PUBLIC UTILITIES
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ISSUE 11

Understanding Non-Revenue Water (NRW) Issues: Lessons for Ghana

JULY 2024

KEY HIGHLIGHTS

- Key Highlights
- Ghana faces a significant NRW problem, with estimates indicating that since 2017, on average 48% of water produced is lost or unaccounted for.
- Ghana Water Limited (GWL's) best NRW performance of 39.1% was recorded in 2020.
- The current regulatory benchmark for NRW is 43.2% as against 23% for poor utilities in developing countries, 15% in North America, and 13% in Western Europe.
- In 2023, GWL recorded 49.9% for NRW, while the average NRW ratio in the sub-Saharan area was 39.72%.
- The NRW levels in Ghana are twice as high as the threshold value for developing countries and three times as high as the threshold for countries in North America and Western Europe,

1.0 Introduction

Protecting and maintaining water distribution networks is critical for guaranteeing high-quality drinking water. Distribution systems, which include pipelines, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic components, transport drinking water from a centralised treatment facility or well supplies to users' taps. (World Health Organisation, 2014). One of the biggest issues that water utilities in the developing world face is a high degree of water loss due to physical losses (leakage), water theft from the system, or because water consumers are inaccurately billed. This has a significant impact on the financial sustainability of water utilities due to lost revenue, and higher operational expenses, limiting their ability to provide critical service expansions, particularly for the poor (Macheve et al 2015).

Accounting for water losses lacked standardised and reliable procedures until the early 1990s. "Unaccounted-for water" was used as a proxy for leakage management performance. This phrase was ambiguous and open to several interpretations since it lacked a well accepted meaning. Unaccounted-for water was commonly reported as a proportion of system input volumes, which is already problematic. In this instance, it was impossible to create realistic objectives, quantify or compare utility performance, and to follow performance against targets with any degree of reliability.

Despite the fact that many nations still face this issue, a lot of work has been done in correcting previous errors. In order to assist utilities in effectively assessing and managing water losses, many international organisations have developed a set of tools and techniques over the past 20 years (ADB, 2010). Most notably, the International Water Association (IWA) has developed and enhanced a wide range of performance metrics for utilities that deliver water. IWA constituted a Water Loss Task Force (WLTF) as part of a programme that began in the late 1990s to examine best practices from across the world and to create performance indicators for water losses. Standardised lexicon was a requirement for computing globally comparable performance indicators; as a result, the task force created an International Water Balance with precise definitions.

The WLTF recommended among other things, the adoption of "non-revenue water" rather than "unaccounted-for water." This presented a precise definition for Non-Revenue Water (NRW). Thus, NRW is the unbilled portion of a water supply system input volume, which includes unbilled authorised consumption, commercial losses, and physical losses (Vermersch et al., 2016; Jang 2018). The International Water Association defines NRW as the difference between cubic metres of water released into the water distribution network and cubic metres billed to the customer. The WLTF suggests that NRW is made up of three components namely:

- Physical losses include system leaks and reservoir overflows. They are caused by inadequate operations and maintenance, a lack of active leakage management, and low-quality underground assets.
- Commercial (or apparent) losses, which are caused by customer meter under registration, data handling errors, and theft of water in various forms.
- Unbilled authorised consumption refers to water utilised for firefighting, operational utility usage, and free water given to certain customer groups.

2. Scope of Regulatory Brief

This regulatory brief provides a general understanding of the NRW situation globally and Ghana in particular. The brief identifies key challenges, and proposes best practices from other countries to address these issues effectively. The objective of this brief is to provide summary understanding of what NRW entails and how to collectively support Ghana Water Limited (GWL) to reduce NRW in Ghana.

3. Components of Non-Revenue Water

As the most recognised framework for understanding NRW, Table 1 shows the IWA water balance. The IWA water balance is a method for assessing the many aspects of water production, storage, and distribution. This analysis will help the utility determine the scope of the water loss problem and create priorities for resolving it based on a component analysis of revenue and non-revenue water elements (Charalambous and Hamilton, 2011). The Table illustrates how NRW is calculated by considering unbilled authorised consumption (such as water used for public park irrigation or firefighting), apparent losses (business losses associated with illicit water connections), and genuine or real losses (physical losses such as leaks).

