and topographical surveys before the drilling of boreholes, which is caused by lack of in-depth technical review of hydrogeological and geophysical surveys.

Similarly, there are inadequate demand forecasting for water and sewage projects, it was indicated that there is a challenge in forecasting water demand to the available population in the respective area.

As a result, during implementation of water projects a number of beneficiaries who were not forecasted were added and this resulted into cost increment and delays in the completion of water projects which could be avoided.

There were problems in BOQ preparation which resulted into missing and underestimation of items and BoQs did not tally with drawings evidenced by differences between billed items and the quantities derived from drawings and site condition.

CHAPTER TEN

RECOMMENDATIONS

10.1 Introduction

The audit findings and conclusions from the analysis of the five performance audit reports on water sector indicated that there were areas for further improvement in the provision of water supply and sewage services.

This chapter therefore provides recommendation to the Ministry of Water and PO -RALG based on the conclusion made in respective of what should be done in order to address the identified weaknesses and improve areas of planning; resources allocation, procurement and contract management; coordination, monitoring and evaluation of activities for provision of water and sewage services.

10.2 Specific Recommendation to the Ministry of Water

The Ministry of Water should ensure that:

1. Feasibility studies for the intended water projects are thoroughly conducted to determine accurate information necessary for design and projection of water quantity and quality. This will minimize cost overruns of projects while at the same time meeting the demand of water for the desired population throughout the lifetime of the water projects;

2. It develops a functioning mechanism for reviewing feasibility studies, designs and Bill of Quantities of water and sewage projects to make sure that water and sewage projects are properly planned to minimize unnecessary cost overrun and delays;

3. It establishes and implement effective coordination mechanisms with clear roles and responsibility of each actor in the provision of water and sewerage services in the country;

4. In collaboration with PO-RALG develop long and short-term plans together with sustainable funding mechanisms for the provision of water supply projects and sewage services in the country;

5. UWSSAs develop a well-established model for allocation of financial resources between water supply and sanitation services in order to cater for both hardware and software requirements for water projects including on-site and off-site sewage services;

6. In collaboration with PO-RALG implementers of water and sewage services are staffed with required professions and equipped with all necessary equipment required for fulfilling their roles:

7. In collaboration with PO-RALG Procuring Entities are capacitated to prepare and review tender documents, evaluation reports and contract documents for water projects prior to awarding the contracts in order to avoid engaging unqualified contractors;

8. Before engaging in the implementation of contracts, there is adequate financial resources sufficiently to effectively execute the project, so as to address problems associated with delay in paying contractors;

9. It strengthens monitoring mechanisms for water and sewerage services from LGAs to a higher level through the development of effective implementation with regards to time, cost and quality;

10. Monitoring and evaluation plans with key performance indicators for measuring the provision of water and sewerage services are developed and effectively implemented;

11. There are mechanisms for follow up on the implementation of recommendations after monitoring of water and sewerage services activities;

12. It develops and implement a risk-based water resources monitoring regime;

13. Basin Water Boards and Urban Water Supply and Sanitation Authorities effectively collect user fees and charges for the provided services. Use the collected fees and charges on activities related to provision of water supply and sewage services such as wastewater treatment plants and Waste Stabilization Ponds among others;

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

15. 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;

16. In collaboration with PO-RALG, LGAs put in place strategies for ensuring effective removal of fecal sludge from communities' on-site sanitation systems; and

17. It develops mechanisms for involving private sector in the provision of sewage services in urban areas.

APPENDICES

Appendix 1: Design problems reported

This part provides details of projects which had noted weaknesses in the design

Name of LGA	Name of water projects	Noted weaknesses on design	Additional cost (TZS)
Kiteto DC	Kaloleni water project	The slab of 200mm thickness which require bottom and top reinforcement had bottom reinforcement only	-
Morogoro DC	Kifindike water project	Poor location of water intake leading to lack of supply of water	-
Shinyanga DC	Mwamadilana water project	Pressure reducing valve which has no capacity to meet intended plan of water supply from 25 bar to 5.4 bar to be 25 bar to 12 bar. Change of tank location	60,500,000
Mkalama DC	Gumanya water supply	2 DPs out of 8 with distribution network were operating with low pressure while others were not operating by December,2016	-
Simanjiro DC	Olichornyori Water Supply Project	Project need Booster pump to be able to deliver water at the position of storage tank.	-
Mbulu DC	Dongobesh Water Supply Project	Bursting of pipes due to high pressure to some areas	-
	Hydom water projects	Lack of stop valves which causes some difficulties when technician need to do some maintenance in case of any breakage	-
Morogoro DC	Kifindike water project	Poor location of water intake leading to lack of supply of water Poor location of the water tank	-
	Kiziwa water project	Lack of top slab of water treatment plant and up-flow rapid filter earthwork which later on was introduced	-

