



**REGIONAL BENCHMARKING OF  
WATER SUPPLY AND SANITATION UTILITIES**

**2020/2021 REPORT**



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## FOREWORD

The practice of WSS regulation is gaining ground in Africa. From several continental and global efforts, there is strong advocacy for implementing WSS regulation within countries. Ongoing water sector reforms have resulted in a significant rethink of the policy, legal and institutional landscape in many countries, with a number of countries instituting regulation/monitoring oversight for WSS.

The Eastern and Southern Africa Water and Sanitation (ESAWAS) Regulators Association is a network of water supply and sanitation regulators. Since its formation, ESAWAS has continued to grow in terms of membership and activities. From an original membership of five at inception in 2009, the current membership has doubled to ten. In the recent past, ESAWAS has gained high recognition for its work regionally, Africa-wide and internationally with growing demand for engagement, partnerships and information sharing initiatives

ESAWAS believes that benchmarking across and beyond the region strongly contributes to improvement in performance and provides the Utilities with a learning opportunity of good practices that others may be implementing. It also enhances regional cooperation and development by promoting formulation of harmonised standards and approaches for adoption and adaptation to country contexts. Going forward, the Association will enhance the benchmarking exercise with the use of more robust ICT tools to expand participation both in number of Utilities and indicators being used. Of particular note will be the introduction of more comprehensive sanitation indicators that cover non-sewered sanitation services.

The current reporting period coincides with the last phase of implementing ESAWAS' 3<sup>rd</sup> Strategic Plan for the period 2019 to 2021. Despite restrictions imposed by the impact of the Covid-19 pandemic, it ignited new initiatives and creativity in achieving work targets. Thus, ESAWAS achieved more than 80% of its intended activities, overall.

Looking ahead to the next three years spanning 2022-2024, ESAWAS under its 4<sup>th</sup> Strategic Plan will focus on the following key strategic objectives:

- **Promote and support effective WSS Regulation** - *provide technical assistance and advocacy continent-wide in support of effective WSS regulation which is still weak across countries with uncondusive regulatory environment, limited operationalisation of regulatory frameworks, regulatory tools, and instruments, as well as, guidelines and standards.*
- **Become a global knowledge hub on WSS regulation** – *repository for gathering, documenting and disseminating evidence-based WSS regulation knowledge, globally.*
- **Strengthen and expand the Africa continental reach of ESAWAS** - *raise exposure, visibility and influence continent-wide through various avenues to support efforts towards regulation implementation and replication.*
- **Improve internal operations of the Association** - *transition to a fully-fledged, sustainable Secretariat.*

With this trajectory, ESAWAS is confident of achieving its renewed vision '**To be a global leader in promoting effective and innovative regulation of water supply and sanitation services**'.

## ABBREVIATIONS/ ACRONYMS

AdeM	Águas da Região de Maputo
ADERASA	Association of Regulators of Water and Sanitation of the Americas
AFUR	African Forum for Utility Regulators
AfWA	African Water Association
AGM	Annual General Meeting
AMCOW	African Ministers' Council on Water
AREEN	Autorité de Régulation des secteurs de l'Eau potable et de l'Energie
AURA	Autoridade Reguladora de Águas, Instituto Público
BMGF	Bill and Melinda Gates Foundation
CRIDF	Climate Resilient Infrastructure Development Facility
DAWASA	Dar es Salaam Water and Sewerage Authority
ESAWAS	Eastern and Southern Africa Water and Sanitation
EWURA	Energy and Water Utilities Regulatory Authority
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IBNET	International Benchmarking Network
IWA	International Water Association
KPI	Key Performance Indicators
LWSC	Lusaka Water and Sanitation Company
LEWA	Lesotho Electricity and Water Authority
NCW&SC	Nairobi City Water and Sewerage Company
NSS	Non-Sewered Sanitation
NRW	Non-Revenue Water
NWASCO	National Water Supply and Sanitation Council
NWSC	National Water and Sewerage Corporation
REGIDESO	Régie de Production et de Distribution d'Eau et d'électricité
RWSS	Rural Water Supply and Sanitation
RURA	Rwanda Utilities Regulatory Authority
SDGs	Sustainable Development Goals
TeCRI	Technical Committee on Regulation Issues
UN	United Nations
WASAC	Water and Sanitation Corporation
WASCO	Water and Sewerage Company
WASREB	Water Services Regulatory Board
WIN	Water Integrity Network
WSS	Water Supply and Sanitation
WSUP	Water and Sanitation for the Urban Poor
WUPI	Water Utility Performance Index
WURD	Water Utility Regulation Department
ZAWA	Zanzibar Water Authority
ZURA	Zanzibar Utilities Regulatory Authority

## EXECUTIVE SUMMARY

Regional benchmarking presents a platform by which Utilities that tend to have no peer in-country can be compared to similar sized Utilities in other countries within the region. The results of the benchmarking exercise are therefore intended to serve as a support tool to regulators and sector actors to identify strengths and weaknesses within the Utilities and areas for improvements and interventions, as well as motivate uptake of good practices towards improved service delivery.

ESAWAS has been conducting the benchmarking exercise since 2013/2014 and the current report presents the results of the 7<sup>th</sup> edition for the reporting period 2020/2021. The number of participating Utilities dropped from ten to nine. These are Nairobi City Water and Sewerage Company (NCW&SC) of Kenya; Lusaka Water and Sanitation Company (LWSC) of Zambia; Dar Es Salaam Water Supply and Sanitation Authority (DAWASA) of Tanzania; Águas da Região de Maputo (AdeM) of Mozambique; Water and Sewerage Company (WASCO) of Lesotho; Water and Sanitation Corporation Limited (WASAC) of Rwanda; Zanzibar Water Authority (ZAWA) of Zanzibar; National Water and Sewerage Corporation (NWSC) of Uganda; and Lilongwe Water Board (LWB) of Malawi. The Régie de Production et de Distribution d'Eau et d'électricité (REGIDESO) of Burundi did not submit data for two consecutive years due to reporting challenges and thus was excluded. This raises the need for regulators and sector actors to invest in data infrastructure for sector monitoring and tracking.

This report has seven chapters summarising the performance of the Association and utility benchmarking in the period under review. Chapter 1 presents an overview of the ESAWAS Regulators Association; Chapter 2 highlights the performance of the Association on the implementation of the third Strategic Plan (2019 to 2021), while Chapter 3 looks at the focus for the next three years. Chapter 4 describes the regional benchmarking framework and presents the various indicators used for benchmarking while Chapter 5 presents the comparative performance analysis of the Utilities on the various indicators. Chapter 6 introduces a performance trend analysis covering 5 years and the report ends with Chapter 7 on the main conclusions and recommendations of the benchmarking exercise.

In summary, ESAWAS achieved most of its objectives during the implementation of the 2019-21 Strategic Plan. Notable achievements included the development of a Regulatory Framework and Strategy for Inclusive Urban Sanitation Services with associated tools to guide its implementation. An Organisational Structure, Business Revenue Model and Growth Strategy for the Association were developed as part of strengthening the capacity and sustainability of ESAWAS.

With respect to Utility Benchmarking, there was minimal change in average performance, generally. There was an overall improvement in the **Quality of Service** indicators with averages for Water Service Coverage at 78.5% from 76.9%, Sewerage Service Coverage at 20% from 19% and Hours of Supply at 17 from 16. However, Water Quality dropped from 97.5 to 96%. Utilities need a more holistic picture of sanitation services by incorporating non-sewered sanitation. For **Economic Efficiency**, improvements were recorded in O&M Cost Coverage by Billing from 104% to 118% and Collection Efficiency from 96% to 97%. However, there was a notable decrease in Staff Cost vs O&M Cost from 37.5% to 41.9%. Disconcertingly, **Operational Sustainability** was the worst performing category affected by a dropping average performance in Metering Ratio from 87.9% to 87.6% and NRW from 45.6% to 45.7%. Only Staff/1,000 W&S Connections improved from 5.10 to 4.93. The areas of poor performance continued to be a threat to the sustainability of the Utilities and urgent interventions are required for redress by all sector actors.

## CHAPTER 1. OVERVIEW OF ESAWAS REGULATORS ASSOCIATION

### 1.1 REGIONAL WSS REGULATORY COOPERATION

Expanding water supply and sanitation (WSS) services across Africa has progressed but not yet at the pace required to meet Sustainable Development Goal (SDG) 6, and considerable further improvements are needed. Achieving safe and equitable WSS service provision depends on effective regulation to formalise the sector and provide clear guidelines for those working within it.

Regulation impacts society and plays a key role in improving service delivery. A well-functioning regulatory system is a central feature of good sector governance. The premise of regulation is to ensure that Government policy is implemented, and service providers are accountable and supported in delivering efficient, affordable, reliable and quality services.

The challenge of any well-functioning regulatory system is to ensure that regulations are appropriate, necessary, and cost effective and that they serve the best interests of society. However, there is no single 'best-practice', or one-size-fits-all approach/design or model for WSS regulation. Therefore, countries must find the 'best-fit' according to their particular context. Effective regulation demands alignment with country specific reforms, governance systems and political economy and development objectives.

Nevertheless, while implementation of regulation should be aligned to country context, the principles and fundamentals of regulation are the same. This allows knowledge and experiences in regulatory governance and substance to be shared across several institutions for adoption or adaptation of what works.

Thus, in recognising the need for collaboration and promotion of the effective development of WSS regulation in Eastern and Southern Africa, several regulators came together to form an association to address new challenges and opportunities through regulatory cooperation for enhanced quality and effective regulations to achieve public policy objectives.

### 1.2 OBJECTIVES OF ESAWAS

The Eastern and Southern Africa Water and Sanitation (ESAWAS) Regulators Association is a network of water supply and sanitation (WSS) regulators that seeks to enhance the regulatory capacity of members to deliver quality and effective regulation to achieve public policy objectives, through cooperation and mutual assistance.

The ESAWAS Regulators Association began informally in 2007 and was officially formed in 2009 by a Memorandum of Understanding. It gained legal personality in 2012 as a registered society in Zambia. The activities of the Association are governed by a Constitution and Rules of Operation.



The objectives of the ESAWAS Regulators Association as stated in its Constitution are:

a) Capacity Building and Information Sharing

Facilitate information sharing and skills training at national, regional and international level to enhance the capacity of members in WSS regulation;

b) Regional Regulatory Co-operation

Identify and encourage the adoption of best practices to improve the effectiveness of WSS regulation in the region.

### 1.3 MEMBERS OF ESAWAS

The ESAWAS Regulators Association is currently composed of ten members as follows:

- 🌐 **Eight autonomous WSS regulators:** the Water Services Regulatory Board (WASREB) of Kenya; the Autoridade Reguladora de Águas, Instituto Público (AURA, IP formerly CRA) of Mozambique; the Rwanda Utilities Regulatory Authority (RURA) of Rwanda; the Energy and Water Utilities Regulatory Authority (EWURA) of Tanzania; the National Water Supply and Sanitation Council (NWASCO) of Zambia; the Lesotho Electricity and Water Authority (LEWA) of Lesotho; the Autorité de Régulation des secteurs de l'Eau potable et de l'Energie (AREEN) of Burundi; and the Zanzibar Utilities Regulatory Authority (ZURA) of Zanzibar;
- 🌐 **One ministry department:** the Water Utility Regulation Department (WURD) of Uganda; and
- 🌐 **One association** of water and sanitation Utilities with regulatory oversight: the Water Services Association of Malawi (WASAMA).

Table 1 gives an overview of the ESAWAS members.

**Table 1: Overview of ESAWAS Members**

	<b>Regulator</b>	<b>Established by</b>	<b>Year begun operations</b>	<b>Number of regulated WSS Utilities</b>
<b>1</b>	<b>National Water Supply and Sanitation Council</b> (NWASCO), Zambia	Water Supply and Sanitation Act No. 28 of 1997	2000	16
<b>2</b>	<b>Autoridade Reguladora de Águas, Instituto Público</b> (AURA,IP formerly CRA), Mozambique	Decree No. 74 of 1998	2000	15
<b>3</b>	<b>Water Services Regulatory Board</b> (WASREB), Kenya	Water Act of 2002	2003	93
<b>4</b>	<b>Rwanda Utilities Regulatory Authority</b> (RURA), Rwanda	Law No. 39 of 2001	2003	1
<b>5</b>	<b>Energy and Water Utilities Regulatory Authority</b> (EWURA), Tanzania	Cap 414 of 2001	2006	87
<b>6</b>	<b>Lesotho Electricity and Water Authority</b> (LEWA), Lesotho	LEA Act of 2002, LEA Amendment Act of 2011	2013	1
<b>7</b>	<b>Autorité de Régulation des secteurs de l'Eau potable et de l'Energie</b> (AREEN), Burundi	Decree No. 100/320 of 2011	2015	1
<b>8</b>	<b>Zanzibar Utilities Regulatory Authority</b> (ZURA), Zanzibar	Act No. 7/2013	2015	1
<b>9</b>	<b>Water Services Association of Malawi</b> (WASAMA)	Trustee Act	1998	5
<b>10</b>	<b>Water Utility Regulation Department</b> (WURD) of Uganda	Cap 152 of the water Act	2009	7

The regulators are generally mandated to undertake both economic and technical regulation of WSS service provision, ensuring a balance between the quality of service, the interests of consumers, and the financial sustainability of service providers.

For effective regulation, regulators have put in place a number of instruments and tools which include:

- Licensing: All WSS providers are required to operate under a license issued by the regulator except in Mozambique and Uganda where the regulators sign a regulatory agreement/ contract with the service provider that defines the regulatory framework.
- Development and Enforcement of Guidelines, Regulations, Rules and Standards: Various guidelines, regulations, rules and standards have been developed and enforced to ensure compliance to the governing water supply and sanitation legislation. Some key regulations, guidelines and standards include: Minimum Service Level, Water Quality Monitoring, Business Planning, Corporate Governance, Reporting and Quality of Supply and Service Standards (QoSsS).
- Tariff Setting: All WSS providers are required to submit tariff applications to the regulator for analysis and approval.
- Performance Monitoring and Quality Control: The regulators undertake regular inspections of Utility infrastructure and operations. Areas of non-compliance are addressed through written directives and orders.
- Sector Performance Reporting and Information Dissemination: The regulators have in place systems for data collection on the performance of the Utilities that is used for sector reporting. All the regulators produce annual reports on the performance of the sector which is published and disseminated to the public.

## CHAPTER 2. PERFORMANCE ON 2019 - 2021 STRATEGIC PLAN

The activities of the ESAWAS Regulators Association are guided by three-year strategic plans. This reporting period marks the end of the Association's third Strategic Plan spanning 2019-2021, with the following four Strategic Objectives:







- 1 Develop harmonised regulatory approaches and frameworks
- 2 Facilitate experience and knowledge sharing
- 3 Undertake and document research in emerging regulatory trends and practices
- 4 Improve operations of the ESAWAS Regulators Association

During the implementation period, the Covid-19 pandemic impacted the world in different ways, including ESAWAS operations. Restrictions imposed by COVID-19 led to a number of activities being implemented virtually for most of the reporting period. However, the Association continued its efforts of influencing and promoting effective WSS regulation within the region and beyond. Table 2 highlights the performance of ESAWAS with regard to the implementation of the 2019-2021 Strategic Plan.

**Table 2: Performance on 2019-2021 Strategic Plan**

Strategic Objective 1: Develop Harmonised Regulatory Approaches and Frameworks		
Key actions	Key Expected Results	Performance
<b>1.1 Extend annual benchmarking exercise for WSS Utilities in the region.</b>	Sector reporting improved by the introduction of new indicators and alignment with SDGs. Results of Benchmarking used to enhance regulatory tools and promote efficiency of regulated entities.	Regional benchmarking report for 2018/2019 was produced and published.  The Lilongwe Water Board of Malawi was brought on board to bring the total number to 10 utilities from 9.
<b>1.2 Improve regulation of sanitation service provision.</b>	Regulatory strategy and framework for inclusive urban sanitation service provision that incorporates non-sewered (onsite) sanitation services developed and implemented.	The Regulatory Framework and Strategy for Inclusive Urban Sanitation Service Provision incorporating non-sewered (onsite) sanitation services was developed, adopted and under implementation by Members.  Guidelines were developed and disseminated on a) Inclusive Urban Sanitation Service Provision, b) Sanitation Services Tariff Setting c) Citywide Inclusive Sanitation (CWIS) Planning and

Strategic Objective 1: Develop Harmonised Regulatory Approaches and Frameworks		
Key actions	Key Expected Results	Performance
		Members were trained in the developed frameworks, guidelines and tools for adoption, adaptation and implementation.
<b>1.3 Address regulation of WSS in the rural areas and small schemes.</b>	A strategy and implementation framework for rural WSS regulation developed.	A number of brainstorming workshops were held in an effort to map out the status of implementation in countries. A strategy and implementation framework were yet to be formulated.
<b>1.4 Develop a regulatory handbook from consolidated findings of six Peer Reviews.</b>	Regulatory Handbook on establishment of a regulator and good practices in regulatory governance & substance developed, published and disseminated.	Regulatory Handbook that covers establishment of a regulator and regulatory practices among six members in regulatory governance and substance was developed.
<b>1.5 Promote equity in terms of service provision (pro poor/ vulnerable communities, households and social inclusion).</b>	Key performance indicators established and/or refined to improve measurement and identification of service levels to poor communities.	The activity proved difficult to implement as there was no consensus or guidance on how to identify the poor.

Strategic Objective 2: Facilitate Experience and Knowledge Sharing		
Key actions	Key Expected Results	Performance
<b>2.1 Document and share good practices in regulation.</b>	Good practices shared among regulators.	Good practices in the following were shared through publications and/or webinars: <ul style="list-style-type: none"> <li> Citywide Inclusive Sanitation (CWIS) regulation in practice</li> <li> NRW Good Practice Guideline</li> <li> Enhancing climate resilience</li> <li> Fragility on Urban Water Utilities</li> <li> Effectiveness of WASH-Based measures in the fight against COVID-19</li> <li> CWIS Regulation: Accountability, Responsibility and Resource Planning &amp; Management</li> </ul>
<b>2.2 Undertake technical regulatory exchange programmes.</b>	Working approaches in key regulatory aspects shared.	A technical exchange meeting was held with all legal counsels. The legal team explored and recommended how to best anchor proposed regulatory models on NSS and possible RWSS models.  AURA-IP, Mozambique undertook an exchange visit to Zambia on pre-paid metering.

Strategic Objective 2: Facilitate Experience and Knowledge Sharing		
Key actions	Key Expected Results	Performance
<b>2.3 Promote and support independent regulation within the region.</b>	<p>Improve awareness regarding the role of WSS regulation.</p> <p>Regulators, existing, newly formed and under establishment supported with advocacy and technical expertise.</p>	<p>A number of webinars were conducted to promote regulation among stakeholders</p> <p>Presentations on benefits of regulation made to stakeholders in Malawi</p> <p>Online discussions were held with states from Nigeria and Sahel countries.</p>
<b>2.4 Establish and strengthen partnerships with training organisations on regulation.</b>	<p>Members have access to specialized training in regulation and curriculum influenced by ESAWAS</p>	<p>Trainings for members were conducted with WSUP on sanitation guidelines and with WHO-REGNET on sanitation safety planning</p> <p>Partnership with IHE-Delft was established for research students who were assigned to EWURA and NWASCO</p> <p>Training on regulation was incorporated in AfWA training of trainers of SAO-CWIS program.</p>

Strategic Objective 3: Undertake and Document Research in Emerging Regulatory Trends and Practices		
Key actions	Key Expected Results	Performance
<b>3.1 Promote climate resilient WSS services.</b>	<p>Tools developed to promote climate resilience disseminated and applied.</p>	<p>With the support of CRIDF, a maturity matrix was formulated to guide the full suite of tools to be developed.</p>
<b>3.2 Improve performance with regard to NRW management.</b>	<p>Key case studies addressing both good and bad practice for NRW, captured and disseminated.</p>	<p>NRW case studies were documented and disseminated from Moshi-Tanzania, Nyeri-Kenya and Maseru-Lesotho. This culminated into the development of a “Good Practice Handbook” on NRW</p>
<b>3.3 Identify new technologies and processes that can significantly enhance regulation.</b>	<p>Technologies for enhanced regulation documented and shared.</p>	<p>A CWIS Service Assessment Planning (SAP) tool was developed to guide decision making for interventions in sanitation towards achieving the outcomes of equity, safety and sustainability. It was implemented by Uganda, Zambia, Kenya and Tanzania and will be upscaled to other country members.</p>

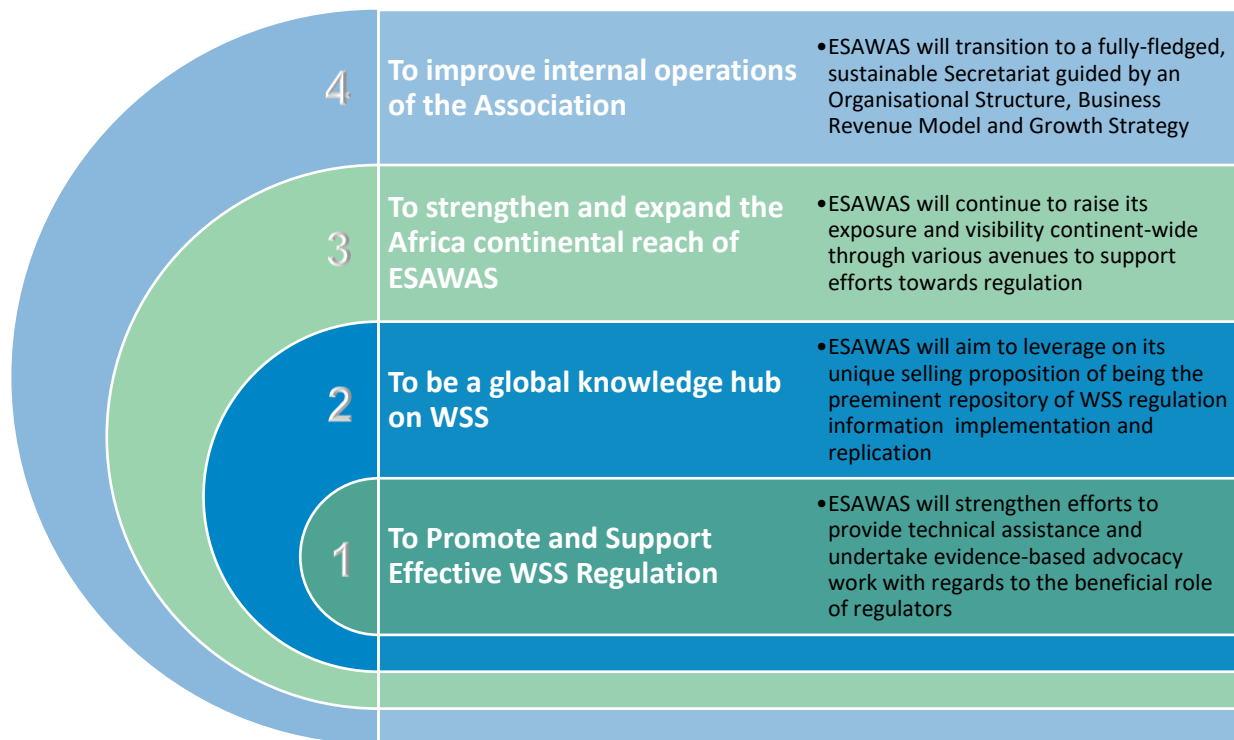
<b>Strategic Objective 4: Improve Operations of ESAWAS Regulators Association</b>		
<b>Key actions</b>	<b>Key Expected Results</b>	<b>Performance</b>
<b>4.1 Hold Annual General Meeting (AGM)</b>	Issues deliberated upon improve performance of ESAWAS Regulators Association.	One physical AGM was held in Bujumbura, Burundi in 2019 and one virtual meeting in 2020.
<b>4.2 Enhance profile of ESAWAS Regulators Association</b>	Number of members increased  Visibility increased at regional, Africa and international events through active participation (presentations given, hosting breakaway sessions etc.)	WURD of Uganda became the tenth member of ESAWAS in 2019 and the Association continued to court other countries such as Angola and South Africa to become members.  Visibility increased through participation/presentations at 20 <sup>th</sup> AfWA, IWA Congress, AfricaSan, UNC, World Water Week and various webinars. Joint publications and articles produced on CWIS and WSS regulation with WSUP, WHO-RegNet and IWA.
<b>4.3 Establish/ strengthen strategic partnerships with other like-minded WSS sector organisations.</b>	ESAWAS' influence, exposure and reach widened globally	New MoUs signed with AfWA, WIN and WHO-Regnet. Furthermore, ESAWAS strengthened partnerships with longstanding partners such as AMCOW and WSUP. ESAWAS also sat on IWA advisory committee, IWRP program committee and AMCOW ASPG taskforce.
<b>4.4 Strengthen gender inclusiveness.</b>	Female participation at decision-making level at ESAWAS events and meetings increased.	ESAWAS supported the participation of women from its members in ESAWAS trainings and events, achieving a 33% ratio.
<b>4.5 Strengthen capacity and sustainability of Secretariat.</b>	Secretariat can successfully handle increased activities. Increased revenue for core activities.	An Organisational Structure, Business Revenue Model and Growth Strategy were developed and under implementation. Recruitment of two full time Secretariat staff was initiated. Just over US\$3,6million grant funding secured for the period 2021-23

## CHAPTER 3. FOCUS FOR THE NEXT THREE YEARS

### 3.1 STRATEGIC OBJECTIVES FOR 2022-2024

In anticipation of the expiry of its third Strategic Plan, ESAWAS began the formulation of the fourth Strategic Plan to guide the activities of the Association for the subsequent three years.