Table 1: IWA Water Balance

<table>
<tr><td rowspan="9">Total System Input Volume</td><td rowspan="4">Authorised Consumption</td><td rowspan="2">Billed authorised Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed unmetered Consumption</td></tr>
<tr><td rowspan="2">Unbilled authorised consumption</td><td>Unbilled Metered Consumption</td><td rowspan="7">Non-Revenue Water</td></tr>
<tr><td>Unbilled unmetered consumption</td></tr>
<tr><td rowspan="5">Water Losses (UFW)</td><td rowspan="2">Apparent Losses (Commercial Losses)</td><td>Unauthorised Consumption</td></tr>
<tr><td>Metering Inaccuracies</td></tr>
<tr><td rowspan="3">Real Losses (Physical Losses)</td><td>Leakage in Transmission & distribution lines</td></tr>
<tr><td>Leakage & overflows at storage tanks</td></tr>
<tr><td>Leakage on service connections up to customer meters</td></tr>
</table>

Source: Asian Development Bank, 2008

Faber and Radakrishnan (undated) contend that in many developing countries, consideration should be given to the billing/collection efficiency while analysing NRW water. Not all bills may be sent to customers, or not all issued bills may have their costs paid. This could contribute significantly to lost revenue in many poor nations as opposed to rich ones. Hence, the only water that should be considered revenue water is the paid for water. Table 2 is a presentation of an adjusted water balance. This water balance suggests that one of the main components of NRW's solution will be, to improve billing and collection procedures, which should be considered while building a business case.

Table 2: Adjusted IWA Water Balance for Developing Countries

<table>
<tr><td rowspan="11">Total System Input Volume</td><td rowspan="6">Authorised Consumption</td><td rowspan="4">Billed authorised Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
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</table>

Source: Faber and Radakrishnan (undated)

Standardised performance metrics based on established methodologies and definitions are crucial for comparing NRW performance among utilities and tracking changes over time. Unfortunately, the percentage of NRW remains the most commonly used performance metric for water loss. This is derived by dividing the total NRW volume by the total system input. While this metric is necessary for utilities to measure, it may not accurately assess water losses. The ADB, (2010) argues that, the percentage of NRW is absolutely inappropriate for comparing water utilities which may have varying usage levels, pressures, and supply times (parameters that might vary greatly in the developing world). NRW levels are also heavily influenced by network characteristics (e.g., mains length and service connections) and a system with high consumption may easily demonstrate low levels of NRW. For instance, a city with high level of business or industrial activity may have an average daily customer use of 1.5 m3. When average quality leakage management is implemented, NRW would be roughly 20%. Similar leakage management measures in a small town with low per-customer use (0.7 m3/d) would yield an NRW of 40%. Kingdom et al (2006) therefore recommended that water utilities employ indicators for contract performance expressed in volumetric terms, and that the methods for determining such amounts are straightforward and objective, as was the case in Selangor, Malaysia.

4. Effects of Non-Revenue Water

Water utilities can utilise NRW levels as a performance measure for their technical and financial efficiency. For instance, high NRW levels are indicative of poor corporate governance (Frauendorfer and Liemberger, 2010). This is true because corporate governance affects policies related to tariff setting, revenue collection, equipment maintenance, infrastructure obsolescence, record keeping, data management, and the use of suitable technology and staff skills. Owing to either physical loss from the water transmission and distribution system or understatement of volume owing to mistakes in measurement and data handling, a high NRW results in a loss of income as customers are not billed for it (Vermersch et al., 2016).

Water sales and NRW are directly related because a lower sales volume of water relative to water production results in a large amount of water being wasted. Water losses are divided into two categories; physical/real losses and non-physical/apparent losses. The apparent or non-physical component of water losses is one of the most important ones as it is the most expensive and directly results in a loss of income for the water supply (Caryn et al., 2004). Given that, water bills are determined by measuring for instance amounts used over a period, any losses resulting from data processing errors or errors in the metre would ultimately lower sales income (Thornton and Rizzo, 2002).

Depending on the availability of water resources, NRW may have a detrimental effect on the nation's institution designated for water management. For example, when the NRW is high, a nation with abundant water resources will have higher operational expenses and lower income, as noted by Lambert et al. (1998). However, a high NRW will result in limited water supply, occasioned by instances of water rationing, particularly in the face of high demand as is the case of Ghana.

Summarily, the following are the consequences of high NRW:

- The loss of precious and scarce resources.
- Overinvestments in network capacity and production.
- Low utility staff morale as high NRW rates is a consequence of poor governance
- Social and economic inequities since consumers are likely to pay for the inefficiencies of water utilities.
- Operational inefficiency
- Revenue losses
- Customer dissatisfaction.

Although it is widely acknowledged that NRW levels in developing countries are often high, actual figures are elusive (World Bank, 2006). Most water utilities do not have adequate monitoring systems and lack access to information on the complete network for assessing water losses. Many countries also lack national reporting systems that collect and consolidate information on water utility performance. The result is that data on NRW is usually not readily available. Even when data is available, it is not always reliable, as some poorly performing utilities are known to practice "window dressing" in an attempt to conceal the extent of their own inefficiency (USAID/WBI, 2010).