Name of LGA	Name of water projects	Noted weaknesses on design	Additional cost (TZS)
		Lack of Top slab in the contract B.O.Q which due to site condition had to be constructed.	7,132,550
Mvomero DC	The construction of Water supply and Civil work for Mlali-Kipera villages	Inadequate conditional survey on the existing pipe. This was because most of the distribution pipes have been damaged and needed to be replaced	45,682,000
	The construction of water supply civil work for kwadoli villages	Inadequate design of the intake which was damaged due to floods and depth which was destroyed by the flood	11,900,000
Sumbawanga DC	The construction of Laela group water supply project.	Changes in Kamnyalile tank location to Mountain area. Also the following reported to be added which are Bitumen application, Damp Proof course to foundation, Construction of chambers to DPs, Columns and beams, reinforcement for foundation, hardcore bed to intake, Installation of air valve and washout chamber along Kachena intake to Mpembano storage tank.	32,330,000
Nkasi DC	Construction of water supply project and civil works for Mfinga Village.	Design problem of not including columns at the centre of Tank slab, ring beam and cross beams.	15,900,000
Lindi DC	Construction of Gravity flow system for King'ombe Village	Design review which led to change of gravity main pipes from OD 110mm to 160mm.	-
	Construction of Borehole pumped	Construction of water tank 50 cubic metres, pump house, supplying and installation of	101,956,637

Name of LGA	Name of water projects	Noted weaknesses on design	Additional cost (TZS)
	scheme, Supply and Installation of Submersible pump, Generator and rain water harvest System for Hingawali Village	new electromechanical equipment and power plant[21].	
Total additional cost			**275,401,187**

Source: Contract addenda and Variation Orders

[21] *Variation order no.1*

Appendix 2: Noted weaknesses in BoQs from the implemented water projects

This part provides details of projects which had weaknesses in the Bills of quantities and their effects

Name of LGA	Name of water project	Noted weakness in BoQs and its effects
Mbulu DC	Singu water project	• BoQs showed that the tank to be constructed was ground tank while the drawing showed the elevated tank • This led to addendum amounting to TZS 56,017,150 in order to construct elevated water tank as per drawing
	Hydom water project	• There was unrealistic distance provided in the BoQs to the real distance of the location of the transformer for supply of electricity, the distance shown in BoQs was 1.2 km while the actual distance as per TANESCO survey was 2.4 km • Approval of addition cost amounting to TZS 32,008,557 to cover the real distance
Kiteto DC	Kaloleni water project	• There was underestimation of 507kg of reinforcement in BoQs which was shown on drawing of Kaloleni water projects • There was an increase of cost amounting to TZS 1,774,500
Shinyanga DC	Mwakitolyo water project	• There was addition of 821m raising main pipe (PN 16 HDPE 160 MM), the BoQs indicated fewer than actual requirement. • There was approval of variation order no. 2 amounting to TZS 67, 226,788
	Didia water project	***Costing item twice in the BoQs*** • Excavate for and construct proposed 90m3 (20,000gallons) reinforced circular storage tank on 6m raiser as per MoW modified TY/TA/40 drawing, the amount which was entered twice are TZS 20 and 33 million respectively for the same item • Construction of Diesel and Electrical Pump House and Fencing as per drawings. The amount which was entered twice are TZS 28 and 29 million respectively for the same item
Morogoro DC	Kiziwa water project	***Costing item twice in the BoQs*** • Foundation slab concrete mix amounting to TZS 1,960,000