An environmental scan undertaken revealed pertinent issues within the water supply and sanitation sub sector that could be addressed at regional level. The Strategic Plan for the period 2022-2024 embraces comprehensive programming and organizational development towards enhancing water supply and sanitation regulation through capacity building, information sharing and regional regulatory cooperation encompassed in the following objectives:



There have been increasing global calls for instituting WSS regulation in countries. This is evidenced by the inclusion of a chapter on regulation in the AMCOW Africa Sanitation Policy Guidelines (ASPGs), as well as the institution of an International Water Regulators Forum (IWRF) by the International Water Association (IWA).

The core objective of the Association is to promote effective regulation. As the environment changes, regulation will evolve with it. Thus, the regulatory regime needs to be alive to changes and emerging challenges in order to incorporate appropriate systems and strategies for regulatory efficiency and effectiveness.







ESAWAS intends to become and remain a global leader in promoting effective and innovative regulation of water supply and sanitation services.



## 3.2 COLLABORATION WITH PARTNERS

Collaboration among organisations is essential to create synergies and leverage on each other in pursuit of common goals. It is also recognised as a central pillar to achievement of Sustainable Development Goals (SDGs) as espoused by SDG 17 that calls for cross-sectoral and cross-national partnerships to achieve the goals. As such, the ESAWAS Regulators Association values partnerships in its quest to realise its long-term objectives and continued to strengthen working ties with its partners, while also exploring new collaborative opportunities.

In the period under review, the Association continued to collaborate with its partners as follows:

-  **Water and Sanitation for the Urban Poor (WSUP)** – ESAWAS and WSUP renewed their partnership objectives to help strengthen pro-poor regulations across Africa through an MoU. Some activities undertaken included: joint training of regulatory staff in CWIS guidelines developed by ESAWAS, co-convened a sub-theme at the AfricaSan6 on ‘Inclusive Policy and Strategy for Accelerating Sanitation and Hygiene Improvement in Africa’ and co-hosted a webinar on ‘CWIS Regulation in Practice’.
-  **Climate Resilient Infrastructure Development Facility (CRIDF)** – developed a concept to convert the Maturity Matrix to a more powerful and strategic tool dubbed the “SCRRRAM” namely; the Strategic Climate Resilience, Risk and Response Assessment Methodology. Other activities included co-hosting a webinar in collaboration with AFUR and SIWI on ‘Effectiveness of WASH-based measures taken in the fight against COVID-19 and their impact on the performance of the sector’.
-  **African Minister’s Council on Water (AMCOW)** – ESAWAS contributed to the chapter on regulation in the African Sanitation Policy Guidelines (ASPGs) which have since been published. ESAWAS led the sector dialogue for Local Authorities at AfricaSan6 and participated in the AfricaSan International Task Force meetings.
-  **Bill Melinda Gates Foundation (BMGF)** – ESAWAS secured further funding towards supporting African WSS regulators to improve urban sanitation services through integration of non-sewered sanitation in regulation. Under this funding, ESAWAS members will receive subgrants based on developed roadmaps for sanitation regulation.
-  **African Water Association (AfWA)** – ESAWAS and AfWA formalized a partnership through an MoU. Activities undertaken included ESAWAS delivering regulation modules for an AfWA training of trainers on City Wide Inclusive Sanitation. Co-hosted several webinars on different topics.
-  **WHO-REGNET** - ESAWAS entered into an agreement with the International Network of Drinking-Water and Sanitation Regulators (RegNet) to support strengthening of water and sanitation regulation and support dissemination and implementation of the regulatory aspects of the WHO Guidelines on Sanitation and Health among regulators in Eastern and Southern Africa. Key activities in the period were the training of regulatory staff in Sanitation Safety Planning and development of sanitation monitoring KPIs.

## CHAPTER 4. REGIONAL BENCHMARKING FRAMEWORK

### 4.1 RATIONALE FOR REGIONAL BENCHMARKING





Benchmarking is a key regulatory tool for assessing and encouraging improvement in performance of WSS Utilities by comparing the performance of a Utility against that of others or industry's best practices or standards. However, in the Eastern and Southern African region, the largest Utility, in-country, tends to have no peers while some countries have a single national WSS provider, thus making reasonable comparison of performance difficult.

Therefore, for large or single Utilities that have no comparable peer within a country, regional benchmarking becomes an essential tool to gauge and incentivise performance improvements. While the operating environments may differ from country to country, by benchmarking against similar sized Utilities, lessons can be drawn by both the regulator and the Utility, on how to improve performance.

In order to design appropriate performance incentives and set minimum targets for key indicators, regulators need to establish where a Utility is coming from (past trends), how it has performed against others (comparative performance) and how it has performed against good practice (industry standards or set acceptable performance).

With regard to the above, ESAWAS developed a regional benchmarking framework in 2015 by a process of harmonising the Key Performance Indicators (KPIs) and benchmarks used by the different regulators.

The regional benchmarking presents a platform by which large Utilities can be compared to similar sized Utilities within the region. The results of the benchmarking exercise are therefore intended to serve as a support tool to:

-  foster improvement in the WSS services by creating competition among the benchmarked Utilities;
-  identify strengths and weaknesses within the Utilities and areas for improvements;
-  generate information for decision making; and
-  contribute to the attainment of targets with respect to country visions and SDGs.

The regional benchmarking exercise is not restricted to the members of the ESAWAS Regulators Association due to the value generated from the exercise. Therefore, any country in the Eastern and Southern African region can participate and individual regulators can use the exercise to further compare the performance of more Utilities in-country against other Utilities in the region and thereby draw comprehensive conclusions regarding the performance of the local Utilities.

## 4.2 BENCHMARKING TOOLS

For the purpose of regional benchmarking, ESAWAS combines the use of the International Benchmarking Network (IBNET) tool developed by the World Bank with the Water Utility Performance Index (WUPI) developed by AURA IP, as described hereunder.

- **IBNET:** The IBNET Toolkit provides a set of financial, technical and process indicators (mainly capturing the institutional context in which the Utilities are operating) for the assessment of Utility performance in the provision of water and sewerage services. This set of indicators provides the basis for cross-Utility and cross-country comparisons. IBNET caters for a large number of indicators in different categories such Service Coverage, Non-Revenue Water, Quality of Service, Cost and Staffing and Financial Performance, amongst others.
- **WUPI:** Analysing single KPIs individually is a useful way to analyse the performance of a Utility at technical level. However, by only using single KPIs in the performance analysis, it is difficult to conduct an integrated evaluation of the overall performance of the Utilities in closely related indicators. Thus, the WUPI is a composite indicator to evaluate the performance of the Utilities in an integrated way for a set of similar indicators (see Annex 3 for a detailed description).

## 4.3 BENCHMARKING KPIs

Ten KPIs are used for regional benchmarking as follows:

- i. Water Coverage
- ii. Sewerage Coverage
- iii. Water Quality
- iv. Hours of Supply
- v. Non-Revenue Water
- vi. Operational and Maintenance (O&M) Cost Coverage
- vii. Collection Efficiency
- viii. Metering Ratio
- ix. Staff per 1,000 Connections
- x. Staff Cost as a proportion of O&M Costs

The indicators are grouped into three main components namely,

- a) Quality of Service- *relating to the extent and assurance of the service;*
- b) Economic Efficiency - *relating to the viability of the service provider;* and
- c) Operational Sustainability – *relating to operational efficiencies.*

Performance boundaries for regional benchmarking were defined by considering the minimum average performance of the Utilities, as well as the minimum for the acceptable benchmarks among the countries. The weights were arrived at by a process of normalisation of the various weights defined by the different regulators.

Table 3 shows the framework used for regional benchmarking.

**Table 3: Regional Benchmarking KPIs and Performance measurements**

	INDICATOR	DEFINITION	CALCULATION	ACCEPTABLE BOUNDARIES	WEIGHT
<b>QUALITY OF SERVICE</b>					
1	<b>Water Coverage</b>	% of total population with access to improved water supply: individual household connection, kiosk, public standposts, communal/shared tap	[Total Population Served/Total Population in the Service Area]	75-90%	10
2	<b>Sewerage Coverage</b>	% of total population with access to sewerage services (no septic tanks)	[Total Population Served/Total Population in the Service Area]	40-70%	5
3	<b>Water Quality</b> <ul style="list-style-type: none"> <li>Residual Cl (w0.4)</li> <li>Bacteriological (w0.6)</li> </ul>	% of water samples undertaken meeting quality requirements	% of tests compliant in relation to applicable / national standards	95-99%	15
4	<b>Hours of Supply</b>	Aggregated average hours of supply (per town/zone/area etc) in the reporting period	Sum of weighted averages per town	18-23	10
<b>ECONOMIC EFFICIENCY</b>					
5	<b>O&amp;M Cost Coverage by Billing</b>	The level of costs covered by billed amounts	[Billed Amount/O&M Costs]	100-150%	10
6	<b>Collection Efficiency</b>	The collected amounts from the billing	[Collected amount/Billed amount]x100	90-99%	15
7	<b>Staff Cost</b>	Personnel Cost as a proportion of O&M cost	[Personnel Cost/ O&M Costs] *100	30-35%	5
<b>OPERATIONAL SUSTAINABILITY</b>					
8	<b>Staff/1000 Connections</b>	Staff per 1,000 water & sewerage connections	[Total Number of Staff x 1,000]/[No. of Water + Sewerage Connections]	5-8	5
9	<b>NRW</b>	Water that does not produce revenue in a given period	[System Input Volume (imported + produced) –billed Volume]/System Input Volume	30-35%	15
10	<b>Metering Ratio</b>	The proportion of metered customers from the total	[Functional Metered Connections]/Total Connections]x100	90-99%	10

## CHAPTER 5. PERFORMANCE ANALYSIS

The number of Utilities participating in the benchmarking exercise dropped from ten to nine with Régie de Production et de Distribution d'Eau et d'électricité (REGIDESO) of Burundi not submitting data for the second year in a row. This presents a real challenge for regulatory monitoring and reporting in the absence of verifiable and reliable data.

This section presents the analysis of the performance of the Utilities based on the set KPIs and benchmarks.

### 5.1 REPORTING PERIOD

In conformity with country requirements, the regulators have different reporting periods as follows:

- July-June for WASREB, RURA, EWURA, WURD, ZURA and WASAMA
- April- March for LEWA
- January –December for AURA, NWASCO and AREEN

Hence, the data used in this report is drawn from the respective reporting periods as applicable.

### 5.2 OVERVIEW OF BENCHMARKED UTILITIES

The benchmarking exercise considers only the largest or single national Utilities from each country. The nine Utilities considered in this report are: Nairobi City Water and Sewerage Company (NCW&SC) of Kenya; Lusaka Water and Sewerage Company (LWSC) of Zambia; Dar Es Salaam Water and Sanitation Authority (DAWASA) of Tanzania; Águas da Região de Maputo (AdeM) of Mozambique; Water and Sewerage Company (WASCO) of Lesotho; Water and Sanitation Corporation Ltd (WASAC) of Rwanda;; Zanzibar Water Authority (ZAWA) of Zanzibar; National Water and Sewerage Corporation (NWSC) of Uganda and Lilongwe Water Board (LWB) of Malawi.

The general overview of the Utilities is presented in Table 4, while a detailed profile is presented in Annex 2. All the Utilities are publicly owned companies.

**Table 4: General profile of benchmarked Utilities**

Utility	Abbreviation	Country	Areas of operation	Year Established
Nairobi City Water and Sewerage Company	NCW&SC	Kenya	City of Nairobi	2003
Lusaka Water and Sanitation Company	LWSC	Zambia	Lusaka city; Kafue; Chongwe; Luangwa; Chilanga, Chirundu	1989
Dar Es Salaam Water and Sanitation Authority	DAWASA	Tanzania	Dar Es Salaam city; Kibaha; Bagamoyo;	2005
Águas da Região de Maputo	AdeM	Mozambique	Greater Maputo City	1999
Water and Sewerage Company	WASCO	Lesotho	Maseru + 15 urban centres	2010
Water and Sanitation Corporation	WASAC	Rwanda	Kigali + all urban centres in the country	2014
Zanzibar Water Authority	ZAWA	Zanzibar	Zanzibar	2006
National Water and Sewerage Corporation	NWSC	Uganda	Kampala + 217 towns	1972
Lilongwe Water Board	LWB	Malawi	Lilongwe	1947

During the reporting period, Lusaka Water and Sewerage Company, as well as Dar Es Salaam Water and Sewerage Authority both changed their names by dropping ‘Sewerage’ for ‘Sanitation’ to align with the mandate of inclusive sanitation services that incorporates non-sewered sanitation. In addition, the mandates of both Utilities were extended to cover rural water supply and sanitation.

The basic operational data about the Utilities is shown in Table 5.

**Table 5: Basic operational data of benchmarked Utilities**

Utility	Population in the Service Area 2019/20	Number of Water Connections 2019/20	Annual Water Production (mil m <sup>3</sup> /yr) 2019/20	Population in the Service Area 2020/21	Number of Water Connections 2020/21	Annual Water Production (mil m <sup>3</sup> /yr) 2020/21
NCW&SC, Kenya	4.63 Million	315,321	176.036	4.82 Million	232,946	179.341
LWSC, Zambia	2.82 Million	121,570	82.504	2.92 Million	130,150	87.675
DAWASA, Tanzania	7.18 Million	314,155	179.787	7.53 Million	343,091	145.888
AdeM, Mozambique	2.46 Million	255,779	81.793	2.52 Million	288,051	86.885
WASCO, Lesotho	0.74 Million	108,481	22.791	0.742Million	110,750	25.186
WASAC, Rwanda	6.32 Million	230,385	52.310	6.46 Million	263,344	59.524
ZAWA, Zanzibar	1.67 Million	115,704	66.017	1.71 Million	124,776	67.676
NWSC, Uganda	20.55Million	724,006	139.746	22.54Million	775,794	144.105
LWB, Malawi	1.06 Million	89,871	37.363	1.11 Million	96,589	38.582

Generally, the number of water connections continued to grow in almost all Utilities except for NCW&SC and LWB where the number of connections decreased owing to data clean-up. NWSC had the highest increase of number of water connections of 51,788 and continued to have the highest number of water connections of 775,794 followed by DAWASA which has 343,091.

Regarding water production, LWSC reported the highest increase of 6%. On the other hand, DAWASA saw a significant drop of almost 34mil m<sup>3</sup> in water production attributed to electricity supply challenges the Utility experienced at its production plants.

### 5.3 PERFORMANCE BOUNDARIES

In order to obtain an integrated view of the Utilities' performance, benchmarking has been done using both single KPIs and composite indicators as defined under the WUPI. The single and components for grouped indicators are shown in Table 6.

The KPIs boundaries established by ESAWAS are not fixed and could be revised as trends progress towards the benchmarks.

**Table 6: KPIs and Performance boundaries**

Component	KPI	Good	Acceptable	Poor
Quality of Service	Water Coverage	>90	90-75	< 75
	Sewerage Coverage	>70	70-40	< 40
	Water Quality	100	>95	< 95
	Hours of Supply	24	23-18	< 18
Economic Efficiency	O&M Coverage	>150	150 – 100	< 100
	Collection Efficiency	>100	99 – 90	< 90
	Staff Cost	<30	30-35	>35
Operational Sustainability	Staff/1,000 Water and Sewerage Connections	<5.0	5.0 – 8.0	>8.0
	NRW	<30	30 – 35	>35
	Metering Ratio	100	99 – 90	< 90

### 5.4 PERFORMANCE ANALYSIS

The performance analysis was done according to the clusters of indicators in the components of:

- i. Quality of Service
- ii. Economic Efficiency
- iii. Operational Sustainability

Per component of indicators, the performance results by single KPIs are presented first, then the performance is analysed using the WUPI, which integrates the single KPIs.



## 5.4.1 QUALITY OF SERVICE

The quality of service is measured using four KPIs: water supply coverage, sewerage coverage, water quality and hours of water supply.

### 5.4.1.1 Water Supply Service Coverage

Water supply coverage is the proportion of domestic population served through individual household connections, public standpipes and water kiosks from the total population in the service area.

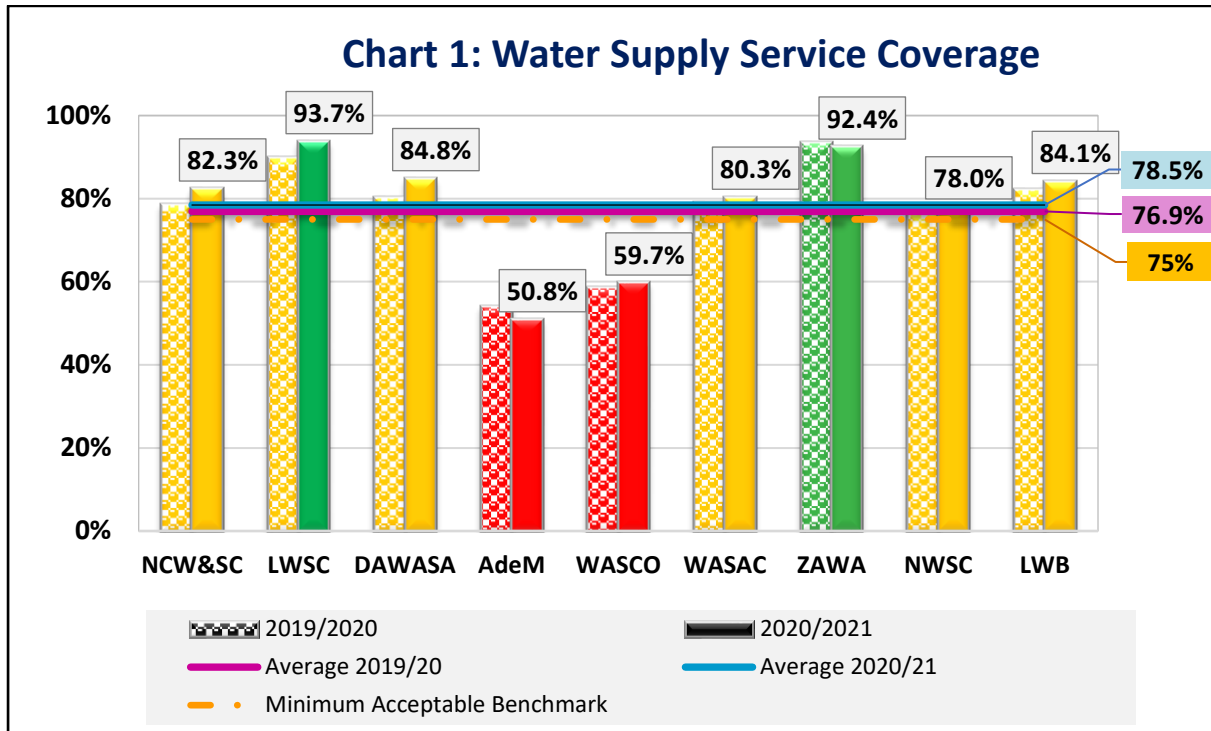
Table 7 shows the number of domestic water connections per Utility. For water coverage to grow, there must essentially be a corresponding growth in domestic connections against population increases. It is to be noted however that public taps also serve a significant portion of the population.

**Table 7: Domestic water connections**

Utility	Domestic Connections 2019/2020	Domestic Connections 2020/21
NCW&SC	293,733	216,998
LWSC	110,250	114,988
DAWASA	309,638	332,489
AdeM	241,849	276,605
WASCO	98,485	100,545
WASAC	209,020	241,186
ZAWA	113,605	121,636
NWSC	535,555	627,234
LWB	83,993	95,965

From Table 7, except NCW&SC, all other Utilities increased the number of domestic water connections. NWSC had the highest increase of 91,679 new connections followed by AdeM and WASAC with 34,756 and 32,166 new connections respectively. The reduction of 76,735 domestic water connections for NCW&SC was attributed to data clean-up which resulted in exclusion of dormant accounts.