5. The Vicious and Virtuous Circles

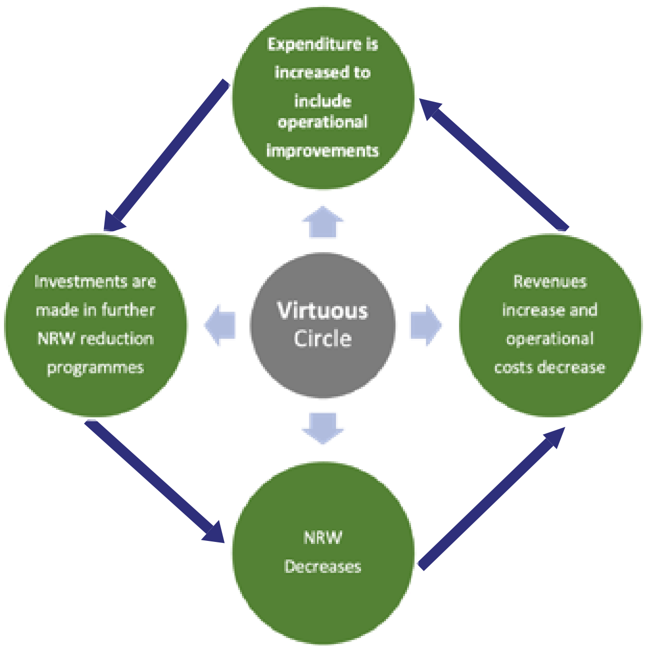
The 'Vicious Circle' of NRW is one of the primary causes of poor corporate performance, resulting in both physical and financial losses. Physical leaks drain water away from users and raise operational expenses. This leads to overinvestment in network capacity. Inaccuracies in consumer metres, improper data management, and illegal connections, lead to commercial losses and decreased income generation.

Figure 1: The Vicious NRW Circle

Source: USAID/WBI, 2010

The aim of water utility administrators is to convert the Vicious Circle into the 'Virtuous Circle'. In fact, decreasing NRW opens up new sources of both water and money. Reducing physical losses increases water availability, delays the need for additional sources of supply and also cuts back on operational expenses. Similarly, lowering commercial losses leads to more water revenues.

Figure 2: The Virtuous NRW Circle



Source: USAID/WBI, 2010

6. Benefits of Reducing NRW

Successful NRW reduction is more than just fixing a single technological problem; it is linked to overall asset management, operations, customer service, financial allocations, and other aspects. It is the duty of everyone within the utility, and not just management (Liemberger and Marin, 2006). Backflow events via cross connections are given special attention, as is the potential for distribution system contamination during construction and repair activities, storage facility maintenance, and the role of premise plumbing in public health risk.

Liemberger and Wyatt (2019) have estimated that the annual global water loss amounts to 126 billion cubic meters, with an estimated worth of USD 39 billion. This the World Bank, (2016) contends that, enough water would be available to serve at least 90 million people if only half of those losses were avoided. With a basic per capita usage of 100 litres per day, water lost through leakages could satisfy over half of the world's population that lacks access to safe drinking water. GWCL loses close to half of the water it produces as a result of leaks, theft, and, in certain cases, improper metering; if this loss is eliminated, water coverage might increase much above the existing GWCL water supply coverage of around 67%, predicted to reach 78% and 90% by 2028 and 2040, respectively as cited in Kusi-Frimpong et al, (2024). The advantages of non-revenue water reduction include:

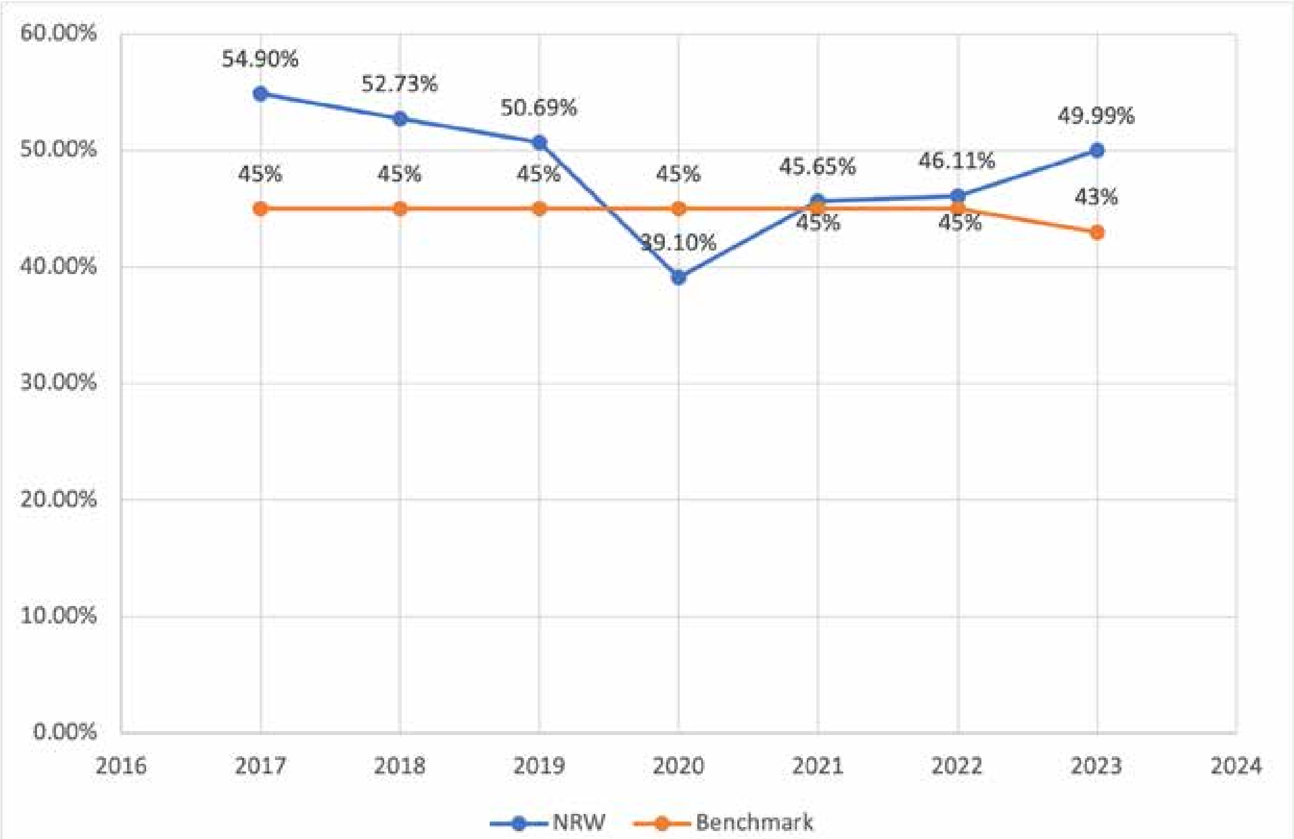
- Increase in the quantity of water billed;
- Increase in net income to the Water Service Providers;
- Reduction of development costs by suppressing new water source development;
- Reduction of construction costs by reducing the number of new facilities
- Elimination of secondary accidents such as flooding and contamination caused by leakages.

Non-Revenue Water: The Ghana Situation

Ghana faces a significant NRW problem, with estimates indicating that, since 2017, on average, 48% of water produced is lost or unaccounted for. The volume of water produced in 2018 reduced by 10.8Mm3 from 314.8Mm3 to 304.0Mm3 in 2019. That notwithstanding, water sold increased marginally from 148.8Mm3 in 2018 to149.9Mm3 in 2019. In 2022, the water produced soared from 321.81 Mm^3 to 340.82 Mm^3 in 2023. However, the volume of water sold declined from 173.41 Mm^3 in 2022 to 170.44 Mm^3 in 2023 (PURC, 2022). Non-revenue water decreased from 52.7% in 2018 to 50.7% in 2019, significantly exceeding the world benchmark of 23 percent for utilities in developing countries (Singh et al. 2014) and the PURC benchmark of 45%.

Prior to September 2022, the PURC set the benchmark for GWL's Aggregate Technical, Commercial and Collection (ATC&C) losses at 47%, made up of non-revenue water ratio of 45% and collection loss ratio of 2%. To further push the service provider towards greater efficiency, this ratio was revised downward to 45.2% comprising, a non-revenue water ratio of 43.2% and collection loss ratio of 2%. GWL's best performance was recorded in 2020, with a NRW of 39.1% as per GWL data, which was below the PURC benchmark value of 45%, but still above the benchmark for developing countries as shown in figure 3. Thereafter, the NRW began to rise, increasing from 46.11% in 2022 to 49.99% in 2023, exceeding the revised PURC benchmark of 43.2%.