Name of LGA	Name of water project	Noted weakness in BoQs and its effects
		• Bottom floor slab concrete amounting TZS 3,840,000 Basically the above two items are the same and during payment they only paid for one item, its impact is that it increased contract cost unnecessarily
		Hardcore laying was not quantified before and later on it was quantified and paid
		Costing item twice in the BoQs • Supply materials and construct water points as per drawings No. 13 including all fittings, lockable valve chambers, stop valves in the chambers and plumbing works amounting to TZS 52,000,000 • Supply materials and construct lockable valve chambers as per drawing No. 06A-06C amounting to TZS 24,700,000 The latter item is within the first item, the two items were paid as well leading to unnecessary payment and wastage of government money
Morogoro DC	The construction of gravity flow piped scheme for Fulwe village	Less quantity in BoQs than the actual quantity of 100 PN10 HDPE Pipe and 32PN 10 HDPE Pipe. Also, Pipelines anchor blocks in valley and rivers were excluded in the BoQs. All these item resulted to additional cost amounting to TZS 121,411,650. But, after changing use of section in the contract the net addition was TZS 34,504,325.
	The construction of gravity flow piped scheme for Kibwaya village.	Missing of quantity in contract BoQs item 2.4.2 were after inserting the quantity leading to additional cost of TZS 2,000,000 and Using contract BoQs with errors especially for Item 3.2.12 and 5.4 which after rectification leads to additional cost amounting to TZS 5,490,000
Mvomero DC	The Construction of Water supply Civil work for Kwadoli villages	Missing of external plastering to ferro cement tank, Hardwood for supporting PVC gutters, excavation of extended washout, External painting to ferro cement tank and air vent. Also there was less quantity for floor screed in contract BoQs ferro cement tank than actual. All these lead to additional cost amounting to TZS 1,495,000
Sumbawanga DC	Construction of laela group Water supply	Missing of finishes to tank floor (cement/and Sand screed 1:3 ratio to tank floors) which lead to additional cost amounting to TZS 2,580,000

Name of LGA	Name of water project	Noted weakness in BoQs and its effects
	project Phase I	
Lindi DC	Construction of Borehole pumped scheme, Supply and Installation of Submersible pump, Generator and rain water harvest System for Hingawali Village	Missing of items in the BoQs which are: a) Sump well, Plastering, Excavation of foundation trench exceeding 3m deep, Hardcore surrounding the tank, Backfilling and Restating the excavated area b) Site clearance for pipeline route c) Riser Tank 75m^3, Backfilling of foundation, Cart away excavated materials, internal plastering for risers, Cement screed for floor, Formwork for roof slab and lintels, Reinforcement for lintels, Bituminous materials, and concrete for Blinding, floor, Intermediate lintels. d) Filling of foundation footing with selected sand for Pump house All the above lead to additional cost amounting to TZS 76,619,500/=
	Construction of Borehole pumped Pipe scheme for Litipu, Nahukahuka and Nyangamara Villages	Site clearance was missing in the BoQs which lead to additional costs of TZS 53,010,000/=
		Fittings were missing which lead to additional cost amounting to TZS 49,247,729
Nachingwea DC	Construction of Borehole pumped scheme for Namangale Village	Quantity shown on B.O.Q was less than actual quantity which lead to additional cost amounting to TZS 51,410,921.

***Source**: Contract information from projects implemented by 12 Visited LGAs (2018)*

Appendix 3: Extent of Post Qualification of Bidders across LGAs

This part provides details for Post Qualification of bidders across LGAs for selected water projects.

Name of the LGA/UWSSA	Number of Contracts	Post qualification (conducted/not conducted)
Dodoma MC	One contract to drill 10 boreholes	Not conducted
Bahi DC	2 contracts for drilling and installation of water network	Not conducted
Longido DC	2 contracts for drilling and installation of water network	Conducted
Arusha MC	2 contracts for drilling and installation of water network	Not conducted
Tabora MC	2 contracts for drilling and installation of water network	Not conducted
Urambo DC	2 contracts for drilling and installation of water network	Not conducted
Bariadi DC	3 contracts for drilling and installation of water network	Conducted for one contract
Meatu DC	2 contracts for drilling and installation of water network	Not conducted
Kinondoni MC	3 contracts to drill 10 boreholes	Not conducted
Temeke MC	2 contracts for drilling and installation of water network	Not conducted
Songea MC	1 contract for drilling exploratory and productive boreholes for water supply including civil works and installation of pumps	Not conducted
Tunduru DC	2 contracts for building distribution network	Not conducted
Lindi MC	9 contracts for drilling exploratory and productive boreholes, pump testing and development of productive boreholes	Not conducted
Kilwa DC	2 contracts for drilling exploratory and productive boreholes and construction of distribution network	Not conducted
UWSSAs		
DAWASSA	1 Contract for Kimbiji and Mpera projects	Not conducted
DUWASA	Single source contract to DDCA	n/a
AUWSA	3 contracts to drill 41 boreholes	Conducted