Chart 1 shows that there was an overall increase in the average of water service coverage from 76.9% to 78.5%. The highest coverage of 93.7% was achieved by LWSC followed by ZAWA with 92.4%. On the other hand, the water supply coverages of AdeM and WASCO were still below the minimum acceptable benchmark. AdeM experienced a decrease from 53.9% to 50.8% despite an increase in domestic connections.



KPI	Good	Acceptable	Poor
Water Coverage	>90	90-75	< 75

#### 5.4.1.2. Sewerage Service Coverage

The data regarding onsite sanitation systems such as septic tanks, pit latrines and other forms of off-grid sanitation are not yet reported in all countries. Therefore, only the services by sewer networks were considered for NCW&SC, LWSC, DAWASCO, WASCO, NWSC and ZAWA.

It is to be noted that in Malawi, Mozambique and Rwanda, sewerage and sanitation services are provided by different entities: Local Authorities in Malawi and City Councils in Mozambique. In Rwanda, in addition to the absence of central sewerage system, sanitation services dominated by faecal sludge collection and transportation are provided by private operators.

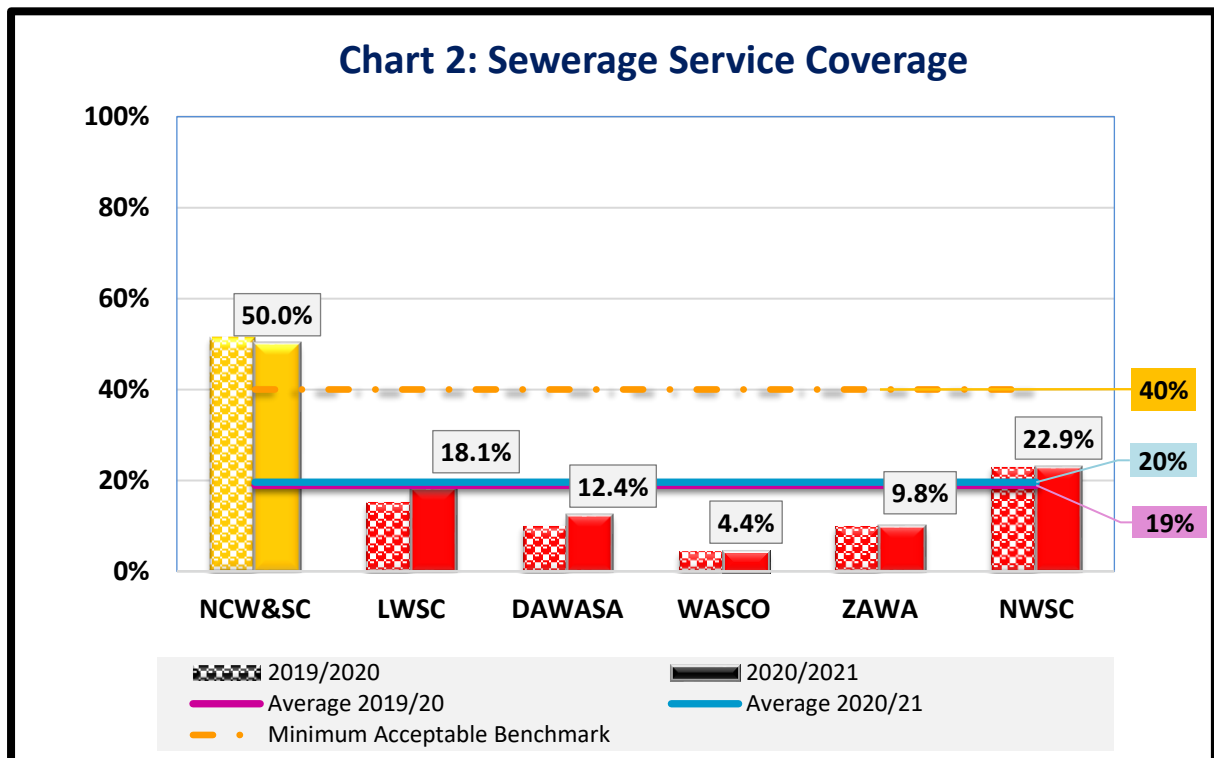
The number of sewerage connections are shown in Table 8 while service coverage is presented in Chart 2.

**Table 8: Sewerage connections per Utility**

Utility	Sewerage Connections 2019/20	Sewerage Connections 2020/21
NCW&SC	255,618	232,946
LWSC	38,842	39,724
DAWASA	19,967	20,004
WASCO	8,060	8,215
NWSC	23,914	25,180
ZAWA	3,000	3,022

As presented in Table 8, all the Utilities recorded increases in the number of sewerage connections except for NCW&SC that recorded a decline of 22,672 connections as a result of data clean-up which removed dormant accounts from the data system.

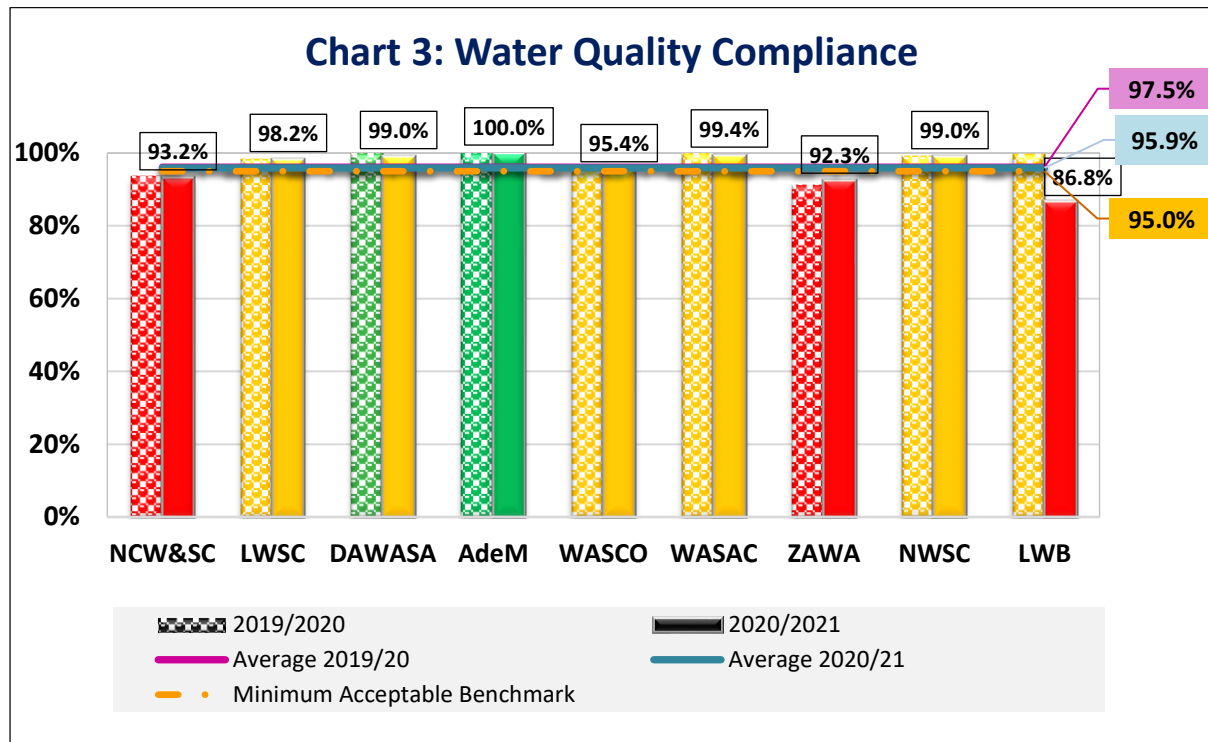
The average sewerage coverage increased marginally from 19% to 20%, however it remained significantly below the minimum acceptable benchmark as shown in Chart 2. Only NCW&SC met the acceptable benchmark. The low sewerage coverage indicates that the majority of the population in the cities rely on onsite sanitation systems or other unregulated options.



KPI	Good	Acceptable	Poor
Sewerage Coverage	>70	70-40	< 40

### 5.4.1.3. Water Quality

Drinking water quality measures the potability of water supplied by a Utility. It is a critical performance indicator since it has a direct impact on the health of consumers. With individual countries having different standards, the drinking water quality result presented in Chart 3 is a composite indicator. It considers compliance in the parameters of Residual Chlorine (40%) and Bacteriological (60%) in terms of number of tests carried out against the required, and number of tests meeting the respective national standards.

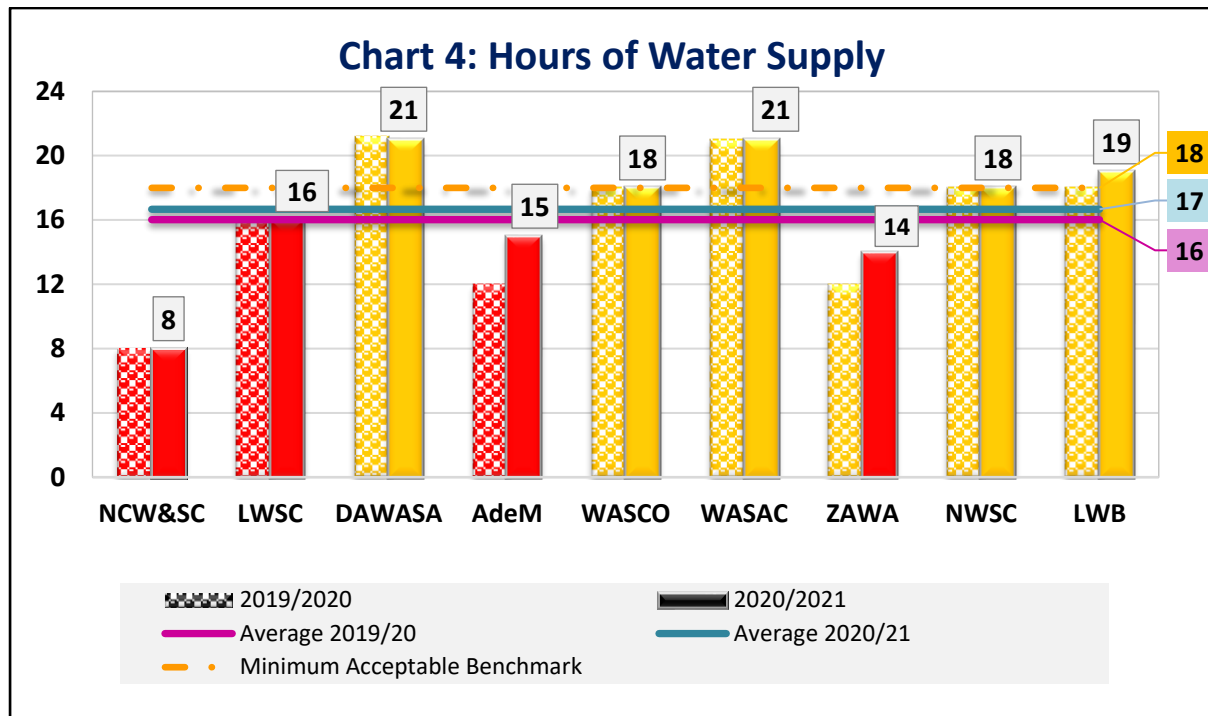


KPI	Good	Acceptable	Poor
Water Quality	100	>95	< 95

From Chart 3, the average compliance decreased from 97.5% to 95.9% but still above the acceptable benchmark of 95%. Only AdeM maintained the good benchmark for water quality. DAWASA, WASAC and LWB experienced a decline in their performance but with only LWB falling below the acceptable benchmark. All other Utilities met the acceptable benchmark except NCW&SC and ZAWA which remained below the acceptable benchmark. The poor performance was mainly attributed to the fact that these Utilities conducted less tests than required number of tests, as well as a low number of conducted tests meeting the standards for both residual chlorine and bacteriological parameters.

#### 5.4.1.4. Hours of Water Supply

Hours of Supply refers to the average number of hours per day that a Utility provides water to its customers. It measures the continuity of services by a Utility and thus the availability of water to the customer. It is an important indicator of quality of service and shows the extent to which the Utility is making progress towards the fulfilment of the human right to water and sanitation in terms of availability of water in sufficient quantities.

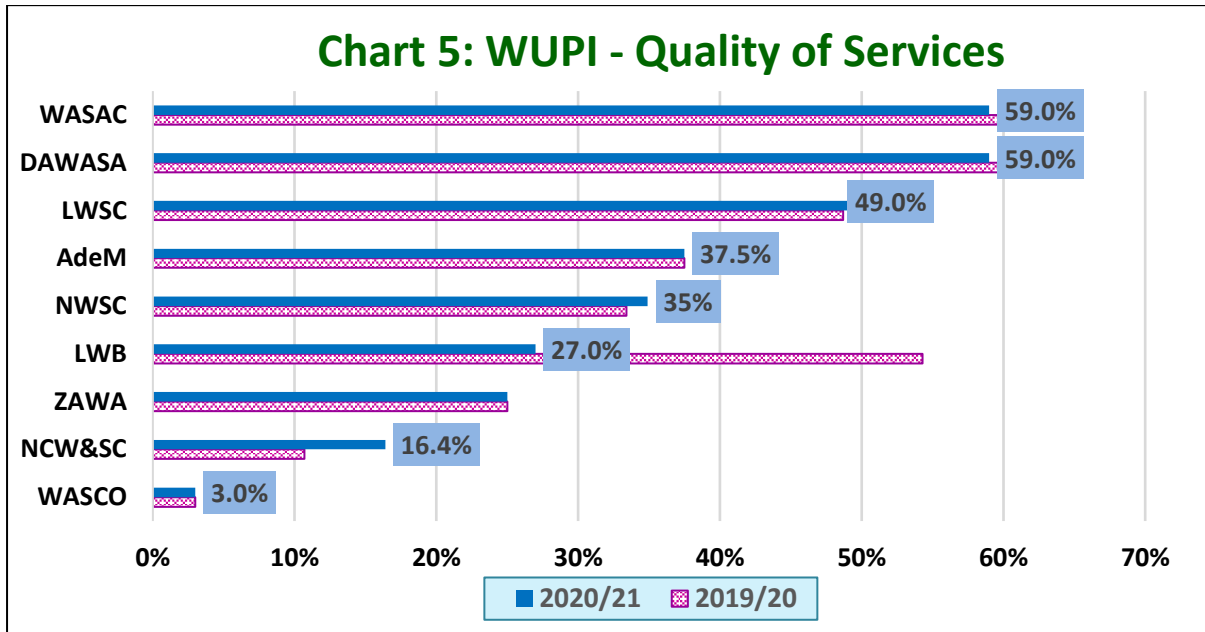


KPI	Good	Acceptable	Poor
Hours of Supply	24	23-18	< 18

The average hours of supply slightly improved from 16 to 17 but remained below the acceptable benchmark of 18. DAWASA and WASAC maintained the highest number of hours of supply at 21. Only NCW&SC, LWSC, AdeM and ZAWA recorded average hours below the acceptable benchmark despite the improvement made by AdeM and ZAWA. For AdeM, the increase in hours of supply was attributed to the completion of a new pumping station and a compact water treatment plant with additional water production of 30,000m<sup>3</sup>/day. For ZAWA, a water reservoir was constructed, hence minimising the dependence on direct water pumping to customers. NCW&SC continued to remain significantly below the acceptable benchmark and the rest.

### 5.4.1.5. Integrated Performance - Quality of Services

The integrated performance for the WUPI-Quality of Services shown in Chart 5 was measured by combining the Water Supply Coverage, Sewerage Coverage, Water Quality and Hours of Supply indicators.



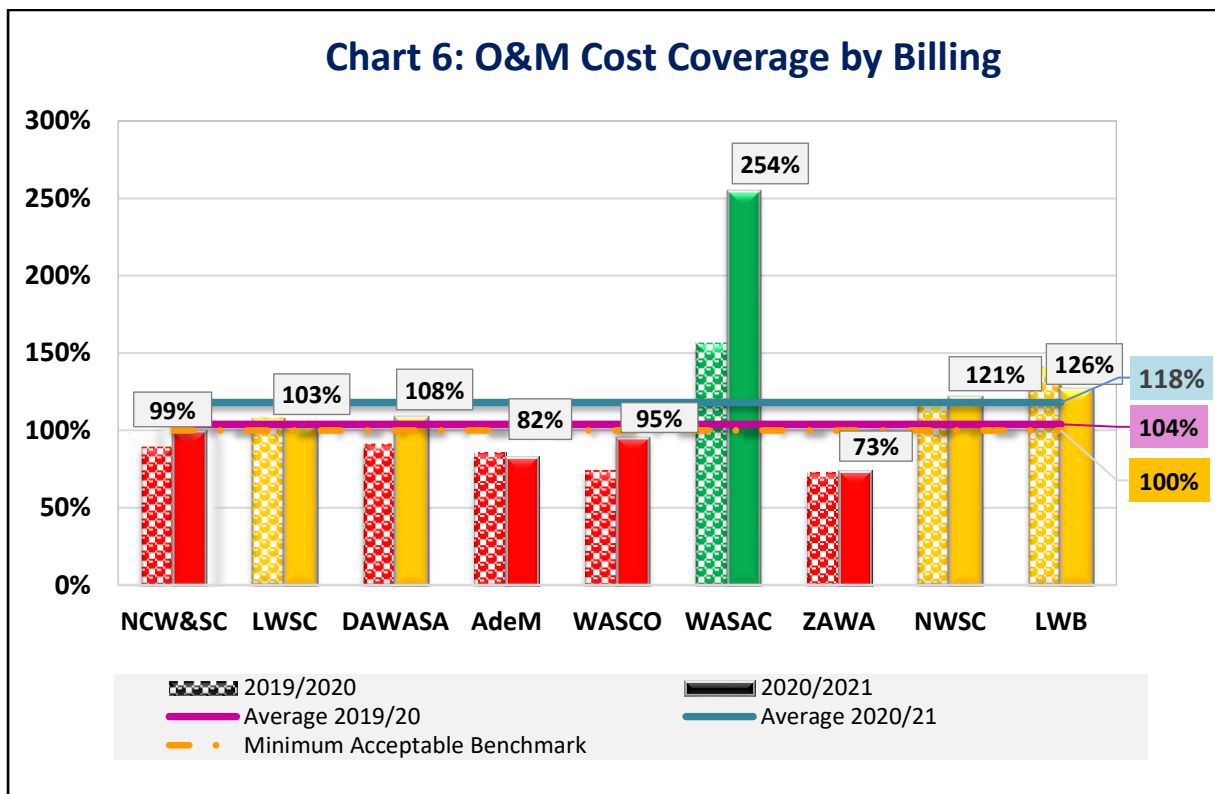
WASAC and DAWASA recorded the best performance in terms of WUPI-Quality of service followed by LWSC as the second-best performer. LWB experienced significant drop in ranking owing to low performance in water quality compliance. Despite an improvement, NCW&SC was the second least performer due to low performance in hours of supply and water quality compliance. WASCO occupied the last place and this is attributed to low performance in both water supply and sewerage service coverage.

## 5.4.2 ECONOMIC EFFICIENCY

Economic Efficiency performance is analysed using three KPIs: Operation and Maintenance (O&M) Cost Coverage by Billing, Collection Efficiency ratio and Staff Cost as a proportion of O&M Costs.

### 5.4.2.1 Operation and Maintenance Cost Coverage by Billing

The Operation and Maintenance (O&M) Cost Coverage is the extent to which internally generated funds from billing for water and sewerage services, cover the cost of running a Utility. It is a measure of the financial sustainability of a Utility. It is desirable that Utilities achieve full cost coverage at some point. However, a good performance of 150% O&M Cost Coverage is set in order to encourage the Utilities to not only meet the O&M costs but also generate funds for some capital investments.



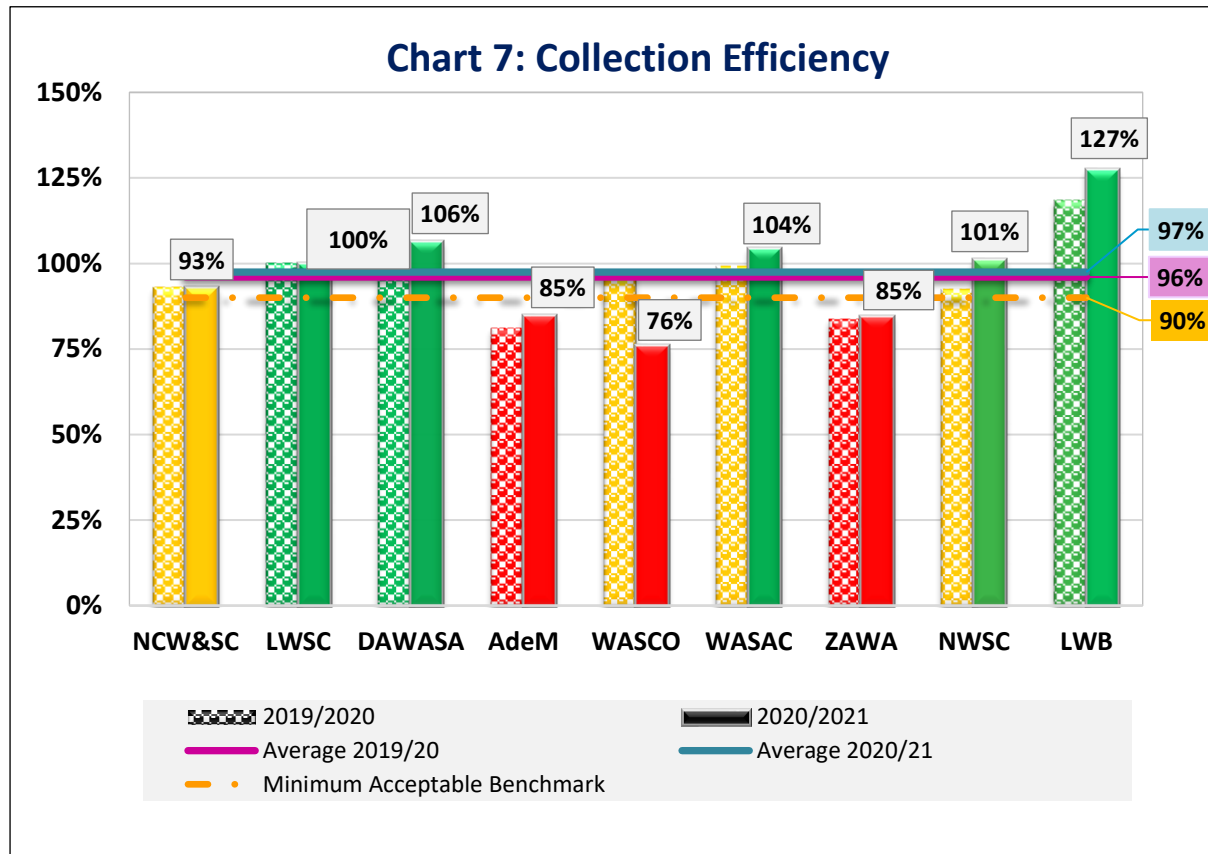
KPI	Good	Acceptable	Poor
O&M Coverage	>150	150 – 100	< 100

Chart 6 shows that six Utilities improved their performance in terms of O&M Cost covered by revenues from billing: NCW&SC, DAWASA, WASCO, WASAC and NWSC. The reported increase in cost coverage ratios was mainly due to reduction in the operation expenses. The highest increase of about 98% was made by WASAC with a 32% decrease in costs against a 10% increase in billed amounts. This led to an apparent distortion in the increase in the average O&M Cost Coverage by Billing from 104% recorded in 2019/20 to 118% in 2020/21.