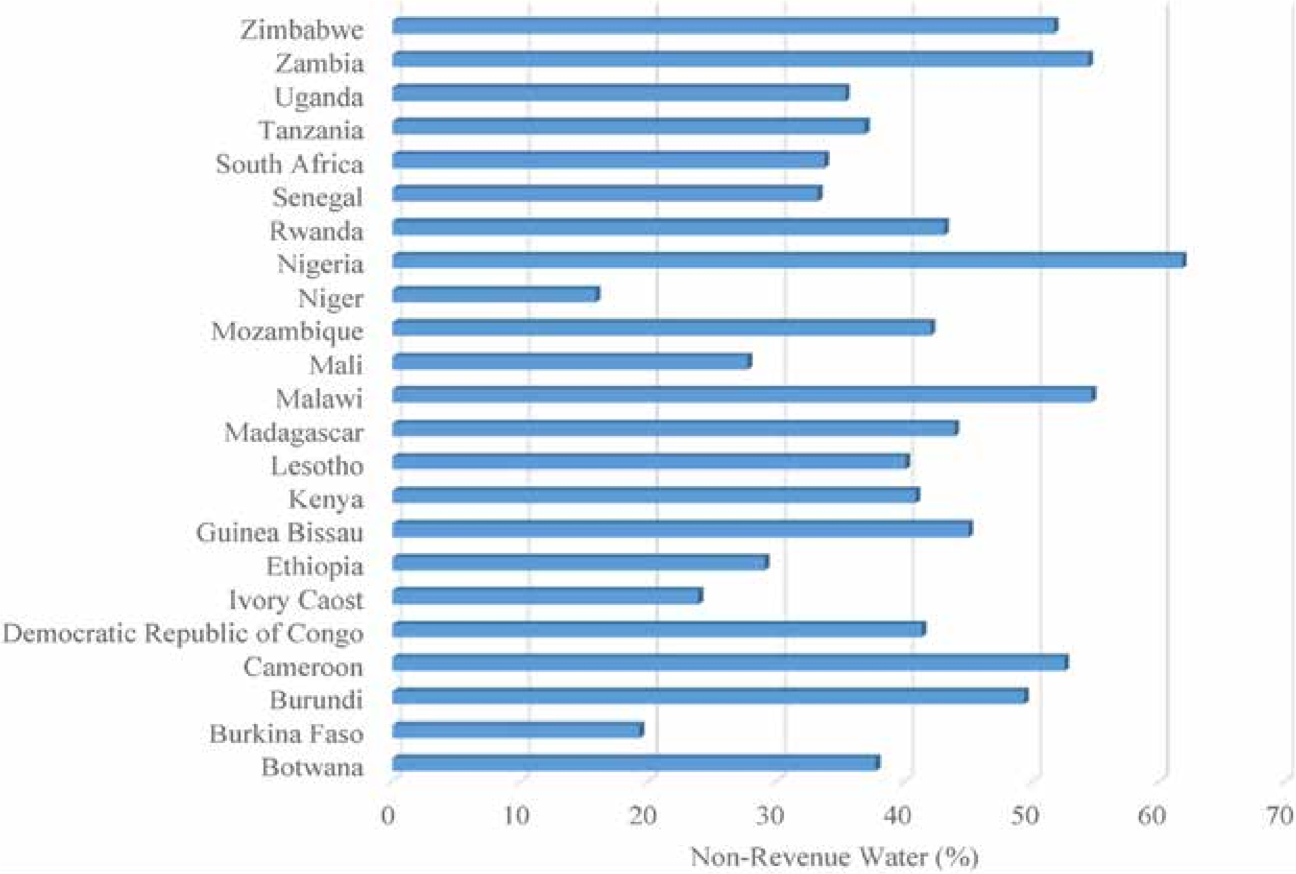
Figure 3: Trend of NRW in Ghana



Globally, the average yearly volume of NRW is 274,679.2m3/day, or 100.26Mm3/year. To put this in context, this volume represents around 52.5% of the yearly system input volume, which is sufficient to provide roughly 4 million people in metropolitan areas assuming a per capita use of 70 litres/day. Over the past decade, the benchmark for NRW for high-performing water utilities was estimated at 23% in developing countries (Singh et al. 2014), 15% in North America, and 13% in Western Europe. In Ghana however, the NRW levels are twice as high as the threshold value for developing countries and three times as high as the threshold in North America and Western Europe, respectively.

The average NRW ratio in sub-Saharan Africa stands at 39.72%, as illustrated in figure 4. The figure highlights three distinct categories of countries: those with NRW ranging from 0 to 23%, such as Niger and Burkina Faso, which are considered to be performing excellently; those with NRW ranging from 23 to 30%, such as Ethiopia, Ivory Coast, and Mali, which are considered to be performing well but with room for improvement; and those with NRW greater than 30%, such as Nigeria and other countries, where significant improvement is required (Mvongo et al, 2024).

Figure 4: NRW in Sub-Sahara Africa



Source: IBNET (2024).

Key Challenges in Ghana

• Old and poorly maintained distribution networks

Many water distribution networks are old and poorly maintained, leading to frequent leaks and bursts. Twumasi-Amoah and Yahaya (2013) argue that, the insufficiency and inefficiency of operating infrastructure has long been a fundamental concern for urban potable water supply. Poor water distribution and disparities in service supply between the affluent and the poor are manifestations of this problem (ibid). There is a growing gap between the needed infrastructure to improve optimal operations and the existing infrastructure. In certain cases, the available infrastructure does not match the ones that are operational owing to malfunctions and breakdowns. The rate of increase in water consumers is not proportional to the available infrastructure, thus, there is a constant pressure on available equipment, resulting in frequent breakdowns and operating below capacity.