***Source**: Auditors' analysis of the information extracted from projects file contract document, 2019*

Appendix 4: Water project and reasons for variations of costs

This part provides details for variations of cost in water projects

Name of LGA	Name of Water Project	Cost (Mill. TZS)	Reason for scope increased
Mbulu	Pumped water scheme for Haydom village	4.5	Increase in fence size from 15X15m to 30X30m at main tank area in order to accommodate old tank.
		2.2	Water meter installation to community water projects
		1.9	Reserve PVC 280mm of 17.4m long pipe for Maintenance
Singida	Laghanida project	15.1	Increase in Tank height from 6m to 9m
	Construction of water supply at Sefunga village	7.6	Addition of toilet
	Itaja water project	8.5	Addition of toilet
Shinyanga	Construction of water Supply Civil works For Mwamadilanha Village	60.5	Increase in raising main pipe and change in their specifications due to changes in Tank location.
	Construction of water Supply Civil works For Didia Village	24.5	Addition of water supply to Chembeli and Bukumbi villages where water infrastructure pass.
Morogoro DC	The construction of gravity flow piped scheme for Fulwe village	195.3	Addendum for Construction of new water project in Bamba village in order to avoid conflict as the source of water for Fulwe project is in Bamba village.
		9.8	Rehabilitation of existing Tank
	The construction of gravity flow piped scheme for Kibwaya village.	16.5	Construction of break pressure Tank, Additional water point including water meter from 13nr to 15nr, Increase of OD 25 HDPE PN 10 from 58m to 463m, Increase of OD 32 HDPE PN 10 from 2262m to 2412m,

Name of LGA	Name of Water Project	Cost (Mill. TZS)	Reason for scope increased
Lindi DC	Construction of Borehole pumped scheme for Namangale Village	175.5	Change of water source from borehole to spring water. This resulted in additional pipes and their fittings for about 8892m, one Weir and 2 DPs
	Construction of Borehole pumped scheme, Supply and Installation of Submersible pump, Generator and rain water harvest System for Hingawali Village	101.5	Construction of water tank 50 cubic metres, pump house, supplying and installation of new electromechanical equipment and power plant
Nachingwea DC	Construction of borehole pumped Piped scheme for nditi village and completion of pumped piped scheme at Mneromiembeni	13.1	Construction of pump house at Mneromiembeni, fencing at water source and completion of laying pipe of work that was done by DC and not completed.
Sumbawanga DC	Construction of water supply project and civil works for Mfinga Village.	4.2	Additional of 2 DPs and its components
Nkasi DC	Construction of water supply scheme at Mpasa Village.	1,248.4	Addendum No. 1
	Construction of Piped Water Supply scheme for Isale villages	2,466.7	Additional work and villages as per report from Rukwa's Regional Secretariat after design review
	Construction of piped water supply scheme at kamwanda Village phase II	7,136.5	Addendum No. 1 dated 29 June 2017 which increased the scope of work by increasing a number of villages and changing sources of water from Lake Tanganyika to River Lwafi
Total Cost		13,072.1	