LWSC, AdeM and LWB recorded decreases in O&M Cost Coverage by Billing. Despite the improvement made by NCW&SC and WASCO, these Utilities together with AdeM and ZAWA had cost coverage ratios below the minimum acceptable benchmark.

### 5.4.2.2. Collection Efficiency

Collection Efficiency in Chart 7 indicates the cash income of the Utility against the billed amounts for water and sewerage services only. Collection ratios above 90% are a key factor in sustaining financial performance of water and sanitation service Utilities. Because collections include arrears, current and advance payments, a collection efficiency of above 100% is accepted.



KPI	Good	Acceptable	Poor
Collection Efficiency	>100	99 – 90	< 90

Except AdeM, WASCO and ZAWA all other Utilities achieved collection efficiency ratios above the minimum acceptable benchmark and the average collection efficiency increased by 1%. LWB recorded the highest collection efficiency ratio with an increase of 9% from the previous year. On the other hand, the ratio for WASCO dropped significantly from 97% to 76% with declining collections despite an increase in billing of about 24%.

### 5.4.2.3. Staff Cost as a proportion of O&M Costs

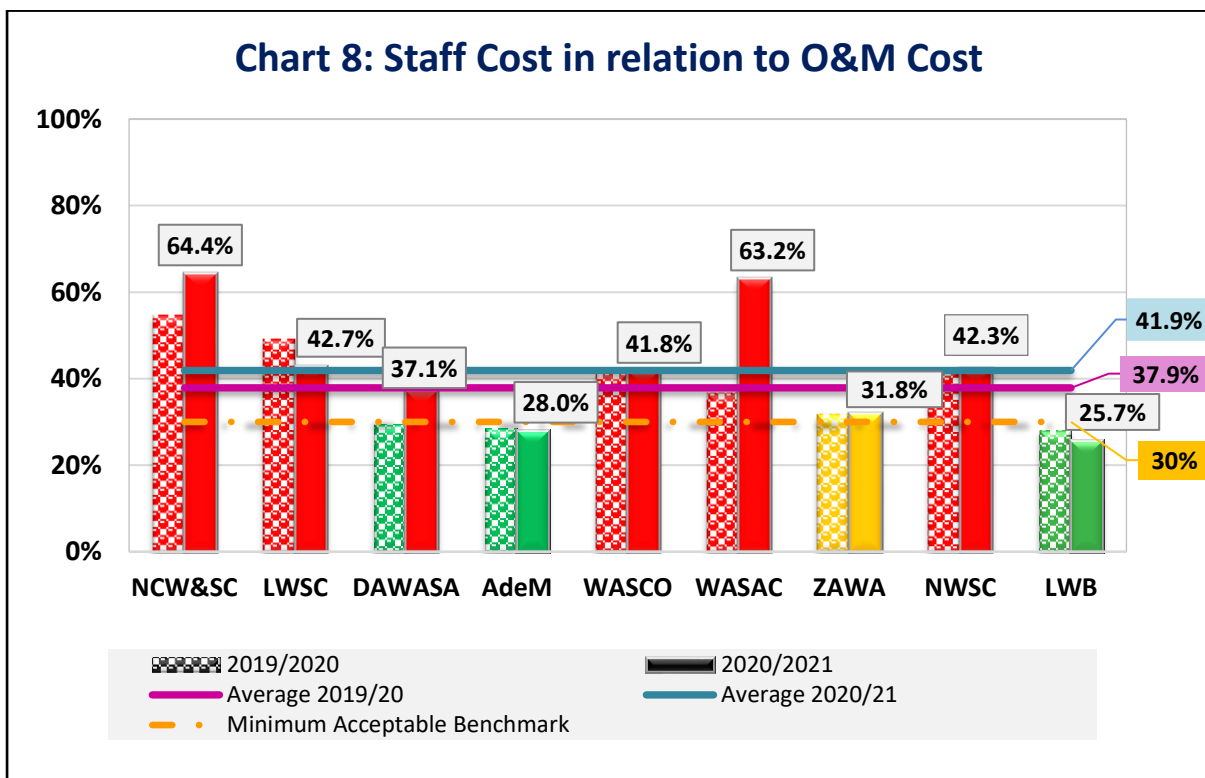
The staff cost is analysed against the O&M costs of the Utility. It is expressed as the proportion (%) of the total O&M costs spent on staff. The internationally accepted “bottom line” for the staff cost is 30% of the total cost and is considered as the maximum acceptable benchmark in this report. To put the cost proportion in perspective, the number of staff per Utility is shown in Table 9.



**Table 9: Total Staff per Utility**

Utility	Total Staff 2019/20	Total Staff 2020/21
NCW&SC	3,335	3,239
LWSC	772	756
DAWASCO	1,392	1,565
AdeM	850	963
WASCO	550	533
WASAC	1,470	1,496
ZAWA	576	574
NWSC	4,082	4,244
LWB	567	517

DAWASA, NWSC, AdeM and WASAC increased the number of staff and this led to increased staff cost. On the other hand, NCW&SC, LWSC, and WASCO reported notable reductions in the number of staff.



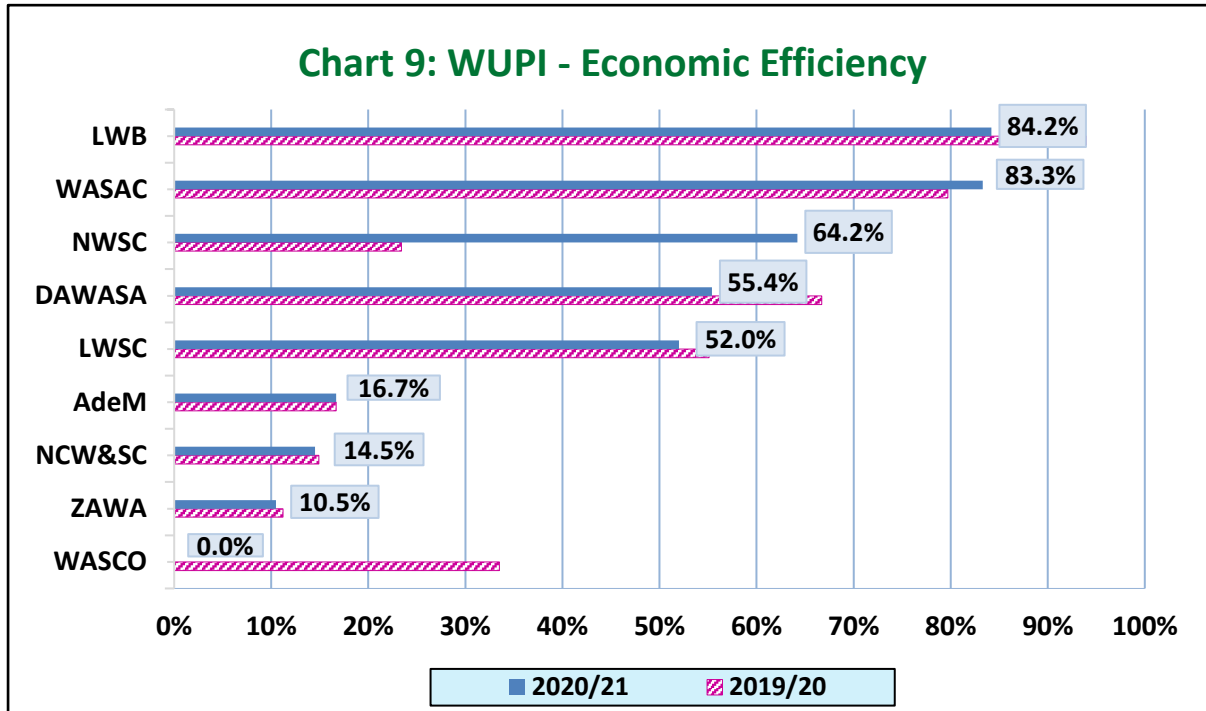
KPI	Good	Acceptable	Poor
Staff Cost	<30	30-35	>35

As shown by Chart 8, only AdeM and LWB maintained the good benchmark (below 30% ratio) on staff costs versus O&M costs while ZAWA maintained the acceptable benchmark ratio

The average Staff Costs to O&M Costs ratio increased to 41.9% owing to declining performance of NCW&SC, DAWASA, and WASAC. On a particular note, NCW&SC has the highest staff cost ratio followed by WASAC which recorded a significant increase of 26.7%. This could undermine effectiveness of other operations of the business.

#### 5.4.2.4. Integrated Performance –Economic Efficiency

The WUPI-economic efficiency, shown in Chart 9, shows an integrated view of the Utilities' performance in the three KPIs of Operation and Maintenance (O&M) Cost Coverage by Billing, Collection Efficiency and Staff Cost as a proportion of O&M Costs.



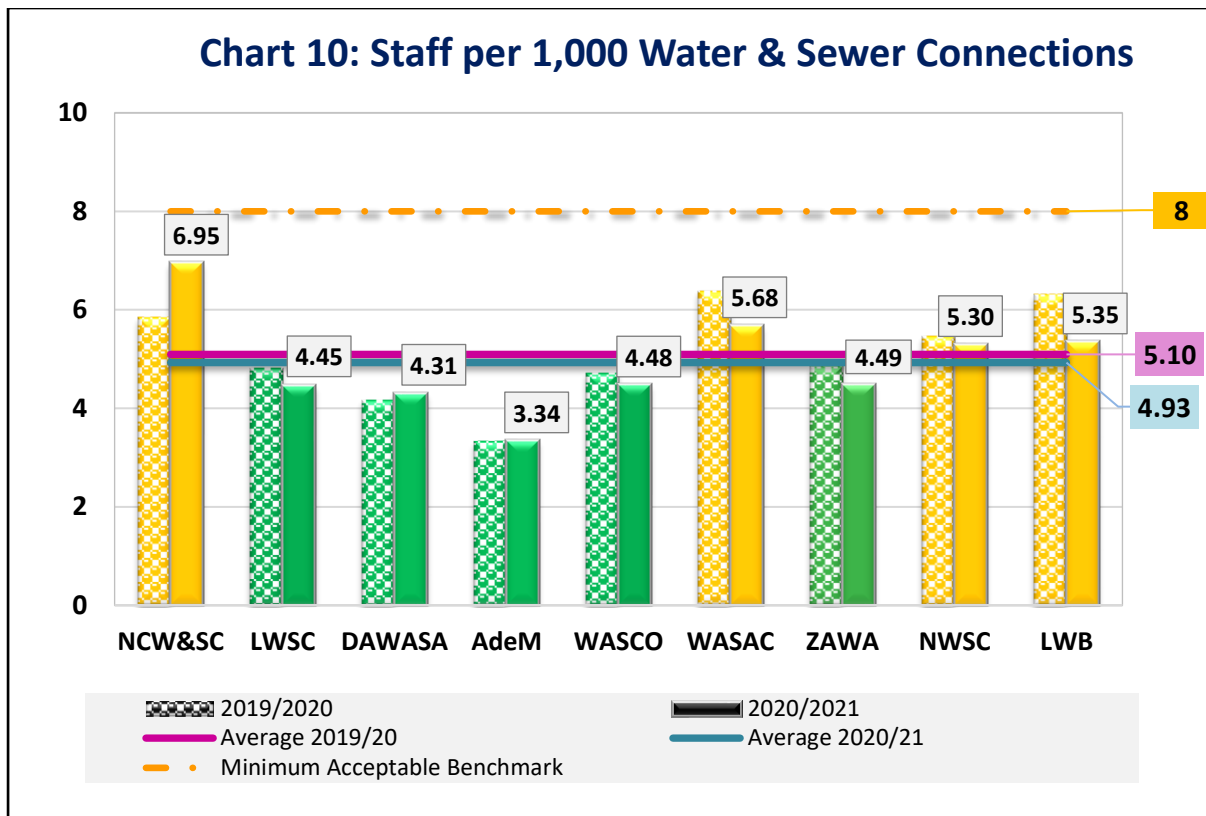
LWB had the highest score of 84.2% followed by WASAC with 83.3%. This was attributed to good performance in Collection Efficiency and Staff Cost in relation to O&M Cost indicators. Despite low performance in Staff Cost versus O&M Cost, NWSC made the most significant improvement from 23.4% to 64.2% owing to good performance in Collection Efficiency as well as the O&M Cost Coverage by Billing. The most significant drops were observed for WASCO from 33.5% to 0% due to its low performance in all indicators.

### 5.4.3 OPERATIONAL SUSTAINABILITY

The Operational Sustainability component is measured using Staff per 1,000 Water and Sewer Connections, Non-Revenue Water and Metering ratio.

#### 5.4.3.1. Staff per 1,000 Water and Sewer Connections

Staff per 1,000 Water and Sewer Connections, shown in Chart 10, represents the number of employees servicing 1,000 connections. It measures the efficiency of Utilities in utilising their staff and hence a low figure is desirable. However, this measure is affected by factors such as nature of human settlements, skills mix, Utility business model (for instance, outsourcing of services), geographical distributions of the served areas and whether a Utility provides water supply only or both water and sewerage services.

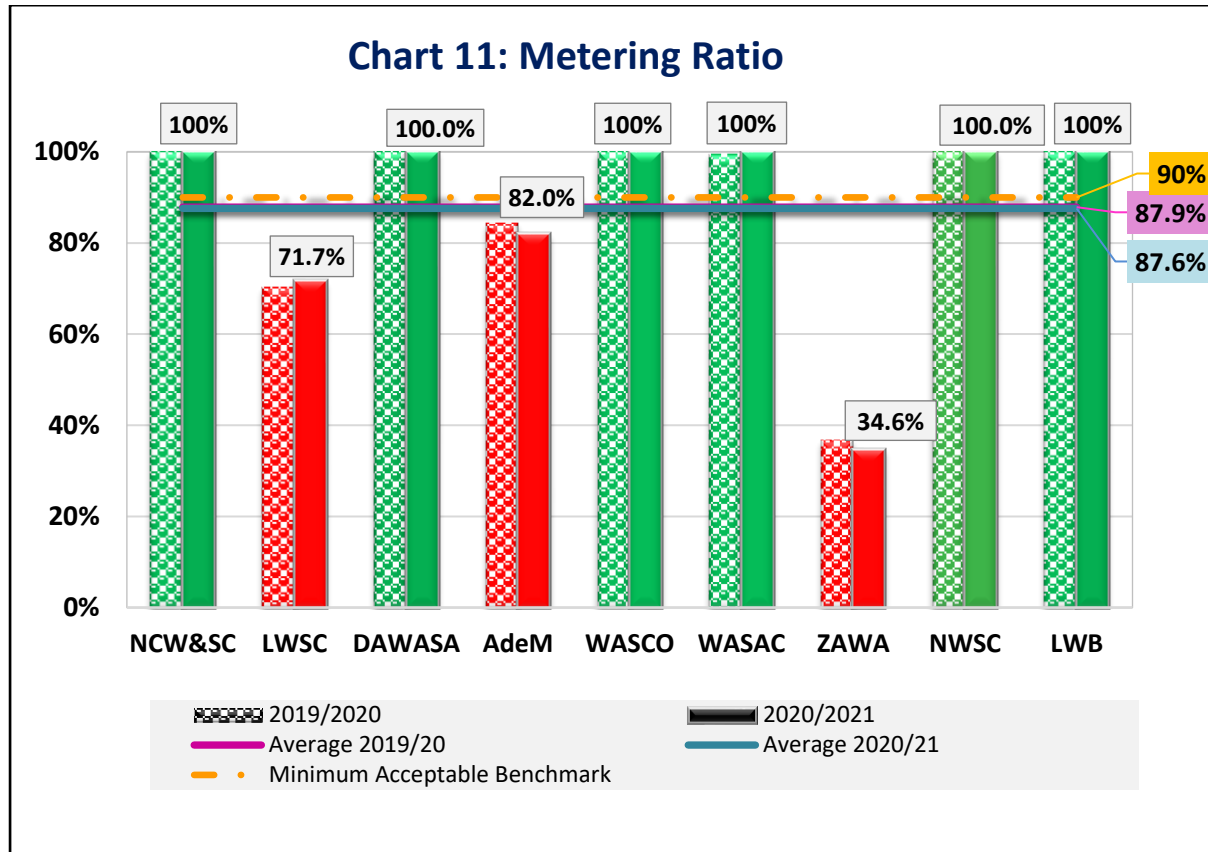


KPI	Good	Acceptable	Poor
Staff/1,000 Water and Sewerage Connections	<5.0	5.0 – 8.0	>8.0

As shown in Chart 10, there is a slight decrease in the average of the Staff per 1,000 Water and Sewer Connections indicator showing an improvement in staff efficiency. Five Utilities, namely LWSC, DAWASA, AdeM, WASCO and ZAWA, met the good performance benchmark with the number of staff per 1,000 connections less than 5. NCW&SC, WASAC, NWSC and LWB were within the acceptable benchmark. The performance of NCW&SC in staff efficiency declined due to a drastic drop in connections despite a decrease in the number of staff.

### 5.4.3.2. Metering ratio

Metering ratio is the proportion of metered connections compared to the total connections. Metering is closely linked to the management of water losses as it measures the volume of water consumed by customers.

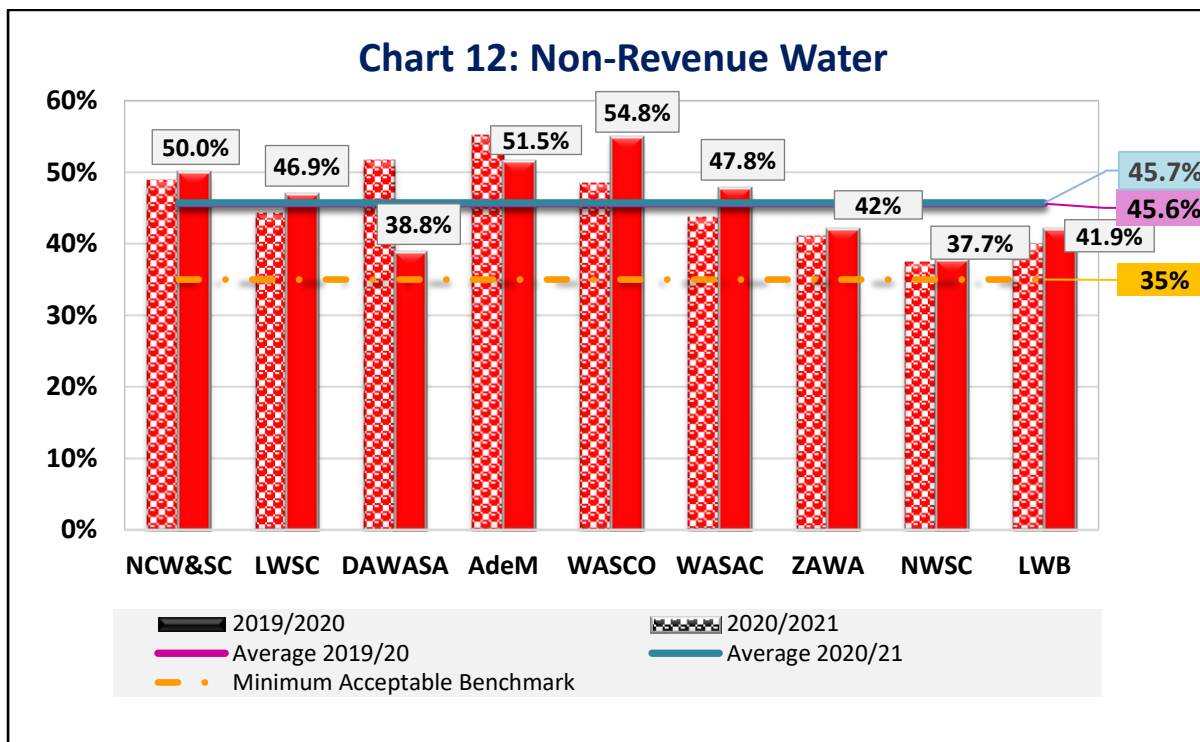


KPI	Good	Acceptable	Poor
Metering Ratio	100	99 – 90	< 90

Despite the fact that the majority of Utilities maintained 100% metering ratio, the average performance slightly reduced and was still below the acceptable benchmark of 90%. This was attributed to declined metering ratio reported by ZAWA (34.6%) and AdeM (82%).

### 5.4.3.3. Water Losses

Water loss expressed as Non-Revenue Water (NRW) is water that has been placed in the distribution system but is either lost before reaching the customer or does not translate into revenue at a predetermined price. It measures the efficiency of a Utility in delivering the produced water to customers' take-off points against the revenue generated. It is made up of technical losses (leakages) and commercial losses (illegal connections/water theft, metering errors and unbilled authorised consumption). Water losses imply revenue loss and becomes a key area for Utilities to address urgently.



KPI	Good	Acceptable	Poor
NRW	<30	30 – 35	>35

As indicated in Chart 12, NRW continues to be a challenge for all the Utilities, none of them was able to achieve at least the acceptable benchmark with an average performance of 45.7%. Nevertheless, DAWASA made a significant improvement by reducing its NRW from 51.7% to 38.8%. A slight reduction was also noticed for AdeM from 55.1% to 51.5%. WASCO, WASAC and LWB experienced declines in their performance.

There are different perspectives as to how NRW can be measured. Table 10 shows the results of NRW evaluated based on distribution network and the number of connections.