• Unmetered or faulty meters

A large proportion of water connections are either unmetered or have faulty meters, resulting in inaccurate billing and significant revenue losses. Ghana's urban majority is becoming more dominated by informality, with the limited supply of water constantly rationed, due to excessive demand (Twum and Abubakar, 2020). The water-access system is such that peri-urban centres have restricted access to pipe-borne water owing to their location, while inner-city districts have access to private home water supply, which is informal, common, and temporary (Fuest & Haffner, 2007).

• Poor Data Management

Lack of reliable data on water production, distribution, and consumption hampers effective management and planning. Appiah et al (2017) notes that in Ghana, it is very difficult to get the breakdown of water losses in terms of the causes, quantity and percentage of the particular loss.

- **Water Theft and Illegal Connections**

Water theft, meter tampering, and illegal connections in Ghana have become a menace, seriously affecting the operation of GWL. These unauthorised connections and water theft contribute significantly to commercial losses.

- **Inadequate Capital for Investment and Maintenance**

Funding is regarded as a major driver of global water shortage. In Ghana, the inability to dedicate financial resources for the infrastructure maintenance is a key barrier to water provision (Twumasi-Amoah and Yahaya, 2013). In general, emphasis is placed on the government and other stakeholders' abilities to support sector operations. However, an urban water scheme without adequate revenues for effective operation and maintenance, has an impact on systems development and the physical state of the current system, which would surely degrade. The aged equipment and pipes are decaying, thereby reducing the company's productivity and efficiency. The resulting deterioration has impacted the infrastructure for processing, storage, and transfer of water to consumers, further exacerbating the NRW problem.

Measures Taken by the Economic Regulator (PURC)

The following are some measures taken by the Commission to address the issues of non-revenue water in Ghana;

- **Regulatory Audit**

The Commission has instituted regulatory audits for GWL's approved investments. To this end, periodic checks are conducted to ensure that, approved investments within a tariff period are undertaken by the utility. The audits are to ensure that such projects are functional and suitable for the purposes for which they were approved.

The Commission has also tied the approval of proposed investments to deliverables. Thus, GWL is expected to justify the need for their proposed investments and the impact these investments would have on service delivery.

- **Review of NRW Benchmark**

The Commission, in 2022, reduced the NRW benchmark for GWL from 45% to 43.2% to demand better efficiency from the service provider.

Best Practices from Other Countries

Several countries have successfully implemented strategies to reduce NRW. Adopting some best practices could significantly improve water management in Ghana.

- **Burkina Faso – Performance Based Contracts**

Burkina Faso's national water and sanitation company is one of the few well-run public water utilities in Sub-Saharan Africa. The government's unwavering commitment to change has been critical to the success of the company. From 2001 to 2006, the company successfully implemented an innovative performance-based service contract with an international operator. A private partnership led by the French private operator Veolia was hired. ONEA however continued to function as a publicly controlled utility for the entire five year contract period (2001–2006). It was only in the third year that progress began to manifest, and the collection ratio steadily improved thereafter, reaching 93 percent in the fourth year and 95 percent in the fifth year. Two years after the end of the service contract, ONEA's performance remained strong, indicating that the efficiency benefits made with the foreign operator were durable. Bills collection percentage remained over 95%, while the level of non-revenue water was 17% and currently at 19%.

- **The case of Nakuru Water and Sanitation Services Company (Kenya) – Adoption of Systematic Action Research (SAR)**

There is a particular case of Nakuru Water and Sanitation Services Company (NAWASSCO), where local and international partners are adopting an innovative NRW model, which has resulted in noteworthy achievements. The NRW pilot used an action research approach to pilot the International Water Association's methods for reducing NRW in the local context. The test used Systematic Action Research (SAR), a Plan-Do-Check-Act procedure, which provides continual learning and refinement of the developing model, depending on local conditions. This entails implementing specific activities as part of a dynamic research process, monitoring and analysing the consequences of the taken actions with the goal of improving practice, then returning to the drawing board and applying the learning in an acyclic iterative process . To help with decision-making, tools for geographic information systems (GIS) and management information systems (MIS) were developed. The pilot project resulted in a significant drop in NRW levels and improved revenues. This indicates that, capacity, when properly developed and locally owned, may produce impressive development gains. The implementation of this programme has systematically reduced NRW in NAWASSCO from 31% to 29%.

- **Singapore – Integrated Urban Water Management**

In the past two decades, Integrated Urban Water Management (IUWM) has been a prominent method for implementing the concepts of Integrated Water Resources Management (IWRM) at the local level. It is anticipated that IUWM will aid in the accomplishment of several policy goals, several of which include improved water security. Singapore's Public Utilities Board (PUB) employs an integrated approach to water management, including advanced metering infrastructure, regular maintenance, and public awareness campaigns. Singapore has achieved one of the lowest NRW rates globally, around 5% (Jang and Choi, 2017).