Source: *Respective Local Government Authorities*

Appendix 5: Water Projects with noted weaknesses

This part provides details of projects which had quality weaknesses

Name of LGA	Name of water projects	Weaknesses observed
Manyoni DC	Londoni water project	Frequent bursting of water pipes for extended water line to cattle troughs and mineral extractive industry
Mbulu DC	Haydom water project	Leakage of water from newly constructed water tank Removal of defective control panel for motor which pump water from booster tank to the main tank Bursting of main water pipes leading to floods Using stick instead of air valve Lack of markers to risk areas where pipes lines pass
Shinyanga DC	Mwanamadilanh a water projects	2 DP provide water with low pressure and 1 DP does not supply water.
Kiteto DC	Dosidosi water project	Water tank had no cover which poses the risk of pollution of water
Morogoro DC	Fulwe water project	Water tank has no cover to protect water in it. Water chamber and its pipe were not covered
	Gwata water project	Establishment of water infrastructure since 2016 without water supply Impaired domestic points as it is not working since its construction
	Kifindike water project	Poor design of water intake Implementation of water infrastructure without assurance of water from intake
Mvomero DC	Kwadoli water project	Poor design of water pipes Pipes were washed away by river water Location of the tank do not allow water to reach all villages
	Kigugu water project	Serious economic activities at water intake Poor design of water intake, periodically washed by river water
	Mlali Kipera	Salty water Serious leakage of water from pipes which supply water to the community, no action taken The available water infrastructures are only efficiently supplying water during the rainy season

Name of LGA	Name of water projects	Weaknesses observed
Sumbawanga DC	Mfinga water project	The project is not working due to sand at water source
	Zimba water project	Using HDPE pipes instead of GSP pipes
	Solola water project	Bursting of pipes Malfunctioning of water taps
Nkasi DC	Kabwe water project	Water tank has no cover to protect the water in it.
	Isale water project	Pipes were not covered up due to trenches being shallow, less than one meter deep.
Lindi DC	Hingawali	The project is not functioning Bursting of pipes Cracks to the water pump house
	Nyamangala/Litipu/Nahukahuka water project	The pipe was leaking at water source, but no actions was taken Water was leaking from the tank-Nangamala Water was leaking from the tank-Litipu
Nachingwea DC	Chiola water project	The project was not working Generator was not functioning
	Lipuyu water project	The project was not working The community failed to run the project due to high running cost
Singida DC	Pohama Water Supply project	Leakage of water in the rising main and absence of non-return valve in the rising main.
Mkalama DC	Gumanga water supply project	Leakage of water in the Water Storage Tank
		2 DPs out of 8 with distribution network were operating with low pressure while others were not operating by December,2016
	Kikhonda Water Supply Project	Lack of water supply due to bursting of pipes and joints which allows leakages of water.
		No Water services at Mbigigi Sub – village due to elevation of the village being higher compared to elevation of the tank
Ikungi DC	Sepuka W/S project	Leakage of water in the rising main
Simanjro DC	Olichornyori Water Supply Project	Project need Booster pump to be able to get water at the position of Storage Tank.
Mbulu DC	Dongobesh Water Supply Project	Bursting of pipes due to high pressure to some areas

Name of LGA	Name of water projects	Weaknesses observed
	Hydom water project	Water tank leakage
	Tumati-Mongahay	Some of the construction material including concrete blocks were not of good quality.
	Massieda water project	Bursting of pipe immediately after the project was handed over to the community due to low quality.
Sumbawanga DC	Matai water project	There was notably improper design of water tank whereby its walls were not reinforced and at the bottom and top part of the tank
Nkasi DC	Mpasa water project	The trench for water pipes was not one meter below the ground in some areas
Lindi DC	Hingawali water project	Water not reaching water tank due to poor design

Source: *Auditors' observation during site visits (2018)*

Appendix 6: Number of delayed contracts for water projects in visited LGAs

This part provides details of projects which delayed to be completed

Name of LGA	Number of delayed contracts of water projects
Morogoro DC	5
Singida DC	5
Mvomero DC	5
Kishapu DC	5
Mnyoni DC	2
Kiteto DC	5
Nachingwea DC	3
Shinyanga DC	5
Nkasi DC	5
Sumbawanga Dc	5
Mbulu DC	5
Lindi DC	3
Dodoma CC	10
Longido DC	9
Arusha MC	6
Tabora MC	3
Lindi MC	3
Bariadi DC	7
Kinondoni MC	1
Temeke MC	7
Bahi DC	6
Songea MC	1
Kilwa DC	1

Source: *Auditors' analysis of payment data from 12 visited LGAs (2018)*

Appendix 7: Analysis on implementation status of recommendations for Water test report

This part provides the analysis on the implementation status of recommendations for water test