**Table 10: Non-Revenue Water in terms of length of network and connections**

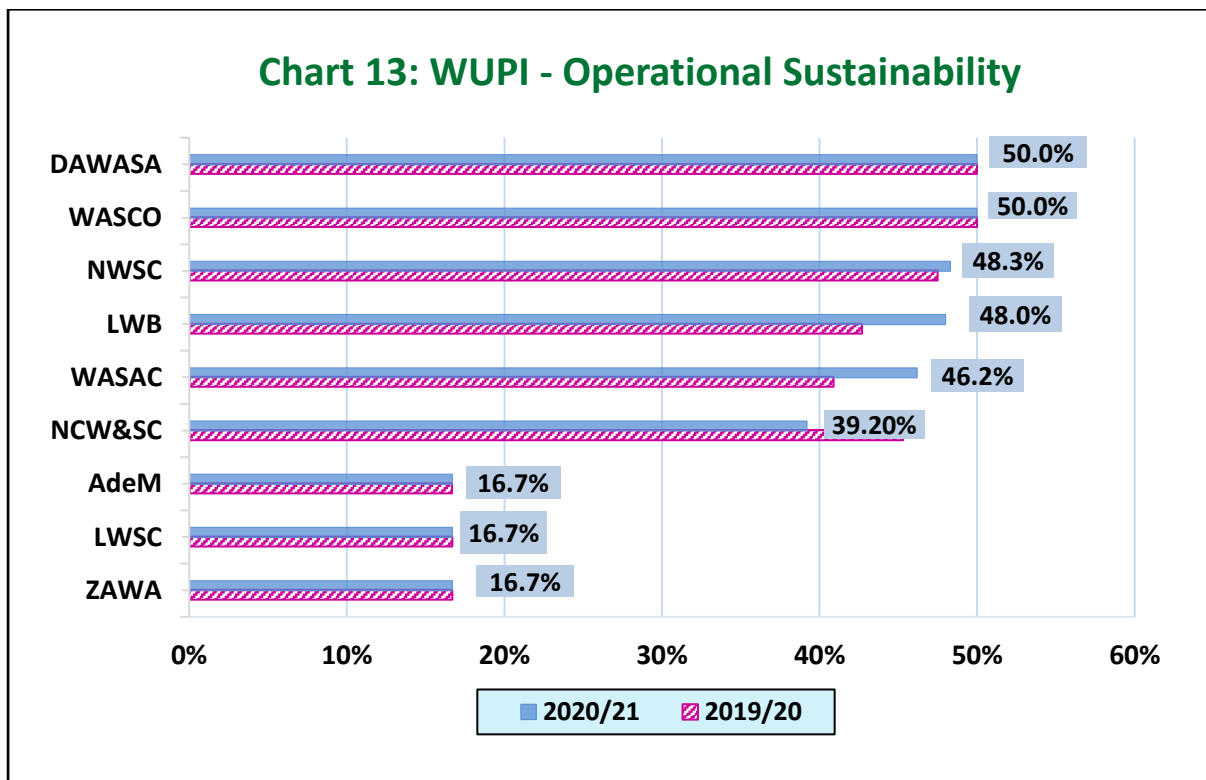
Utility	Length of Network (km)	Water Production (m <sup>3</sup> )	Water Connections	Non-Revenue Water		
				%	m <sup>3</sup> /km/day	L/conn/day
NCW&SC	5,797	179,341,134	232,946	50.0%	42.4	1,054.6
LWSC	2,487	87,675,068	130,150	46.9%	45.3	865.6
DAWASA	4,623	145,887,831	343,091	38.8%	33.5	452.0
AdeM	3,358	86,885,000	288,051	51.5%	36.5	425.6
WASCO	2,202	25,186,338	110,750	54.8%	17.2	341.4
WASAC	15,698	59,524,103	263,344	47.8%	5.0	296.0
ZAWA	2,617	67,676,477	124,776	42.1%	29.8	625.6
NWSC	20,489.73	144,105,256	775,794	37.7%	7.3	191.9
LWB	2,273.65	38,581,843	96,589	41.9%	19.5	458.5

From Table 10, in terms of the porousness of the network by length, NWSC and WASAC had the longest network yet the lowest losses of 7.3 and 5.0 m<sup>3</sup>/km/day. On contrary, LWSC with a relatively short network had the highest water losses of 45.3 m<sup>3</sup>/km/day.

In terms of losses by connections, NWSC is a representation of an ideal case, with least losses despite having the highest number of connections. This, however, is not the case for NCW&SC which had relatively high number of connections but with high water losses of 1,054.6 L/conn/day. LWSC despite having the 4<sup>th</sup> lowest number of connections, still had the highest water losses per connection as well implying possibilities of illegal connections. WASAC with the lowest losses per km of network, had relatively high losses per connections.

#### 5.4.3.4. Integrated Performance – Operational Sustainability

The WUPI - Operational Sustainability shown in Chart 13 is based on the aggregation of the three KPIs; Staff per 1,000 Water and Sewer Connections, Non-Revenue Water and Metering Ratio.



DAWASA and WASCO maintained the first place with the same score of 50% owing to good performance in Staff per 1,000 Water and Sewer Connections and Metering Ratio indicators. Additionally, DAWASA reduced its Non-Revenue Water significantly. NWSC, LWB and WASAC made improvement and occupied the third, fourth and fifth places. On the other hand, the performance of NCW&SC decreased from 45.3% to 39.2% and that of AdeM, LWSC and ZAWA remained the same at 16.7%.

## 5.5 SUMMARY ANALYSIS

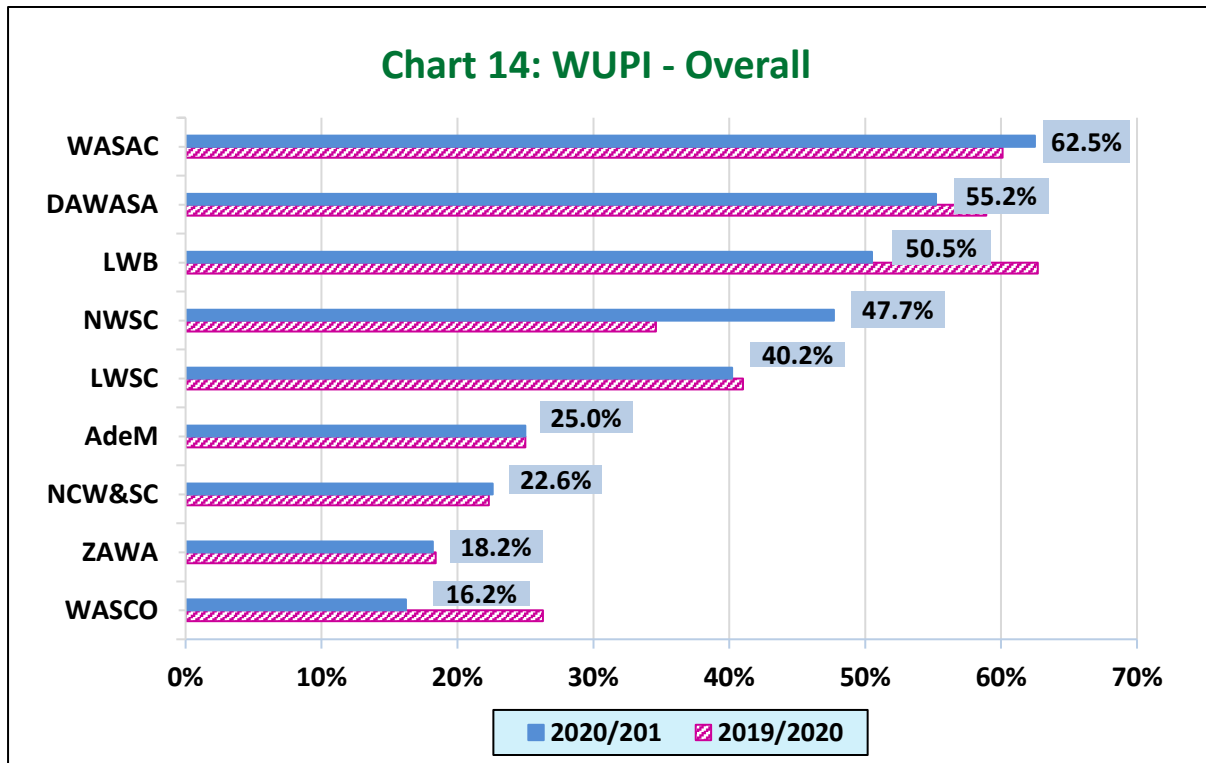
The performance analysis of the Utilities on the ten selected single KPIs is summarized in Table 11 and an Overall WUPI is shown in Chart 14. The Overall WUPI is derived by aggregating the three WUPI of Quality of Services, Economic Efficiency and Operational Sustainability.

**Table 11: Summary of Utilities performance**

	KPI	NCW&SC	LWSC	DAWASA	AdeM	WASCO	WASAC	ZAWA	NWSC	LWB
Quality of Services	Water Coverage	82.3%	93.7%	84.8%	50.8%	59.7%	80.3%	92.4%	78.0%	84.12%
	Sewerage Coverage	50.0%	18.1%	12.4%	-	4.4%	-	9.8%	22.9%	-
	Water Quality	93.2%	98.2%	99.0%	100%	95.4%	99.4%	92.3%	99.0%	86.79%
	Hours of Supply	8	16	21	15	18	21	14	18	19
Economic Efficiency	O&M Cost Coverage	98.9%	102.9%	108.2%	82.2%	95.1%	254.3%	73.2%	121.2%	126.26%
	Collection Efficiency	92.9%	100.0%	106.4%	84.8%	76.0%	104.2%	84.5%	101.1%	127.42%
	Staff Cost vs O&M Costs	64.4%	42.7%	37.1%	28.0%	41.8%	63.2%	31.8%	42.3%	25.7%
Operational Sustainability	Staff/1,000 W&S Connections	6.95	4.45	4.31	3.34	4.48	5.68	4.49	5.30	5.35
	Metering Ratio	100.0%	71.7%	100.0%	82.0%	100%	100%	34.6%	100.0%	100.00%
	NRW	50.0%	46.9%	38.8%	51.5%	54.8%	47.8%	42.1%	37.7%	41.91%

All the Utilities maintained acceptable performance in Staff/1,000 W&S Connections. Conversely, the worst performance by all the Utilities was in Non-Revenue Water where none met the acceptable benchmark.

From the Overall WUPI in Chart 14, WASAC of Rwanda obtained the first position displacing LWB that ranked third following a significant drop in overall performance. DAWASA took second position and NWSC fourth with an improvement of 12.7%. WASCO recorded a deterioration in performance and came last.





## CHAPTER 6. PERFORMANCE TREND ANALYSIS

### 6.1 TRACKING PERFORMANCE TRENDS OVER 5 YEARS

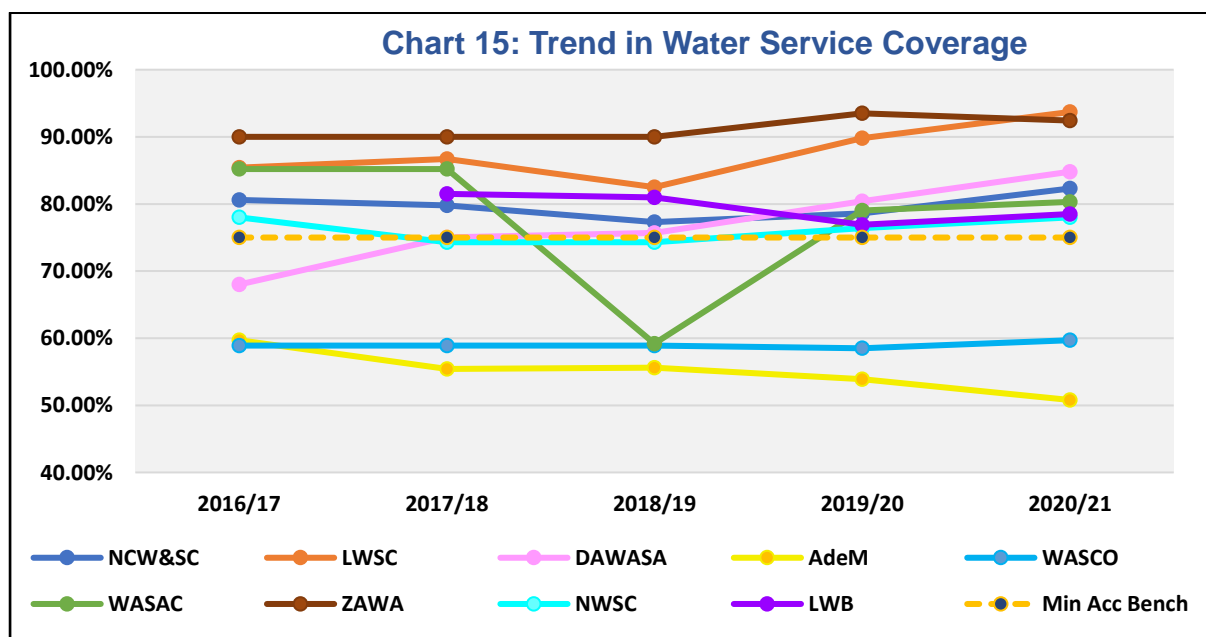
The regional benchmarking exercise started in 2013/14 and for the first two years only six regional Utilities participated. In 2015/16, the exercise encompassed eight Utilities and this number increased to nine in the following year and ultimately to ten Utilities since 2017/18. Therefore, it was deemed opportune to reflect on how performance has progressed over a period of the last 5 years with a maximum number of Utilities participating. REGIDESO which did not submit data for some periods, was not included in this analysis.

The performance trend analysis aims to draw comparison with past performance and indicate progress towards achieving the set benchmarks. The exercise helps to identify where Utilities are improving, stagnant or declining in their performance. Moreover, from the performance trends, it is possible to identify persistent challenges, strengths and weaknesses of Utilities vis-à-vis performance indicators. This can provide guidance on exchange of good practices, learnings, mentor and mentee programs for the benefit of benchmarked Utilities and promotion of WSS service provision.

### 6.2 PERFORMANCE TREND IN QUALITY OF SERVICE

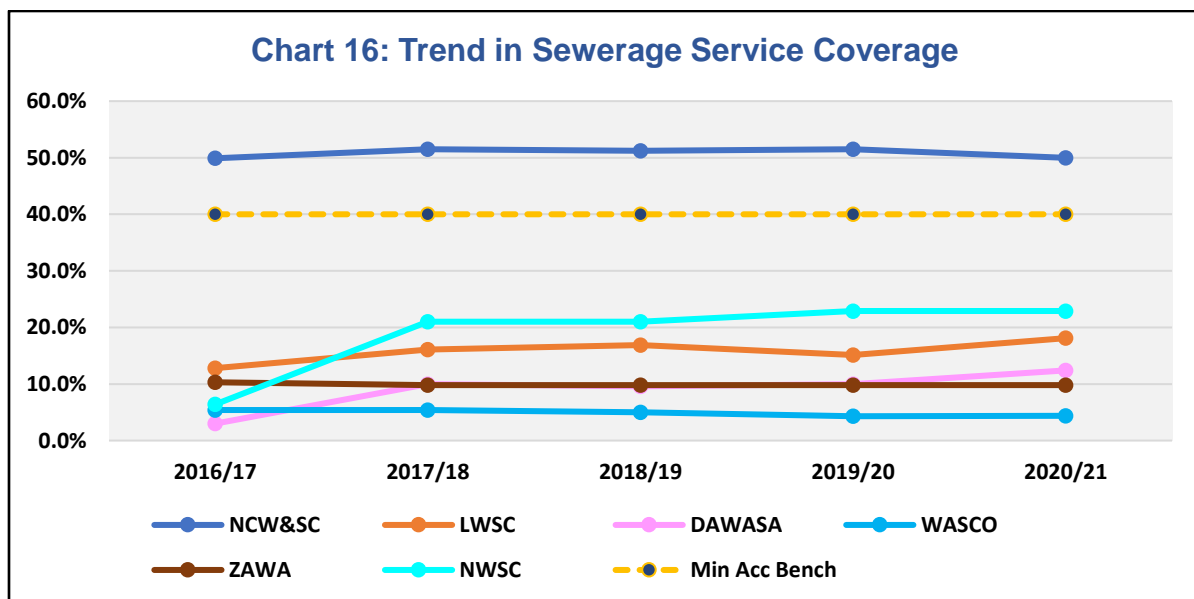
#### 6.2.1 Water Supply Coverage

As indicated in Chart 15, from 2017/18, seven of the nine Utilities maintained performance at or above the minimum acceptable benchmark of 75% despite a significant drop in performance by WASAC below the benchmark in 2018/19. WASCO and AdeM consistently recorded performance far below the minimum acceptable benchmark and only AdeM continued to decline in coverage. The high performance signals a potential to revise the minimum acceptable benchmark upwards to further push the Utilities towards 100% coverage.



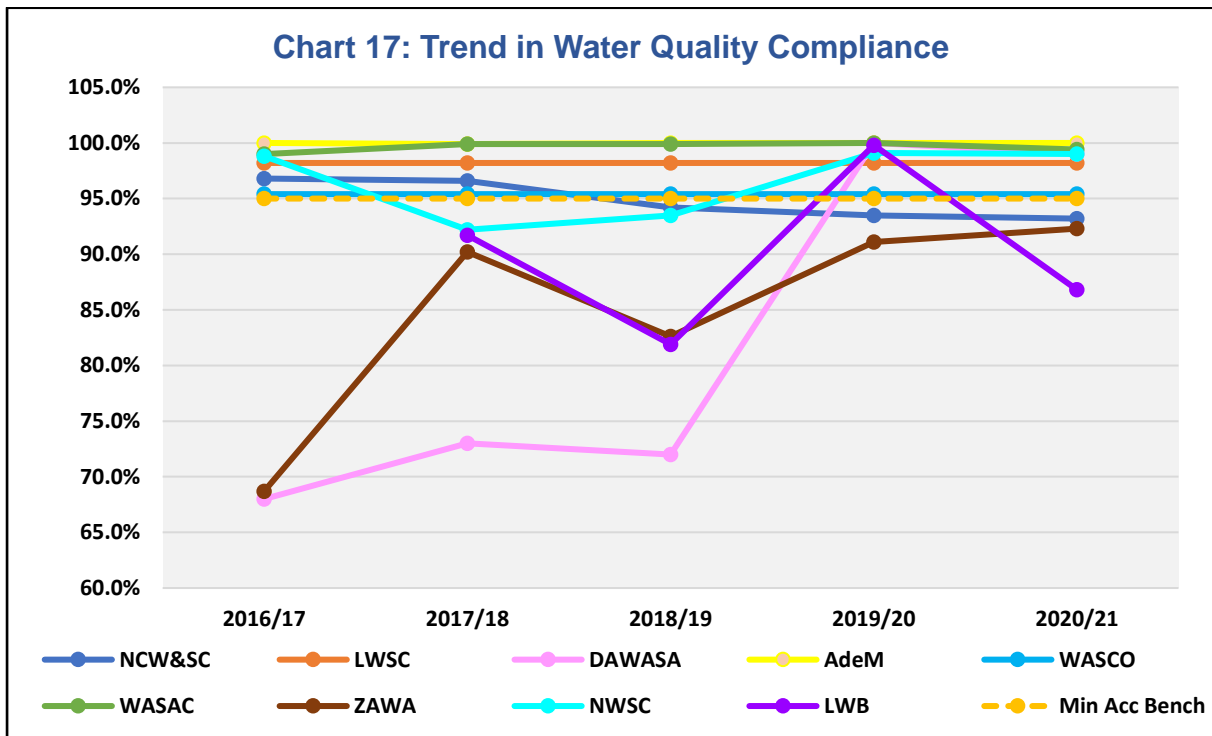
### 6.2.2 Sewerage Service Coverage

Only NCW&SC maintained performance above the minimum acceptable benchmark for service coverage at 40% but with declining performance. Disconcertingly, the increase in service access by sewer network was very minimal, if any. This situation continues to underscore the need for a holistic approach to sanitation that considers both sewered and non-sewered services. Having recognised that the majority of the population in the region rely on onsite sanitation, ESAWAS is in the process of amplifying KPIs for service monitoring and tracking with non-sewered services being brought under regulation.



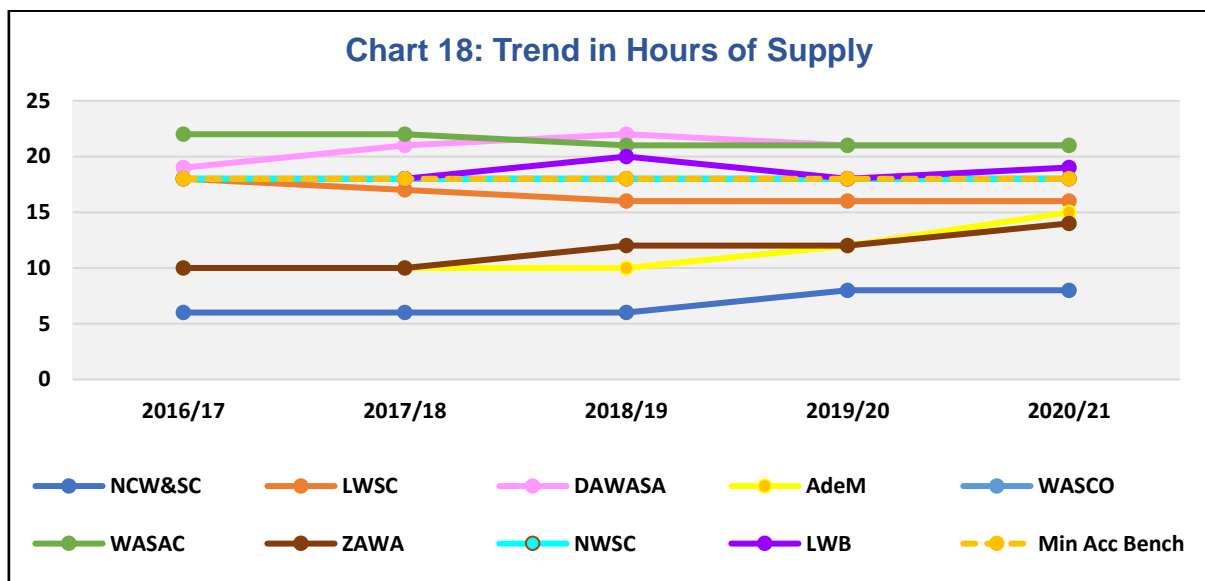
### 6.2.3 Water Quality

Chart 17 shows a steady performance in maintaining water quality compliance above 95% for five Utilities namely: AdeM, WASAC, LWSC, WASCO and NWSC. DAWASA, ZAWA and LWB had widely fluctuating performance mainly due to challenges in meeting the number of tests to be performed and those complying with quality standards. NCW&SC performance gradually declined to below acceptable benchmark from 2017/18.