- **Philippines: Performance-Based Contracts**

The spring board for the success in transforming water sector in Metro Manila is Public-Private Partnership (PPP). The Manila Water Company uses performance-based contracts for NRW reduction, incentivizing contractors to achieve specific NRW targets. Prior to the PPP, NRW was around 63% in 1996 with a population of 3.1 million. However, after the PPP, NRW substantially reduced to 11% in 2014 with a population of 6.3 million.

Role of the Regulator in Addressing NRW

Water regulators have a wide range of techniques available to combat water losses. These tools are often classified into two groups: regulatory and non-regulatory instruments.

Regulatory Tools

Regulatory instruments are more formal systems with enforceable power, frequently mandated by legislation. They often use economic criteria such as prices and performance targets to govern water utility activity.

Setting Performance Standards

Establishing enforceable standards for performance is a key component of economic regulation in the water sector. Regulatory bodies might set benchmarks based on best industry practices and key performance indicators (KPIs). These guidelines provide an empirical framework for assessing utility performance in water loss management.

Driving Investment in Infrastructure

Regulatory regimes can encourage capital investment in infrastructure development. By permitting utilities to include capital expenditure in their rate base, regulators may guarantee that they have the funds to invest in infrastructure upgrades and modernisation.

Non-Regulatory Tools

Non-regulatory instruments are softer techniques that try to impact water management by raising public awareness, engaging stakeholders, and encouraging voluntary compliance. These categories are not mutually exclusive and frequently work best when utilised in tandem for a comprehensive approach to water loss management.

Conclusion

Addressing the NRW situation in Ghana demands a multidimensional strategy that involves infrastructural investment, technological adoption, capacity building, and stakeholder involvement. By learning from successful foreign models and customising solutions to local constraints, Ghana may dramatically lower NRW, improve water service delivery, and improve the financial sustainability of its water utilities.

Recommendations

- The Commission should promote the use of data analytics for real-time water network monitoring, allowing GWL to quickly detect and fix NRW concerns. Real-time monitoring and data analytics technologies enable a more extensive, diversified, and accurate knowledge of system behaviour, resulting in more effective management over the distribution network and water supply system. Thus, the Commission in collaboration with GWL should create and deploy software tools to enable operational management that include two critical features: the capacity to act in systems through event production and the ability to study data over time (based on historical data). This will eventually lead to a significant boost in the environmental and financial efficiency levels of water utilities.

- Employing cutting-edge technology for leak detection can greatly aid in swift detection of leaks and bursts in the distribution network. These technologies include remote sensing, acoustic sensors, and machine learning algorithms that may identify possible leakage locations by analysing data. Effective mitigation of actual losses can be achieved by prompt repairs and outline maintenance based on these results.

- It is crucial to maintain an optimal pressure in the distribution system. Although low pressure can promote contamination and backflows, high pressure can cause stress on pipes and result in leaks. Maintaining the proper pressure levels can lower the danger of leaks and bursts. This can be achieved by installing pressure regulating valves and utilising smart pressure management systems.

- Reducing apparent losses is largely dependent on accurate metering and data analysis. It is possible to monitor usage trends in real-time and identify irregularities quickly by installing automated meter reading (AMR) or advanced metering infrastructure (AMI) systems and upgrading to more dependable and accurate meters.

- Investment in Infrastructure: Prioritize funding for the repair and replacement of ageing water infrastructure to reduce physical losses.

- Advanced Metering Systems: Implement advanced metering infrastructure (AMI) to ensure accurate measurement and billing of water consumption.

- Public awareness campaigns to educate consumers about the importance of water conservation and the impacts of NRW. Additionally, there should be strict enforcement of stricter regulations and penalties for illegal connections and water theft.

- Encourage public-private partnerships to leverage private sector expertise and resources in reducing NRW.

- GWL should be encouraged to invest in data-driven decision-making systems to gather, analyze, and utilize accurate data for informed decision-making.