Name of Water Project	Recommendation issued	Actions taken
Hydrological and Geophysical survey, Drilling, Development, Pumping test and capping of nine productive boreholes, specific on sanza borehole	Water is alkaline with high contents of chloride, total dissolved salt, solids, Magnesium and Hardness Water is acceptable for domestic use but not for human consumption (for drinking)	DWE was not aware of the recommendation, he promised the audit team to consult Internal Drainage Basin-Singida on how to handle the situation while all the activities were stopped.
Mtinko borehole	Water is very hard Reverse Osmosis or Ion – exchange desalination technique is needed to reduce the hardness	They were proceeding with the project and promised to consult water basin authority for advice.
Ngamu borehole	Water is very hard and saline Reverse Osmosis or Ion – exchange desalination technique is needed to reduce the hardness	Promised to consult water basin authority for advice on the matter.
Yaeda chini-Basodom	Slightly alkaline and hard water Water should be treated by calcium hypochlorite before installation of pump so as to be suitable for domestic use	All boreholes were drilled by development partners through TAG church, DWE's office promised to communicate to development partners to know what actions were taken as per given recommendations
Yaeda chini-Giduru	Slightly alkaline with elevated turbidity and color Water should be treated before supplied to consumer in order to reduce turbility and color	
Eshkesh village	Desalination of drinking and cooking water is recommended	
Domanga village-borehole	Concentration of fluoride is slightly high Defluoridation of both drinking and cooking water is recommended	

Name of Water Project	Recommendation issued	Actions taken
Eseki village borehole	Water is alkaline and very hard with high contents of Nitrate, hardness, chloride, calcium, magnesium and Potassium above the Tanzanian Domestic water standard Water is not acceptable for domestic use	No response from DWE up to the issue of this report
Namangale borehole	Water from the source was very high with turbidity, manganese, magnesium, calcium and sulphate, Source should be pumped for 72 hrs and sample should be rechecked before use, Water needs to be disinfected by calcium hypochlorite and boiled before drinking	The LGA used another source-Mihima spring which was not tested
Kiwawa borehole	Water is saline and hard, bacteriologically water does not meet the standard Not suitable for domestic use unless treated for salinity and hardness removal and disinfected to kill the bacteria	The Borehole has been abandoned
Kiwawa old shallow well	Water is very hard with high calcium, color, turbidity, iron and manganese Water should be aerated in order to reduce the concentration of manganese and iron	The borehole has been abandoned
Nyangamara borehole	The water from this source has high concentration of iron Water should be aerated to reduce the iron concentration followed by addition of lime water to rise pH.	This is the old source, the source was abandoned, currently Chemchem village is used as the source but it's water was not tested
Namkongo borehole	Water from this entire source is very hard with high concentration of electrical conductivity, calcium, manganese, and Chloride	The community was advised to boil water while water was pumped and aerated to the water tank

Name of Water Project	Recommendation issued	Actions taken
Construction of borehole pumped scheme for mituguru village	• All parameters analysed except iron are acceptable for domestic water quality • Iron can be reduced by aeration/ when water is disinfected by chlorine	No response from Nachingwea DC up to the date of this report
Construction of borehole pumped scheme for nditi and completion of pumped scheme at Mnero miembeni as per BOQ at Nachingwea	• Water has high concentration of manganese and turbidity • Aeration process is needed to reduce the amount of manganese and filtration is needed to reduce turbidity	No response from Nachingwea DC up to the date of this report
Construction of borehole pumped scheme for chiola village	• Water is permanently hard and saline due to presence of Magnesium chloride and Magnesium Sulphate • Water is not suitable for domestic use	Reverse Osmosis Plant. The plant was installed but not operational
Construction of borehole pumped piped scheme fitted pumped wit for farm 8 village	• Water is saline due to presence of high value of chloride which makes off taste of the water • Its saline is 376mg/l NaCl	No response from Nachingwea DC up to the date of this report
Construction of borehole pumped piped scheme for lipuyu village	• Water is permanently hard and saline due to presence of Magnesium chloride and Magnesium Sulphate • Water is not suitable for domestic use	Reverse Osmosis Plant. The plant was installed but not operational

Source: Auditors' analysis 2019