#### 6.2.4 Hours of Water Supply

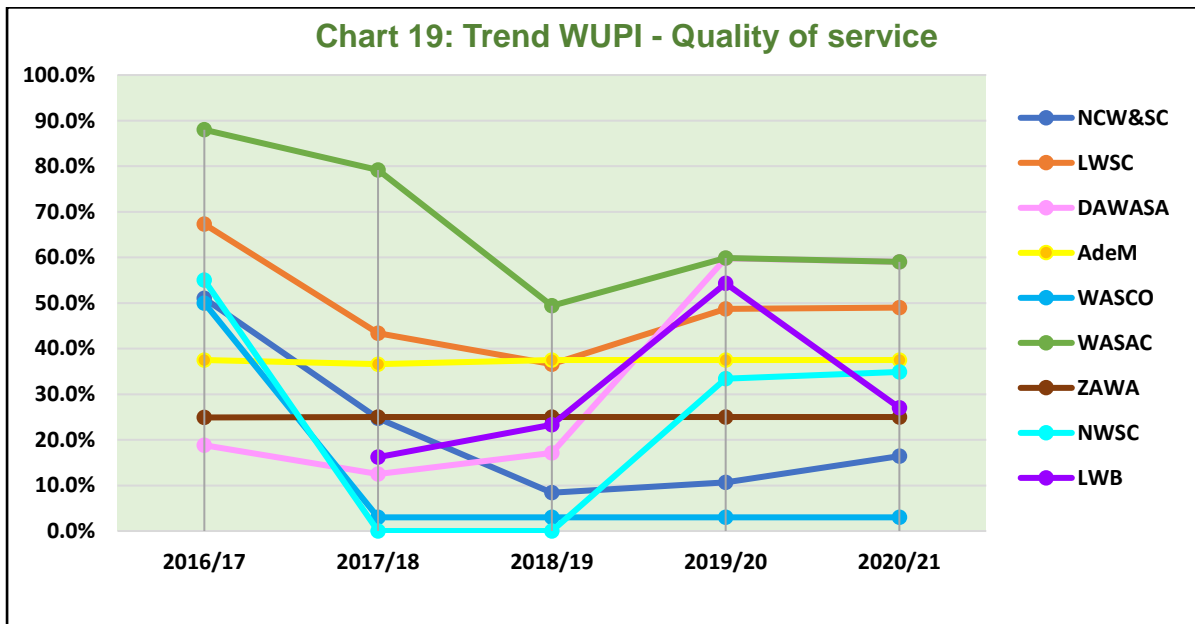
From Chart 18, five Utilities (DAWASA, LWB, WASAC, NWSC and WASCO) met the minimum acceptable benchmark with DAWASA and WASAC maintaining the highest hours of supply at 22. AdeM, LWSC, NCW&SC and ZAWA remained below the acceptable benchmark despite improvements, except LWSC which declined from 2017/18 onwards. NCW&SC with the highest number of connections, continued reporting the lowest hours of 6 to 8. Despite performance below the minimum acceptable, AdeM significantly increased hours of supply in the last 3 periods from 10 to 12 and 15 hours per day.



Note: NWSC and WASCO recorded 18 hours of supply hence overlapping Min Acc Bench

### 6.2.5 Integrated Performance Trend in Quality of Service

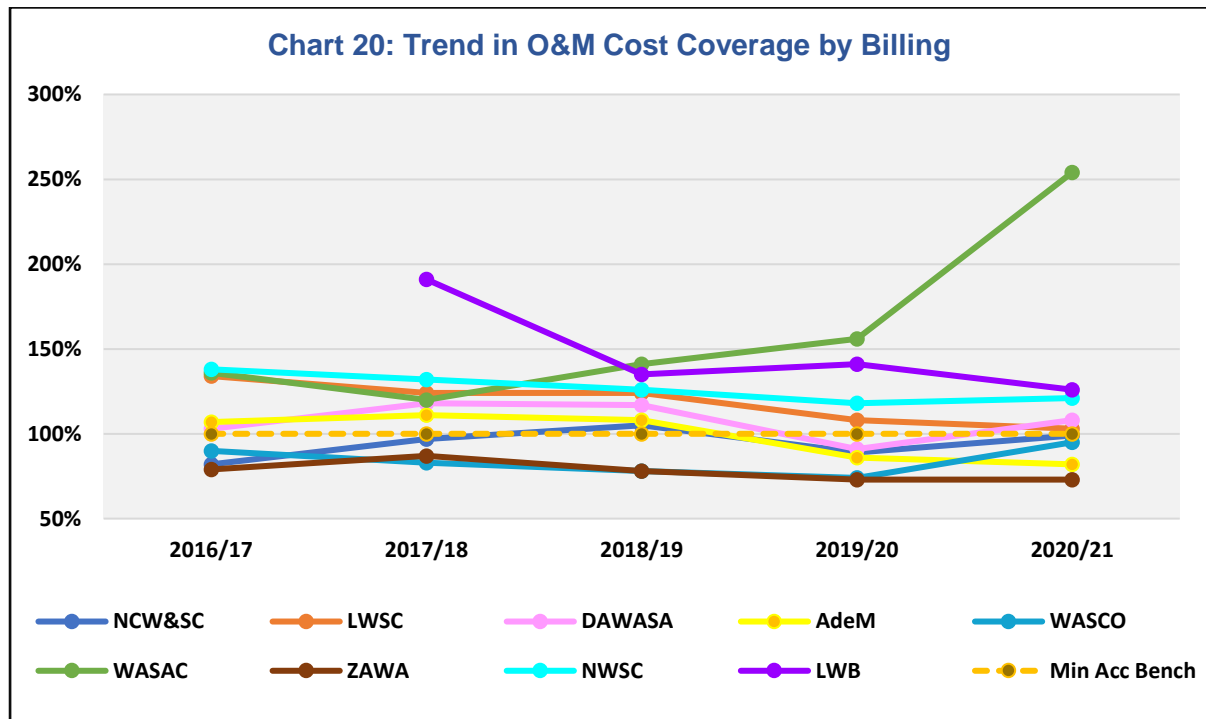
The overall performance in Quality of Service in Chart 19 combining indicators on Water Coverage, Sewerage Coverage, Water Quality and Hours of Supply during the last 5 years showed that WASAC ranked the best in all 5 periods despite a decline in 2018/19 caused by drop in Water Coverage. LWSC, DAWASA and NWSC improved their performance ranking over time. WASCO ranked lowest for 4 consecutive periods.



### 6.3 PERFORMANCE TREND IN ECONOMIC EFFICIENCY

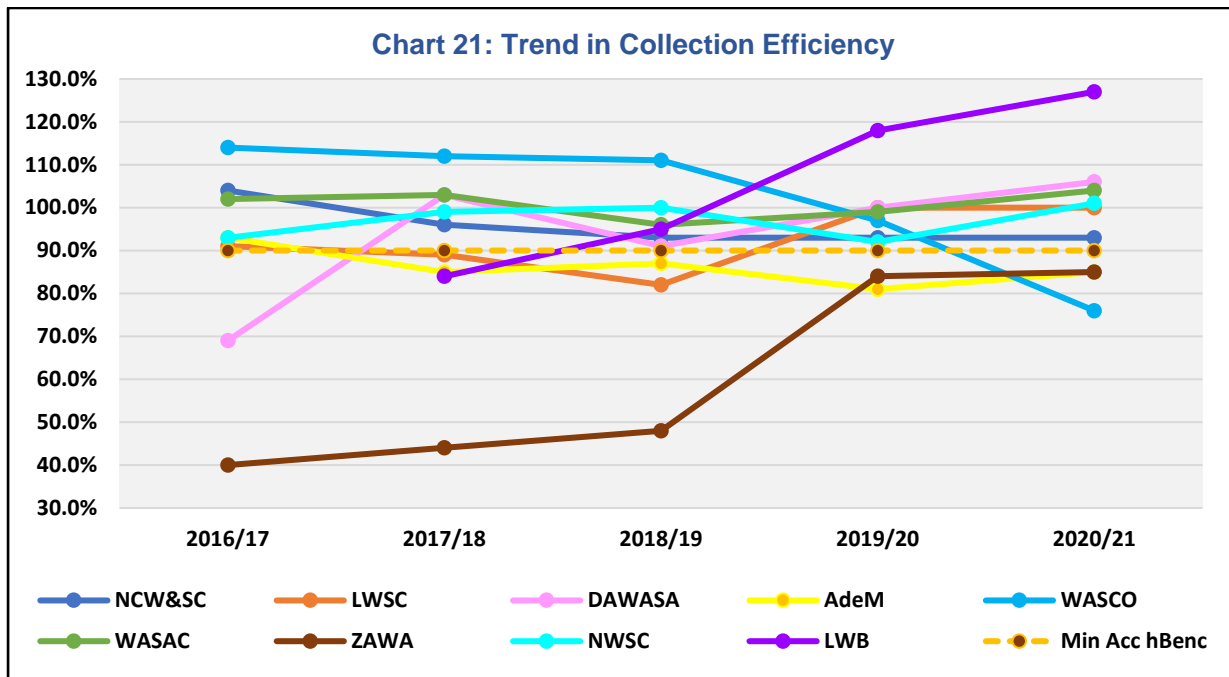
#### 6.3.1 Operation & Maintenance Cost Coverage by Billing

Generally, the most of the Utilities were able to cover O&M costs from billed revenues, for the majority of the period. The reported significant increase for the case of WASAC in 2020/2021 was attributed to its efforts in billing and reduction in overall operational expenses. NCW&SC, WASCO and ZAWA were below the minimum acceptable benchmark. Most notably cost coverage declined for most Utilities between 2018 and 2020 corresponding to the height of the Covid-19 pandemic and slow-down in industry operations (commercial, businesses and schools).



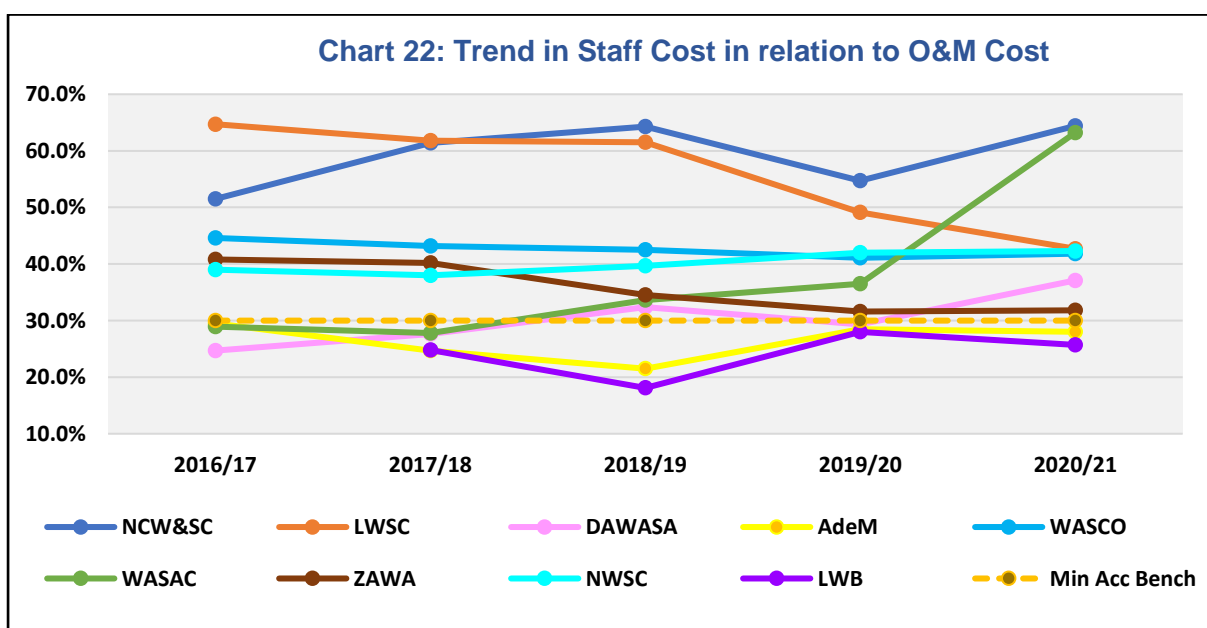
### 6.3.2 Collection Efficiency

As shown in Chart 21 only AdeM and ZAWA could not meet the acceptable benchmark of 90%. However, it is worth noting the sharp increases in performance by ZAWA, NWSC and LWB in 2019/20.



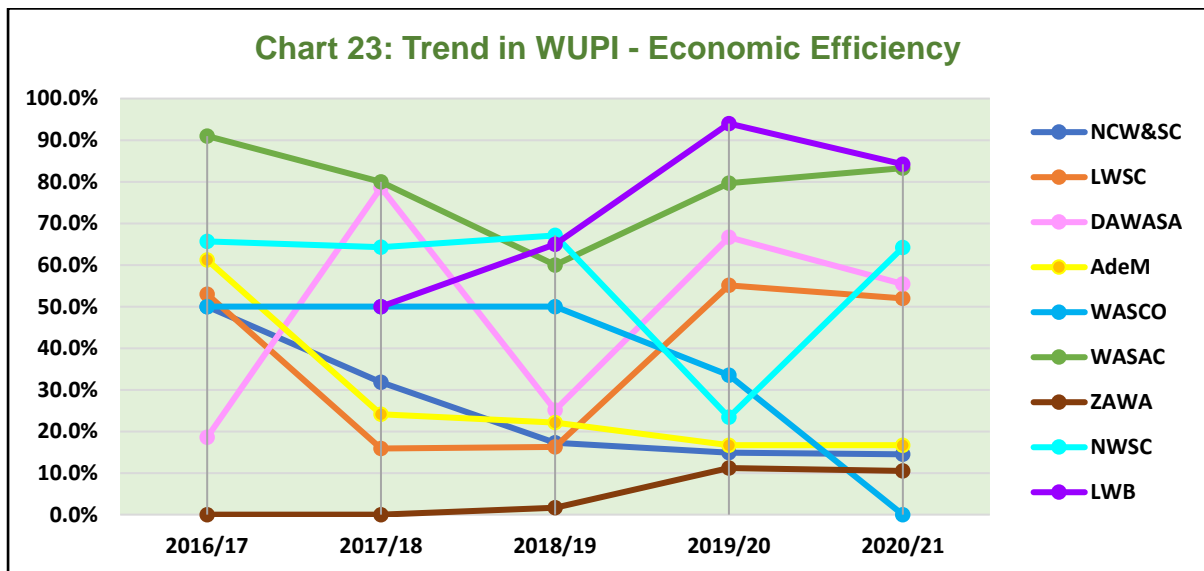
### 6.3.3 Staff Cost in relation to O&M Cost

As per Chart 22, almost all Utilities had low performance with regard to staff cost as a proportion of O&M costs except AdeM and LWB that met the maximum acceptable benchmark of 30%. Nevertheless, LWSC and ZAWA made notable improvements in the past 4 years whereas the performance of WASAC deteriorated over the years.



### 6.3.4 Integrated Performance Trend in Economic Efficiency

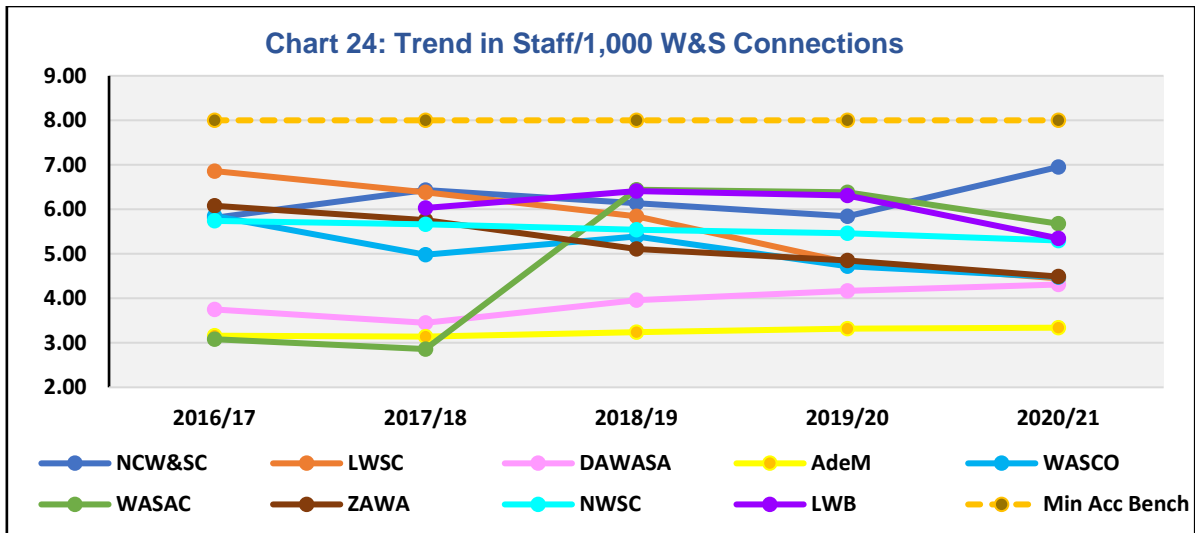
Chart 23 on WUPI-Economic Efficiency trend shows fluctuating trend in the performance of all the Utilities with WASCO, NCW&SC and AdeM exhibiting a declining pattern in their performance. Despite a slight improvement in the last 3 years, ZAWA still ranked lowest throughout. The top spots were held by LWB and WASAC for two consecutive years while WASAC maintained in the top three throughout the period.



## 6.4 PERFORMANCE TREND IN OPERATIONAL SUSTAINABILITY

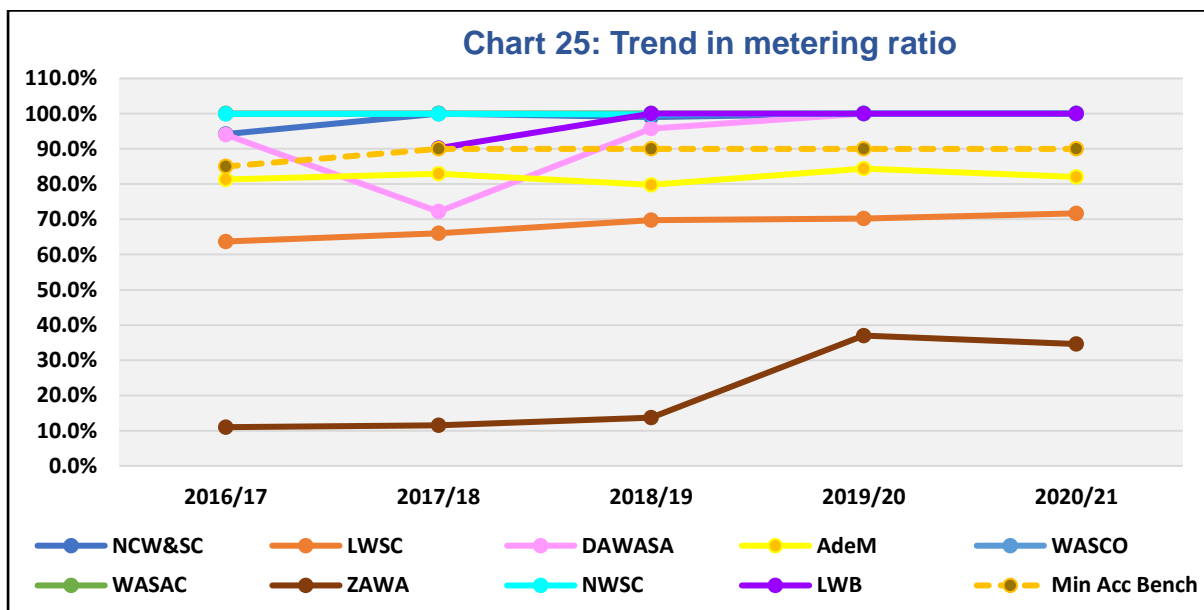
### 6.4.1 Staff per 1,000 Water and Sewer Connections

Regarding staff efficiency, all the Utilities met the maximum acceptable benchmark with AdeM and DAWASA maintaining a good performance of less than 5 staff/1,000 connections. Additionally, ZAWA, WASCO and LWSC achieved this performance in the last two years.



### 6.4.2 Metering Ratio

As shown in Chart 25, WASAC, WASCO and NWSC maintained 100% metering ratio for the whole period of five years despite increasing connections. LWB and NCW&SC achieved and maintained full metering ratio from 2018/19 while DAWASA achieved this benchmark from 2019/20. AdeM and LWSC continued to make slow strides to improvement while ZAWA made marked progress in 2019/20 but thereafter declined.

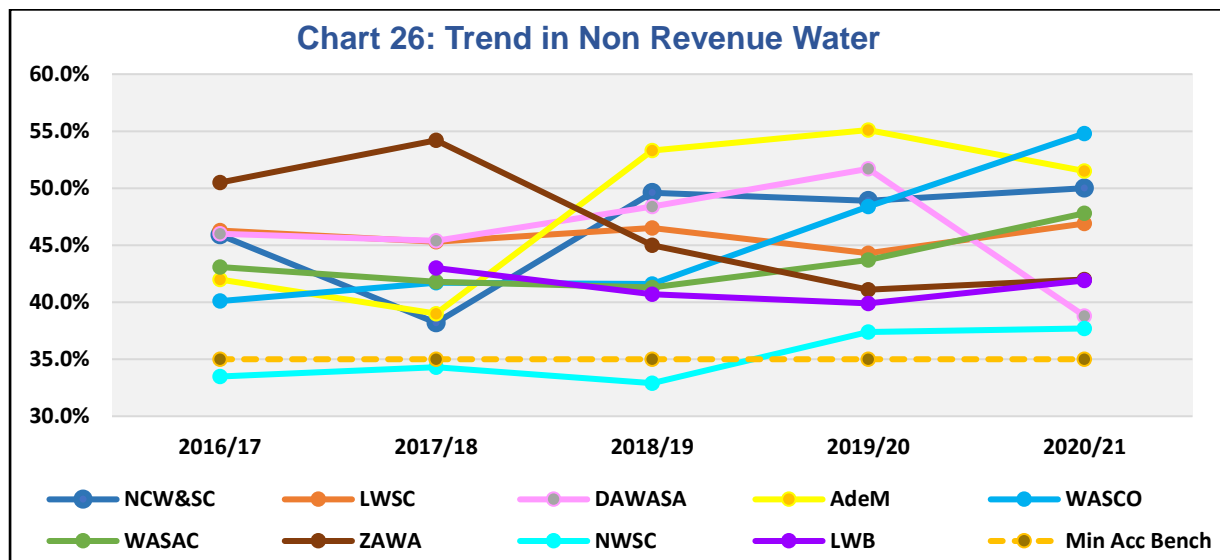


Note: WASAC, WASCO and NCW&SC recorded the same metering ratio of 100% resulting in overlap on the chart.