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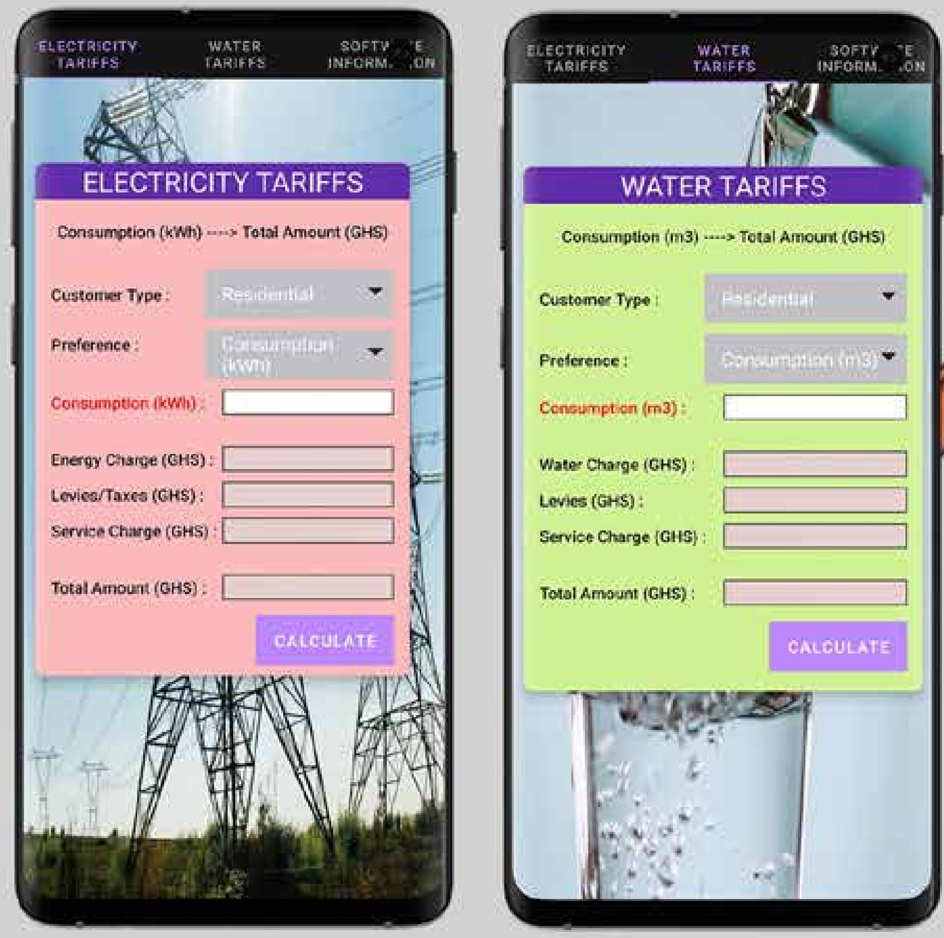

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WhatsApp: (233-558) 082547
Email: info@purc.com.gh
Website: http://www.purc.com.gh

Greater Accra Regional Office
Ground Floor, GNAT Heights
Opposite Zenith Bank, Liberation Road
Tel: (233-302) 240046
WhatsApp: (233-540) 126201

KUMASI
1st Floor Cocobod Jubilee House
P. O. Box 1001, U.S.T
Kumasi, Ashanti Region
Tel: (233-322) 037510
WhatsApp: (233-540) 126202

TAKORADI
2nd Floor, GPHA Credit Union House
Behind Bank of Ghana
P. O. Box AX 1985
Takoradi, Western Region
Tel: (233-312) 024010
WhatsApp: (233-540) 126203

TAMALE
1st Floor, NCA Building
Opposite Regional Coordinating Council,
P. O. Box TL 1870
Tamale, Northern Region
Tel: +233-372) 026380
WhatsApp: (233-540) 126204

KOFORIDUA
Galloway, Near Jubilee Park Koforidua
P. O. Box KF 2781
Koforidua , Eastern Region
Tel: (233-342) 020770
WhatsApp: (233-540) 126205

HO
2nd Floor, GERCO Plaza, Opposite SG-Bank
P. O. Box HP 1373
Ho, Volta Region
Tel: (233-362) 028607
Fax: (233-362) 028608
WhatsApp: (233-540) 126206

SUNYANI
Plot 15/16 South Industrial Estate
Sunyani Maganzine
P. O. Box SY 1003
Sunyani, Bono Region
Tel: (233-352) 021651
(233-352) 021653
WhatsApp: (233-540) 126207

CAPE COAST
First Floor Data Bank Building
Tantri Road
P. O. Box CC 453
Cape Coast, Central Region
Tel: (233-332) 137926
WhatsApp: (233-540) 126208

WA
2nd Floor Stanbic Bank Building
Opposite Societe Generale
P. O. Box 445
Wa, Upper West Region
Tel: (233-392) 024275
WhatsApp: (233-540) 126209

BOLGATANGA
Ground Floor, NCA Building, Opposite the
Regional Hospital - Bolgatanga
P. O. Box BG 273, Bolgatanga
Bolgatanga, Upper East Region
Tel: (233-382) 024524
WhatsApp: (233-540) 126210

TECHIMAN
1st Floor, Williams Residence
Close to TTH 316
Techiman, Bono East Region
Tel: 0531031443

PURC Ghana