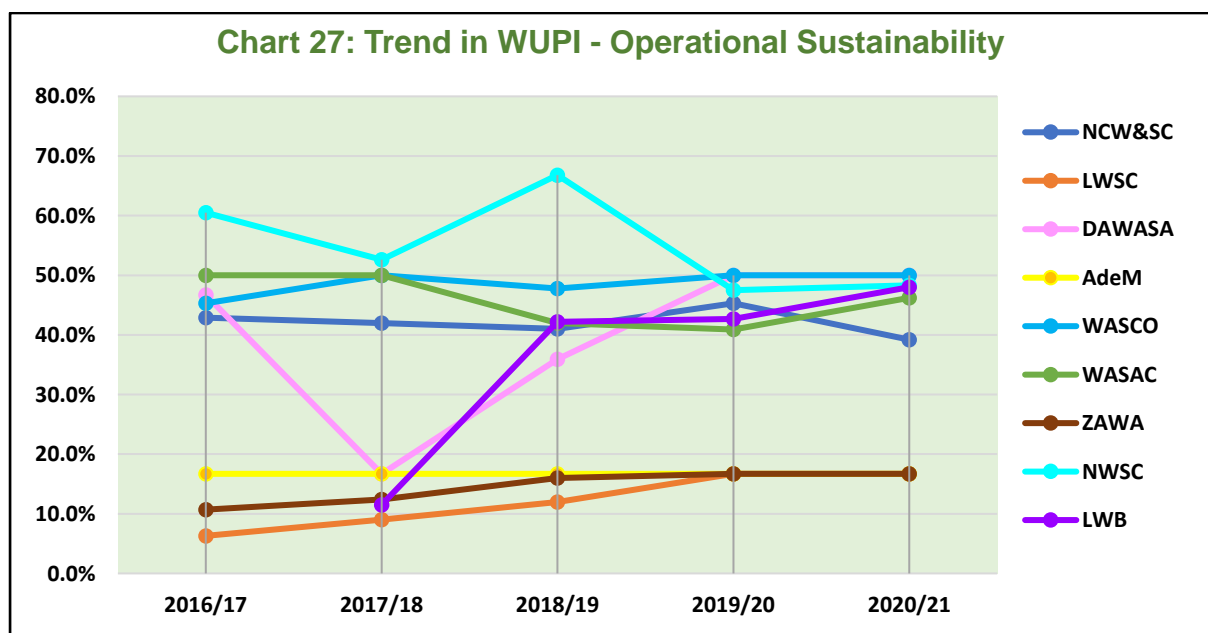
### 6.4.3 Water Losses

Non-Revenue Water is the most challenging indicator for all the benchmarked Utilities as none of them has been able to meet the maximum acceptable benchmark of 35%. The most significant reductions during the period were reported by ZAWA and DAWASA. The rest of the Utilities continued to incur more losses, including NWSC, which had previously achieved the acceptable benchmark. Urgent interventions, particularly for commercial losses, are needed in the sector.



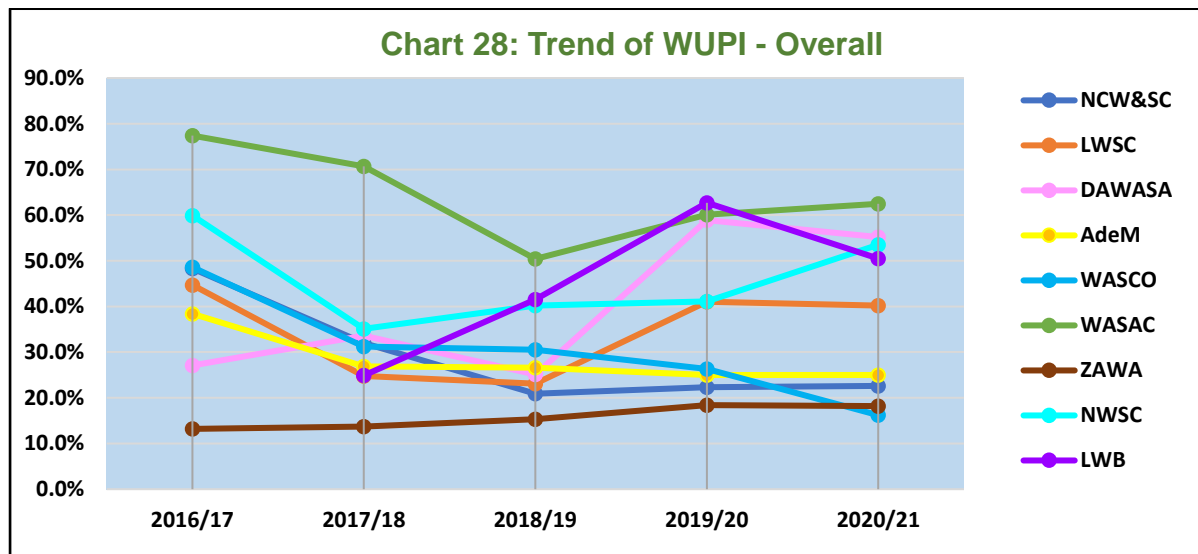
### 6.4.4 Integrated Performance Trend in Operational Sustainability

From the Chart 27 on WUPI – Operational Sustainability, the trend indicates a steady and slightly changing performance for AdeM, LWSC, ZAWA, NCW&SC and WASCO and a highly fluctuating performance for DAWASA, LWB, NWSC and WASAC. The top 2 slots were held by NWSC and WASCO for the majority of the period while LWSC and ZAWA trended bottom.



## 6.5 TREND IN OVERALL PERFORMANCE

The overall performance trend shows inconsistent performance of all Utilities over the considered period of 5 years. From Chart 28, most of the Utilities experienced a decline in their overall performance for 2017/18 and 2018/19. A significant improvement in performance was observed for WASAC, LWB, DAWASA and LWSC in 2019/20. WASCO and AdeM recorded deterioration in their performance. Despite being ranked lowest, ZAWA showed a slight but continuous improvement in its performance over the years.

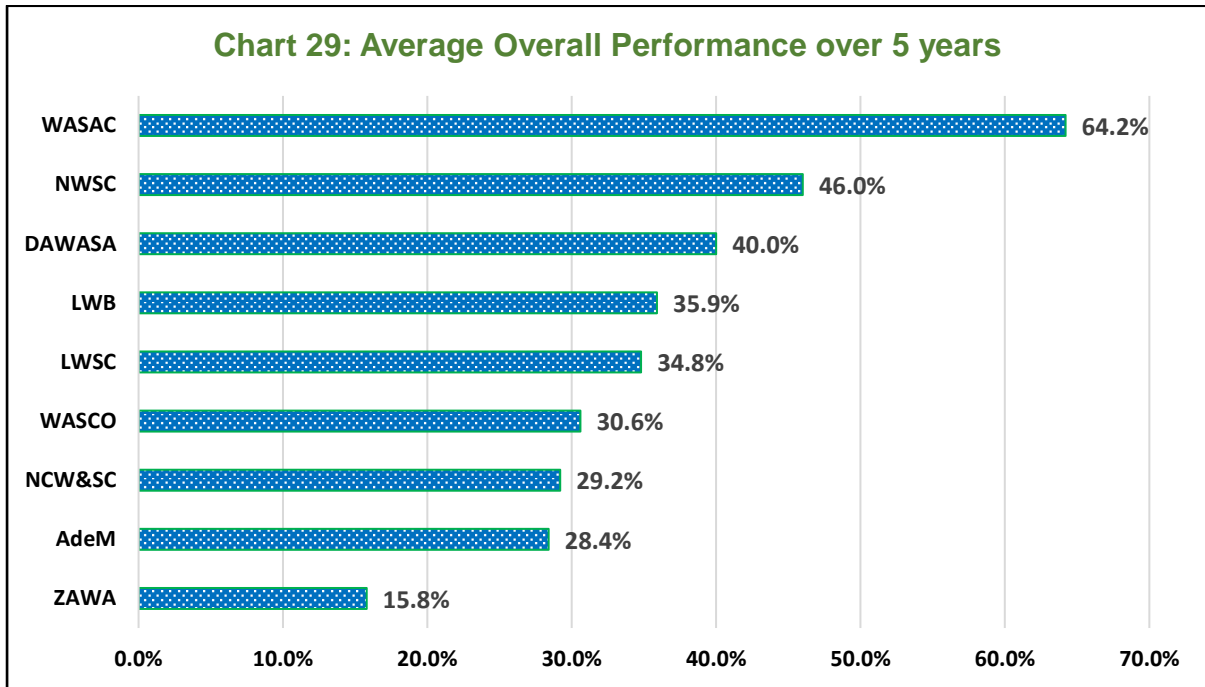


From Table 12 and Chart 29 depicting the average performance over 5 years, WASAC was the best performer followed by NWSC and DAWASA.

**Table 12: Average performance trend**

WUPI – Overall over 5 years							Ranking
	2016/17	2017/18	2018/19	2019/20	2020/21	Average	
WASAC	77.4%	70.7%	50.4%	60.1%	62.5%	64.2%	1
NWSC	59.9%	35.1%	40.2%	41.1%	53.5%	46.0%	2
DAWASA	27.1%	33.6%	25.1%	58.9%	55.2%	40.0%	3
LWB		24.9%	41.5%	62.7%	50.5%	35.9%	4
LWSC	44.7%	24.8%	23.1%	41.0%	40.2%	34.8%	5
WASCO	48.6%	31.2%	30.5%	26.3%	16.2%	30.6%	6
NCW&SC	48.3%	32.0%	20.9%	22.3%	22.6%	29.2%	7
AdeM	38.4%	26.9%	26.6%	25.0%	25.0%	28.4%	8
ZAWA	13.2%	13.7%	15.3%	18.4%	18.2%	15.8%	9

ZAWA remained the least performer with an average of 15.8% followed by AdeM and NCW&SC with average scores of 28.4% and 29.2% respectively.







## CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS




Benchmarking is a strategic tool that can stimulate improvements in the performance of an industry. It helps identify the system strengths and weaknesses and provides opportunity for enhancing operational efficiencies. Thus, the benchmarked Utilities should examine their own operations further, draw the inspiration from others and embrace good practices as they strive to make improvements.

This section provides a general picture of the performance of benchmarked Utilities. Using the average performance, Table 13 provides an overview of the progress on Key Performance Indicators in the period under review. The trend analysis of past performance of benchmarked Utilities showed fluctuating performance for different indicators except ZAWA which had a slow but improving performance pattern. Overall, six of the ten benchmarks were met with improving trends in six KPIs as well.

**Table 12: Progress on Key Performance Indicators**

KPIs		2019/20	2020/21	Progress	Benchmark
Quality of Service	Water service coverage %	76.9	78.5	↑	75
	Sewerage service coverage %	19	20	↑	40
	Water quality %	96	96	→	95
	Hours of supply	16	17	↑	18
Economic Efficiency	O&M cost coverage by billing %	104	118	↑	100
	Collection efficiency %	96	97	↑	90
	Staff cost in relation to O&M cost %	37.5	41.9	↓	30
Operational Sustainability	Staff/1,000 W&S connections	5.10	4.93	↑	8
	Metering ratio %	87.9	87.6	↓	90
	NRW	45.6	45.7	↓	35
 Increase  Decline  Benchmark met  Benchmark not met					

With regard to the three components of KPIs:

-  **Quality of Service** – generally, there was an overall improvement in the Quality of Service indicators except for Water Quality where the average performance declined by 1.5%. Utilities need a more holistic picture of sanitation services by incorporating non-sewered sanitation.
-  **Economic Efficiency** –O&M Cost Coverage and Collection efficiency improved. However, there was notable decrease in Staff Cost vs O&M Cost.
-  **Operational Sustainability** – Operational Sustainability was the worst performing category affected by a dropping average performance in Metering Ratio and NRW indicators. Arresting the significant water losses needs more consolidated efforts among Utilities to adopt good practices with regards to NRW management.

The following conclusions and recommendations can be drawn for each individual Utility using an overview of performance in the good, acceptable and poor benchmarks for all ten KPIs in Table 14:

**Table 14: Performance of Utility per indicators**

Utility	Good performance	Acceptable performance	Poor performance	Conclusions and Recommendations
<b>NCW&amp;SC</b>	Metering ratio	Water coverage Sewerage coverage Collection efficiency Staff/1000 W&S Connections	Water quality Hours of Supply O&M Cost coverage by billing Staff Cost vs O&M Cost NRW	The Kenyan Utility performed well in metering ratio and maintained the highest sewerage coverage among all the Utilities at 50%. NCW&SC maintained acceptable performance in 4 KPIs over a 5-year period. However, efforts are required to improve the KPIs with low performance, particularly hours of water supply which have been below 10 for more than 5 years.
<b>LWSC</b>	Water coverage Collection Efficiency Staff/1000 W&S Connections	Water quality O&M Cost coverage by billing	Sewerage coverage Hours of Supply Staff Cost vs O&M Cost Metering ratio NRW	The Zambian Utility achieved good performance in water coverage, collection efficiency and staff/1,000 connections with two KPIs in the acceptable benchmark. However, significant improvements are needed in 5 KPIs, particularly NRW which increased with time, coupled with less than 100% metering ratio.
<b>DAWASA</b>	Collection Efficiency Staff/1000 W&S Connections Metering ratio	Water coverage Water quality Hours of Supply O&M Cost coverage by billing	Sewerage coverage Staff Cost vs O&M Cost NRW	The Tanzanian Utility made notable improvements in water coverage, water quality, collection efficiency and metering ratio over the last five years with 3 KPIs meeting the good and 4 KPIs the acceptable benchmarks. Nevertheless, the Utility needs to continue efforts in 3 KPIs with low performance, especially sewerage coverage.
<b>AdeM</b>	Water quality Staff Cost vs O&M Cost Staff/1000 W&S Connections	-	Water coverage Hours of Supply O&M Cost coverage by billing Collection efficiency Metering ratio NRW	The Mozambican Utility was the best performer for water quality and staff efficiency and the second-best performer in staff cost vs O&M cost with all three in the good benchmark. However, effort is needed to improve its performance to at least acceptable benchmark for all other indicators.
<b>WASCO</b>	Staff/1000 W&S Connections Metering ratio	Water quality Hours of supply	Water coverage Sewerage coverage O&M Cost coverage by billing Collection efficiency Staff Cost vs O&M Cost NRW	The Lesotho Utility achieved good performance in staff efficiency and metering ratio and acceptable performance in 2 KPIs. However, efforts are required to improve 6 KPIs with emphasis on the declining collection efficiency as well as increasing NRW.

Utility	Good performance	Acceptable performance	Poor performance	Conclusions and Recommendations
<b>WASAC</b>	O&M Cost coverage by billing Collection efficiency Metering ratio	Water coverage Water quality Hours of supply Staff/1000 W&S Connections	Staff Cost vs O&M Cost NRW	The Rwandese Utility maintained the first position owing to good performance in 3 KPIs as well as acceptable performance in 4 KPIs. Despite this performance, the Utility has to improve on Staff cost vs O&M Cost which is more than double of acceptable threshold and increasing NRW.
<b>ZAWA</b>	Water Coverage Staff/1000 W&S Connections	Staff Cost vs O&M Cost	Sewerage coverage Water quality Hours of supply O&M Cost coverage by billing Collection efficiency Metering ratio NRW	The Zanzibari Utility performed well in Water Coverage and Staff/1,000 Connections indicators and its performance in Staff cost vs O&M Cost met the acceptable benchmark. The performance trend over 5 years indicates that this Utility has been progressively making improvements in all indicators. However, 7 KPIs remain below acceptable and concerted efforts are required to improve.
<b>NWSC</b>	Collection efficiency Metering ratio	Water coverage Water quality Hours of supply O&M Cost coverage by billing Staff/1000 W&S Connections	Sewerage Coverage Staff Cost vs O&M Cost NRW	The Ugandan Utility made significant improvement in a number of KPIs with 2 meeting the good benchmark and 5 the acceptable benchmark. However, 3 KPIs were below acceptable and particular work is needed on sewerage coverage, and to arrest the increasing NRW.
<b>LWB</b>	Collection efficiency Staff Cost vs O&M Cost Metering ratio	Water coverage Hours of supply O&M Cost coverage by billing Staff/1000 W&S Connections	Water quality NRW	The Malawian Utility achieved good performance in 3 KPIs and acceptable performance in 4 KPIs. However, its overall WUPI performance reduced significantly and the Utility needs to address poor water quality compliance and increasing NRW.

## Annex 1. COMMON KPIS WITH BENCHMARKS SET BY EACH REGULATOR

	WATER COVERAGE	SEWERAGE COVERAGE*	WATER QUALITY	HOURS OF SUPPLY	NRW	O&M COST COVERAGE	COLLECTION EFFICIENCY	METERING RATIO	STAFF EFFICIENCY
<b>WASREB</b>			Residual Chlorine, Bacteriological						Staff per 1,000 water and sewer connections
<b>Acceptable Benchmark</b>	80-90%	80-90%	90-95%	16-20	20-25%	100-149%	85-95%	95-99%	5-8
<b>Weight</b>	30	15	30	20	25	25	20	15	20
<b>NWASCO</b>			Residual Chlorine, Bacteriological Physio-Chemical(Turbidity, pH, Metals, Colour)						Staff per 1,000 water connections
<b>Acceptable Benchmark</b>	80-90%	80-90%	95%	18-20	20-25%	100-150%	85-90%	100%	6-8
<b>Weight</b>	5	5	20	15	10	15	20	15	10
<b>EWURA</b>			E-Coli, Turbidity						Staff per 1,000 water connections
<b>Service Level Benchmark</b>	100%	30%	98%	24	20%	150%	95%	100%	5
<b>Weight</b>	5	40	15	5	15	10	15	15	10
<b>AURA IP</b>		N/A	Residual Chlorine, Bacteriological, Physio-Chemical (Turbidity, pH, Conductivity)						Staff per 1,000 water connections
<b>Boundaries</b>	40-80%	-	65-100%	9-24	25-47%	85%-150%	80-90%	80-90%	10-15
<b>Weight</b>	5.5		33	5	25.5	13	8	5	5
<b>RURA</b>		N/A	Residual Chlorine, Bacteriological						Staff per 1,000 water connections
<b>Acceptable Benchmark</b>	80-90%		90-95%	16-20	20-25%	#	85-90%	95-99%	5-8
<b>Weight</b>	25	-	25	20	25		20	20	20
<b>LEWA, ZURA</b>			Residual Chlorine, Bacteriological						
<b>Benchmark</b>	Not yet defined								

\*Mozambique and Rwanda have separate entities providing sewerage services.

#The water Utility in Rwanda had until June 2014 been a single Utility providing both electricity and water. Hence, the Utility had been unable to separate O&M costs for water services only given that the costs incurred, for example at headquarters, could not be allocated either to electricity or water, thus the benchmark could not be defined.

## Annex 2. DETAILED PROFILES OF UTILITIES

<b>DAR ES SALAAM WATER AND SANITATION AUTHORITY (DAWASA) - TANZANIA</b>																							
<b>Water Utility</b>	<p>The DAWASA Act 2001 established Dar es Salaam Water and Sewerage Authority (DAWASA) responsible for operating and maintaining all water supply and sewerage services in the City of Dar es Salaam and the towns of Kibaha, Bagamoyo and the corridors of its two transmission lines. DAWASA changed its name in 2019 to Dar es salaam Water Supply and Sanitation Authority under the new Water Supply and Sanitation Act no 5 of 2009 which came in to operation on July 1st 2019. DAWASA reports functionally to the Ministry of Water and Irrigation.</p> <p>The total population in the DAWASA operation area is 7,528,962 people. The sources of water are Ruvu and Kizinga Rivers and 20 boreholes located in various areas within the service area. The Utility has a sewerage system with sewer line of 189.27km and eight (8) waste water stabilization ponds.</p>																						
<b>General Data About Water Utility</b>	<table> <tr> <td>Abbreviation</td> <td>DAWASA</td> </tr> <tr> <td>Start of Operations</td> <td>2005</td> </tr> <tr> <td>Number of Towns in Operation Area</td> <td>3</td> </tr> <tr> <td>Total Population in Operation/Service Area</td> <td>7,528,962</td> </tr> <tr> <td>Total Water Connections</td> <td>343,091</td> </tr> <tr> <td>Total Waste Water/Sanitation Connections</td> <td>20,004</td> </tr> <tr> <td>Total Production/year</td> <td>145,887,831 m<sup>3</sup></td> </tr> <tr> <td>Total Staff</td> <td>1,565</td> </tr> <tr> <td>Annual O&amp;M Costs</td> <td>TZS 130,209,200,000</td> </tr> <tr> <td>Annual Water and Sewerage billing</td> <td>TZS 140,837,500,000</td> </tr> <tr> <td>Annual Water and Sewerage Collections</td> <td>TZS 149,842,000,000</td> </tr> </table>	Abbreviation	DAWASA	Start of Operations	2005	Number of Towns in Operation Area	3	Total Population in Operation/Service Area	7,528,962	Total Water Connections	343,091	Total Waste Water/Sanitation Connections	20,004	Total Production/year	145,887,831 m <sup>3</sup>	Total Staff	1,565	Annual O&M Costs	TZS 130,209,200,000	Annual Water and Sewerage billing	TZS 140,837,500,000	Annual Water and Sewerage Collections	TZS 149,842,000,000
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## ÁGUAS DA REGIÃO DE MAPUTO (ADEM)- MOZAMBIQUE

### Water Utility

Maputo Water Supply System, supplies water to the metropolitan area of Maputo and is managed by the Water Society of Maputo Region (AdeM) under a Lease Contract.

In 2010, after evaluation by the Government of the Delegated Management Framework implementation process, FIPAG (Water Asset Management Fund) acquired the majority shareholder position of AdeM. Functionally, AdeM reports to the Ministry of Public Works.

The total population in the AdeM operation area is 2,519,104 people. The main source of water is the Umbeluzi River. The Utility does not provide sewerage services.

### General Data About Water Utility

Abbreviation	AdeM
Start of Operations	2010
Number of Towns in Operation Area	3
Total Population in Operation/Service Area	2,519,104
Total Water Connections	288,051
Total Waste Water/Sanitation Connections	N.A
Total Production/year	86,885,000 m <sup>3</sup>
Total Staff	963
Annual O&M Costs	MT 2,910,803,000
Annual Water Billing	MT 2,393,602,437
Annual Water Collections	MT 2,028,636,996

### Tariff Structure

\*Exchange Rate: MT64 to 1US\$ (2021)

DOMESTIC					
Tariff Band	Service Availability rate (Fixed rate)	0 -5 m <sup>3</sup> (Fixed value)	The first 5m <sup>3</sup>	5m <sup>3</sup> - 10m <sup>3</sup>	Above 10m <sup>3</sup>
	MT/Month	MT/Month	MT/Month	MT/m <sup>3</sup>	MT/m <sup>3</sup>
	60.00	58.40	132.66	39.80	54.29

NON DOMESTIC				
Category	Municipalities	Minimum Consumption (Commercial, Public)	Minimum Consumption (Industrial)	Above Minimum Consumption
	MT/m <sup>3</sup>	MT/Month	MT/Month	MT/m <sup>3</sup>
MT./m <sup>3</sup>	19.87	1,386.97	2,773.94	55.48

#### Note :

- There is a social tariff up to 5m<sup>3</sup> and all domestic tariffs include a fixed charge;
- In case of faulty meter, customers are billed according to the average of previous three meter readings;
- The initial sewerage tax fee will be 15% and will be applied as soon the negotiations are finalised with Municipalities Authority

## RWANDA WATER AND SANITATION CORPORATION (WASAC)- RWANDA

### Water Utility

WASAC was established in August 2014 with the mandate to produce and distribute Water and provide Sanitation services in all urban areas in Rwanda. The Company was created in replacement of the Energy, Water and Sanitation Authority (EWSA), a public Utility that was providing both Water and Electricity. WASAC reports functionally to the Ministry of Infrastructure but is overseen strategically by a Board of Directors.

WASAC is the water service provider for Kigali and all other towns in Rwanda and was created to operate on commercial basis and inherited all water infrastructures and is mandated to improve the service and coverage in all urban areas. In the current arrangement, WASAC is also mandated to mobilize capital investment and execute major water investment works (through projects & programs) in rural areas before handing over the assets to districts (assets holders) that also delegate the management to private operators (rural).

The total population in the WASAC operation area is 6,461,860 people. The sources of water are mainly surface water from rivers, lakes and springs as well groundwater (only in Kigali). The Utility does not provide sewerage services.

### General Data About Water Utility

Abbreviation	WASAC
Start of Operations	2014
Number of Towns in Operation Area	14
Total Population in Operation/Service Area	6,461,860
Total Water Connections	263,344
Total Waste Water/Sanitation Connections	Not applicable
Total Production/year	59,524,103 m <sup>3</sup>
Total Staff	1,496
Annual O&M Costs	FRW 10,822,715,121
Annual Water and Sewerage billing	FRW 27,519,064,049
Annual Water and Sewerage Collections	FRW 28,663,291,226

### Tariff Structure

\*Exchange Rate: FRW 1,079.73 to 1US\$ (2020/21)

DOMESTIC						
Tariff Band	Public taps & lifeline block (0-5 m <sup>3</sup> )	6-20 m <sup>3</sup>	21-50 m <sup>3</sup>	51-100 m <sup>3</sup>	Above 100m <sup>3</sup>	Kiosks
FRW/m <sup>3</sup>	323	331	413	736	847	323

NON-DOMESTIC	
Category	Industrial
FRW/m <sup>3</sup>	736

#### Note:

- No approved flat rate tariff but can be used in case of faulty meter and customers are billed according to the average of previous three meter readings
- No sewerage tariff since there is no centralized sewerage system

LESOTHO WATER AND SEWERAGE COMPANY (WASCO) - LESOTHO																																									
<b>Water Utility</b>	<p>The Water and Sewerage Company (PTY) Ltd was established through a Water and Sewerage Act No. 13 of 2010, thereby making it fully fledged private company wholly owned by the Government of Lesotho earmarked to deliver water and sewerage services in the urban centres of the country. WASCO reports functionally to the Ministry of Energy, Meteorology and Water Affairs., but is overseen strategically by a Board of Directors.</p> <p>With effect from 2012 and in order to enhance its operational efficiency and effectiveness, WASCO was placed under regulation undertaken by the Lesotho Electricity and Water Authority (LEWA), as per the LEA Act 2002 as Amended. LEA Amendment Act 2011 extended the Mandate of Lesotho Electricity Authority (LEA) to include the regulation of water and sewerage services, having regulated the electricity sub-sector only since 2004.</p> <p>The total population in the WASCO operation area is 742,296 people.</p> <p>Industries and commercial premises, particularly in Maseru, use about 64% of the water produced, and domestic customers consume 36%.</p>																																								
<b>General Data About Water Utility</b>	<table border="0"> <tr> <td>Abbreviation</td> <td>WASCO</td> </tr> <tr> <td>Start of Operations</td> <td>2010</td> </tr> <tr> <td>Number of Towns in Operation Area</td> <td>10 towns plus 6 designated urban areas</td> </tr> <tr> <td>Total Population in Operation/Service Area</td> <td>742,296</td> </tr> <tr> <td>Total Water Connections</td> <td>110,750</td> </tr> <tr> <td>Total Waste Water/Sanitation Connections</td> <td>8,215</td> </tr> <tr> <td>Total Production/year</td> <td>25,186,338 m<sup>3</sup></td> </tr> <tr> <td>Total Staff</td> <td>533</td> </tr> <tr> <td>Annual O&amp;M Costs</td> <td>LSL 260,071,000</td> </tr> <tr> <td>Annual Water and Sewerage billing</td> <td>LSL 247,270,836</td> </tr> <tr> <td>Annual Water and Sewerage Collections</td> <td>LSL 188,045,000</td> </tr> </table>	Abbreviation	WASCO	Start of Operations	2010	Number of Towns in Operation Area	10 towns plus 6 designated urban areas	Total Population in Operation/Service Area	742,296	Total Water Connections	110,750	Total Waste Water/Sanitation Connections	8,215	Total Production/year	25,186,338 m <sup>3</sup>	Total Staff	533	Annual O&M Costs	LSL 260,071,000	Annual Water and Sewerage billing	LSL 247,270,836	Annual Water and Sewerage Collections	LSL 188,045,000																		
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## NAIROBI CITY WATER AND SEWERAGE COMPANY (NCW&SC)- KENYA

**Water Utility**

In 2002 the Kenyan government launched an ambitious programme of reforms for the water sector through the enactment of the Water Act 2002. The new legislation separated policy formulation, regulation, water resources management, water services and created clear roles and responsibilities of the newly established key water institutions. This resulted in the establishment of the Water Services Regulatory Board (WASREB) in 2003 to oversee the implementation of policies and strategies relating to provision of water and sanitation services. Also established were regional Water Services Boards (WSBs), in the capacity of asset holders, and over 100 Water Service Providers (WSPs), as their appointed agents for actual service delivery.

Nairobi City Water and Sewerage Company (NCW&SC) was incorporated in December 2003 and appointed by the Athi Water Service Board (AWSB) as its agent, with the mandate of providing water and sewerage services within the jurisdiction of the city of Nairobi. Further the Constitution of Kenya (CoK-2010) devolved water service provision to the 47 county governments. Therefore NCW&SC is now wholly owned by the County Government of Nairobi. The Company is ISO 9001:2008 certified.

Nairobi City has an estimated population of 4,820,830. The sources of water are four namely Thika dam Ruiru dam, Sasumua dam and Kikuyu Springs. The four water sources jointly produce 550,000 m<sup>3</sup>/day for the city against its demand of 750,000m<sup>3</sup>/day. The Utility has two waste water treatment plants, Dandora with a treatment capacity of 180,000m<sup>3</sup>/day and Kariobangi with a treatment capacity of 80,000m<sup>3</sup>/day.

<b>General Data About Water Utility</b>	Abbreviation	NCW&SC
	Start of Operations	2003
	Number of Towns in Operation Area	1
	Total Population in Operation/Service Area	4,820,830
	Total Water Connections	232,946
	Total Waste Water/Sanitation Connections	489,265
	Total Production/year	179,341,134 m <sup>3</sup>
	Total Staff	3,239
	Annual O&M Costs	KSHS 9,295,870,128
	Annual Water and Sewerage billing	KSHS 9,190,986,498
Annual Water and Sewerage Collections	KSHS 8,538,517,142	

**Tariff Structure**

*\*Exchange Rate: KSHS 120.00 to 1US\$ (2020/21)*

WATER TARIFF						
Category	Domestic	Institutions	Commercial	Industrial	Water to Kiosks for Resale	Bulk Water to WSPs for Resale
<b>Consumption Block</b>	<b>KSHS/m<sup>3</sup></b>					
<b>0-6</b>	34	34	34	34	20	30
<b>7-20</b>	53	53	53	53		
<b>&gt;20</b>	64	64	64	64		
	<b>Schools and Colleges</b>					
<b>0-600</b>	48					
<b>601-1200</b>	55					
<b>&gt;1200</b>	60					

**Note :**

- Sewerage is charged at 75% of the water billed for all customers with a sewer connection.
- Resale by manned kiosk vendors and communal water dispensers is Kshs 1 per 20-litres.
- Resale at ATM water dispenser is Kshs 0.50 per m<sup>3</sup>
- Bulk meter for gated communities is at Kshs 53 per m<sup>3</sup>

## LUSAKA WATER AND SANITATION COMPANY(LWSC) - ZAMBIA

### Water Utility

Lusaka Water and Sanitation Company (LWSC) was established in 1989 under the Companies Act to provide water supply and sanitation services to the Greater City of Lusaka. In the 90s, Zambia embarked on water sector reforms that saw the establishment of the WSS regulator, NWASCO and brought LWSC under regulation through the Water Supply and Sanitation Act, No. 28 of 1997.

In 2008, LWSC, as a private limited liability company, became a provincial Utility for Lusaka Province and extended its WSS services to five other towns. LWSC is fully owned by the Local Authorities in Lusaka Province namely Lusaka, Luangwa, Chongwe, Kafue, Chilanga and Chirundu. The Ministry of Water Development, Sanitation and Environmental Protection has principal oversight of all WSS Utilities in Zambia.

The total population in the LWSC operation area is 2,924,716. The main sources of water are the Kafue River situated about 65km from Lusaka City, Chongwe River and Zambezi River and over 100 boreholes situated in various areas. About 60% of the water for Lusaka City is produced from the boreholes. The Utility has a sewerage system with two mechanised treatment plants and about six sewage ponds.

### General Data About Water Utility

Abbreviation	LWSC
Start of Operations	1989
Number of Towns in Operation Area	6
Total Population in Operation/Service Area	2,924,716
Total Water Connections	130,150
Total Waste Water/Sanitation Connections	39,724
Total Production/year	87,675,068 m <sup>3</sup>
Total Staff	756
Annual O&M Costs	ZMW 372,755,770
Annual Water and Sewerage billing	ZMW 383,728,563
Annual Water and Sewerage Collections	ZMW 383,728,563

### Tariff Structure

\*Exchange Rate: ZMW18to 1US\$ (2021)

DOMESTIC						
Tariff Band	0 - 6	6 - 30	30 - 100	100 - 170	+170	Kiosks/ Public Tap
Lusaka - K./m <sup>3</sup>	5.65	6.79	7.69	9.04	11.08	5.00
Kafue, Chongwe, Luangwa- K./m <sup>3</sup>	3.62	4.30	4.74	5.20	5.88	
Chirundu- K./m <sup>3</sup>	3.62	5.43	6.48	8.60	8.60	

NON-DOMESTIC			
Tariff Band	0-30	30-170	+170
Lusaka - K./m <sup>3</sup>	10.24	14.14	16.09
Kafue, Chongwe, Luangwa- K./m <sup>3</sup>	7.73	11.49	13.12
*Chirundu- K./m <sup>3</sup>	7.88	9.33	11.40

#### Note:

- Flat rates for non-metered customers vary per customer category (i.e High, Medium and Low).
- Standing/Fixed monthly meter charge is K8 for domestic and K25 for non-domestic.
- The sewerage tariff is 30% and 45% of water for domestic and non-domestic respectively
- Sanitation surcharge is 2.5% of water bill levied on all customers (except kiosks and stand pipes) specifically for sanitation service extension and improvements.

## Régie de Production et de Distribution d'Eau et d'Électricité (REGIDESO) - BURUNDI

### Water Utility

REGIDESO was established in 1962 after the independence of Burundi, to take care of drinking water supply and electricity. The period from 1992 to 2004 was marked by the socio-political crisis that caused the destruction of a significant part of REGIDESO's facilities. The company has had great difficulty rebuilding its infrastructure and coping with maintenance works especially after donors withdrew funding amid limited self-financing capacity. However, the human resources of this company have demonstrated their abilities in the restoration of water and electricity services in difficult times. The period from 2005 to 2011 corresponded to a period of reconstruction and development of infrastructure. It was during this period that REGIDESO began to rehabilitate damaged or dilapidated infrastructure and extended the water and electricity supply networks to the new districts, the city of Bujumbura and the interior of the country.

The total population in the REGIDESO operation area is estimated at 1,383,600 people. The main source of water is the Lake Tanganyika, which is near Bujumbura City from which about 90% of water supplied to the city is produced.

### General Data About Water Utility

Abbreviation	REGIDESO
Start of Operations	1962
Number of Towns in Operation Area	20
Total Population in Operation/Service Area	1,383,600
Total Water Connections	10,323
Total Waste Water/Sanitation Connections	
Total Production/year	51,259,455 m <sup>3</sup>
Total Staff	1,376
Annual O&M Costs	BIF 2,412,244.00
Annual Water and Sewerage billing	BIF 31,772,692.60
Annual Water and Sewerage Collections	BIF 20,176,574,056

### Tariff Structure

\* Exchange Rate: *BIF to IUS\$ (2019/20)*

Domestic			
Bands	Tariff	Fixed charges	Period
0-20 m <sup>3</sup>	315	0	2 months
21-40 m <sup>3</sup>	613	0	2 months
> 41 m <sup>3</sup>	802	7274	2 months

Commercial and Industries			
	Tariff	Fixed charges	Period
Band	609	26,581	2 months

Standpipes			
	Tariff	Fixed charges	Period
Band	224	-	1 month

Administration			
	Tariff	Fixed charges	Period
Band	613	-	2 months

## ZANZIBAR WATER AUTHORITY (ZAWA) - ZANZIBAR

### Water Utility

The Zanzibar Water Authority (ZAWA) was established under Act. No. 4 of 2006, and is a semi-autonomous entity tasked to offer water supply services and water resources management in Zanzibar. ZAWA has the responsibility of providing clean, reliable and good quality water supplies through the operation and maintenance of water infrastructure, and development of new waterworks in the urban and rural areas of Unguja and Pemba islands. It is also responsible for the management and regulation of water resources and effluent discharges in Zanzibar

In 2013, Zanzibar Utilities Regulatory Authority (ZURA) was established under the ZURA Act No.7/2013 as a multi sectoral regulatory authority. ZURA began operating in 2015 and brought ZAWA under regulation.

The total population in the ZAWA operation area is 1,712,300.

### General Data About Water Utility

Abbreviation	ZAWA
Start of Operations	2006
Number of Towns in Operation Area	6
Total Population in Operation/Service Area	1,712,300
Total Water Connections	124,776
Total Waste Water/Sanitation Connections	3,022
Total Production/year	67,676,477.00 m <sup>3</sup>
Total Staff	574
Annual O&M Costs	TSH 12,782,534,740
Annual Water and Sewerage billing	TSH 9,362,756,430
Annual Water and Sewerage Collections	TSH 7,912,782,540

### Tariff Structure

\*Exchange Rate: TSH 2,300.00 to 1US\$ (2020/21)

DOMESTIC		
Tariff Band	0-8	+8
TSH/m <sup>3</sup>	667	1,540

NON DOMESTIC		
Tariff Band	0-15	15-1000
Institutional TSH/m <sup>3</sup>	924	2,259
Commercial TSH/m <sup>3</sup>	0-15	15-100
	821	1,437

#### Note:

- Flat rate is TSH4,000 per month

## NATIONAL WATER AND SEWERAGE CORPORATION (NWSC) - UGANDA

### Water Utility

The National Water and Sewerage Corporation (NWSC) is a public Utility company 100% owned by the Government of Uganda. The Corporation was established in 1972 under Decree No: 34. At its inception in 1972, the corporation operated in three (3) major towns of Kampala, Jinja and Entebbe. These laws were revised in 1995 by the NWSC Statute and later on, the statute was incorporated in the Laws of Uganda as CAP 317 (Laws of Uganda 2000). The primary aim of this law was to revise the objectives, powers and structure of NWSC to enable the corporation operate and provide water & sewerage services in areas entrusted to it on a sound commercial and viable basis.

The Water Utility Regulation Department, under the Directorate of Water Development in the Ministry of Water and Environment, is responsible for regulation of provision of water supply and sanitation services.

The total population in the NWSC operation area is 22,545,177. NWSC has over 56 water treatment facilities and operates 3 conventional sewerage treatment plants and 28 waste stabilisation ponds with a total sewer network length of 20,489.73 km.

### General Data About Water Utility

Abbreviation	NWSC
Start of Operations	1972
Number of Towns in Operation Area	218
Total Population in Operation/ Service Area	22,545,177
Total Water Connections	775,794
Total Waste Water/ Sanitation Connections	25,180
Total Production/ year	144,105,256 m <sup>3</sup>
Total Staff	4,244
Annual O&M Costs	UGX 354,377,299,000
Annual Water and Sewerage billing	UGX 429,680,913,464
Annual Water and Sewerage Collections	UGX 434,521,159,422

### Tariff Structure

*\*Exchange Rate: UGX 3,669 to 1US\$ (2020/21)*

DOMESTIC		
Tariff Band	/m <sup>3</sup>	Price per 20 ltr Jerrycan
Domestic	1,553	31
Public Standpipe	2,490	50

NON-DOMESTIC		
Tariff Band	/m <sup>3</sup>	Price per 20 ltr Jerrycan
Institution/Government	3,065	61
Commercial <500m <sup>3</sup> /month	3,760	75
Commercial >500-1,500m <sup>3</sup> /month	3,760	75
Commercial >1,500m <sup>3</sup> /month	3,005	60



## LILONGWE WATER BOARD (LWB) - MALAWI

### Water Utility

The Lilongwe Water Board (LWB) is a Statutory Corporation established in 1947 and reconstituted by the Act of Parliament 'Water Works Act' No. 17 of 1995. As Utility service provider, LWB is responsible for the provision of water supply services to the City of Lilongwe and surrounding areas to all categories of customers (domestic, institutional, industrial and commercial).

The main source of water for the Board is Lilongwe River, over which two dams have been constructed; the Kamuzu Dam I and Kamuzu Dam II. Kamuzu Dam I has a storage capacity of 4.5mil m<sup>3</sup> while Kamuzu Dam II has storage of 19.8mil m<sup>3</sup>. LWB operates two main water treatment plants and is not mandated to provide sewerage services, which mandate lies with the Lilongwe Local Authority.

The total population in the LWB area of jurisdiction is 1,106,441.

### General Data About Water Utility

Abbreviation	LWB
Start of Operations	1947
Number of Towns in Operation Area	1
Total Population in Operation/Service Area	1,106,441
Total Water Connections	96,589
Total Waste Water/Sanitation Connections	-
Total Production/year	38,581,843.00 m <sup>3</sup>
Total Staff	517
Annual O&M Costs	MK 19,490,662,248.87
Annual Water and Sewerage billing	MK 24,609,637,909.48
Annual Water and Sewerage Collections	MK 31,356,475,147.74

### Tariff Structure

*\*Exchange Rate: MK 825 to IUS\$ (2020/21)*

DOMESTIC			
Tariff Band	0-5	6-10	>10
MK/m <sup>3</sup>	1,727*	496	690

NON DOMESTIC			
Tariff Band	0-5	6-40	>40
Commercial/ Industrial MK/m <sup>3</sup>	8,415*	1,849	2,011
Tariff Band	0-10	11-40	>40
Institutional MK/m <sup>3</sup>	15,114*	1,690	1,810

#### Note:

- \*Fixed amount for first bracket
- Kiosks have flat rates of K215 (Community built) and K239 (LWB), respectively.

### Annex 3. WUPI

The Water Utility Performance Index (WUPI) was developed following the guidelines suggested by the OECD-JRC (2008). In summary, the OECD-JRC (2008) recommends to build the composite indicators following 10 steps: 1) development of a theoretical framework; 2) selection of the basic indicators; 3) imputation of missing data; 4) multivariate analysis; 5) normalisation; 6) weighting and aggregation; 7) robustness and sensitivity; 8) back the details (indicators); 9) association with other variables; and 10) dissemination.

The Water Utility Performance Index (WUPI) is a composite indicator developed by CRA in 2012. The WUPI used by CRA (now AURA IP) was harmonized for regional comparison. The WUPI allows measurement of the performance of the Utilities in an integrated way by aggregating three main performance components: quality of service, economic efficiency and operational sustainability. 10 KPIs are used to build up the WUPI and are clustered in the three components.

The WUPI uses the max-min technique for the normalisation of the KPIs. The aim of the KPI normalization is to convert the set of KPIs selected for the construction of the WUPI (which are expressed in different units of measurement), into a homogeneous set of variables measured in the same unit. The KPIs are then measured on a scale that ranges from 0 (the worst possible performance) to 1 (the best possible performance). For ESAWAS, the minimum and maximum threshold values for each indicator to perform the indicator normalisation were pre-established (see Annex 1).

The final step of the construction of the WUPI is the aggregation of all of the normalised indicators into the three WUPI components and the overall WUPI. The weighted sum of the indicators, which assume total compensation among the indicators is used to aggregate the indicators. This linear aggregation of the indicators is calculated using the following formulas:

$$WUPI_{quality\_service, i} = \frac{\sum_{k=1}^{k=4} w_k^* \cdot I_{k, i}}{\sum_{k=1}^{k=4} w_k^*}$$

$$WUPI_{economic\_efficiency, i} = \frac{\sum_{k=5}^{k=7} w_k^* \cdot I_{k, i}}{\sum_{k=5}^{k=7} w_k^*}$$

$$WUPI_{operatinoal\_sustainability, i} = \frac{\sum_{k=8}^{k=10} w_k^* \cdot I_{k, i}}{\sum_{k=8}^{k=10} w_k^*}$$

$$WUPI_{overall, i} = \sum_{k=1}^{k=10} w_k^* \cdot I_{k, i}$$

Where  $i$  refers to the specific water Utility under analysis,  $w_k^*$  is the relative importance of the KPI  $k$ , and  $I_{k,i}$  is the normalised value of the KPI  $k$  for water Utility  $i$ .