

# Chapter 3



## Transforming a water company to improve service levels and resilience: Lessons from Sierra Leone

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### ABSTRACT

All water companies need to be able to provide safe, adequate and reliable water supplies to their customers and consumers. Yet some work under very daunting conditions. The civil war in Sierra Leone resulted in the destruction of much water supply infrastructure. It also had a devastating impact on the performance of water companies. Since the war ended in 2002 other changes continue, such as: population growth, unplanned urbanisation, environmental destruction and climate change, plus the Ebola outbreak. These pressures all have a massive impact on the natural environment and on demands for water. It is against this background that Guma Valley Water Company is trying to rebuild water infrastructure and strengthen utility arrangements for providing a reliable and affordable service on which people depend. This article describes ongoing efforts to improve water supply in Freetown. The case study highlights the multi-faceted nature of resilience building and the processes that must be undertaken if water

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companies are to become resilient. Long-term technical and financial support is required, however, programmes should be realistic in their expectations.

**Keywords:** low-income countries, water utility reform, water resources, infrastructure.

### 3.1 INTRODUCTION

Despite recent development progress, Sierra Leone is still classed as a fragile state (Fragile states are classified as those that are unable or unwilling to provide essential services to their people and communities). Typically, this means that periods of relative stability, in which development efforts make some progress, are often punctuated by crises that have long-lasting impacts. The 2014 West African Ebola outbreak and 2017 mudslides in Freetown highlight recent disasters.

Sierra Leoneans are resourceful people and Guma Valley Water Company (hereafter referred to as 'Guma') is a stoic company. However, it is a daunting prospect to achieve resilient services if water infrastructure is crumbling and the company struggles to achieve its desired level of performance. It is against this background that Guma must develop both its infrastructure base and own capability to deliver water to the people of Freetown, in order to fulfil its mandate.

The single biggest challenge for Guma, is that physical water demand massively exceeds available supply. There is simply not enough water entering the water supply network to meet the demand side pressures, which continue to grow. This fundamental point has often been overlooked by successive governments and donors that are responsible for designing technical support programmes. Securing new raw water sources represents the single most important area of improvement for Guma's service levels.

This chapter describes both previous efforts, and future requirements, to strengthen water resources management, water supply and company performance. This is required so Guma can achieve its aspiration to 'provide access to safe, affordable, and sustainable water for all residents of Freetown by 2028'. This case study reflects on the transitions undertaken and concludes by sharing key learning from these experiences.

### 3.2 OVERVIEW

Sierra Leone is located in Western Africa on the Atlantic Coast. It has a tropical climate which is strongly influenced by the West African Monsoon. Its natural environment is characterised as being well-watered. Average annual rainfall ranges from less than 2000 mm in drier areas of the far north east to about 2500 mm in the south east and more than 4500 mm over the Freetown peninsula

(MWR, 2015). However, a substantial amount of precipitation (around half) is lost to evapotranspiration and, in the absence of major abstractions and surface water storage infrastructure (such as reservoirs), the many rivers discharge surface runoff directly to the Atlantic Ocean. Rainfall across Sierra Leone is also seasonal, typically occurring from May to October followed by a protracted dry spell from November to April. Rainfall peaks in July and August and this has a direct impact on Guma's ability to serve people year-round. Most of Guma's rainfall monitoring network along the peninsula was also destroyed during the civil war and there is currently a dearth of routinely collected and analysed hydrometric data to assess seasonal variations year-on-year.

Continuous problems related to water resources management include amongst others: population growth, unplanned urbanisation, catchment encroachment, land degradation, deforestation and growing demand. These issues, along with growing water demands, vandalism to water supply infrastructure, leakage, high rates of non-revenue water, limited revenue and inadequate financial investment over many years is undermining service performance levels and making water supply an issue of national security. As an indication, the Ministry of Water Resources (MWR) and Guma have been operating a drought contingency plan in Freetown during the dry season months since 2016.

Indeed, the performance of the water sector in Sierra Leone has been mixed in recent years. Sierra Leone's economy and institutions suffered massively as a result of the civil war (1991–2002) and the network of infrastructure, institutions and finance still require significant external support nearly two decades later. The performance of service providers has also struggled to keep pace with the many growing pressures and drivers of change.

### **3.3 CHALLENGES OF WATER RESOURCES MANAGEMENT, WATER SUPPLY AND UTILITY REFORM**

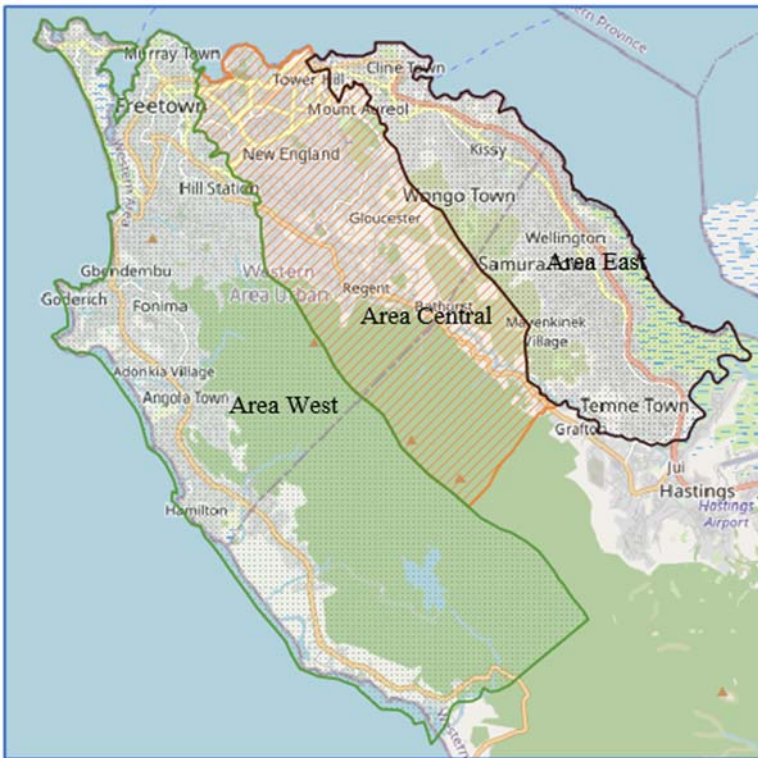
The Guma Valley watershed is located on the Freetown peninsula and is one of the wettest in Africa (Ledger, 1975). It drains into the Guma reservoir and dam. This is the main source (Other smaller sources include: Hastings dam, Charlotte, Regent, Babadori, Bluewater and Whitewater.) of water for Freetown and is owned and operated by Guma. The dam was constructed in 1967 when the city's population was around 450,000 people. The original dam, treatment works and trunk mains were commissioned with a capacity of 27,000 m<sup>3</sup> water supply per day. This was supported by further upgrading work in 1973 and subsequent infrastructure works that increased capacity to 80,000 m<sup>3</sup> water supply daily. To compliment this construction work, further efforts were taken to extend water supply to Wellington Industrial area in 1985.

In 2003, the population in Guma's supply area was estimated to be in excess of 825,000. To compound these demand–supply pressures further the network has suffered from ongoing vandalism (illegal connections), destructive cutting of

pipes, limited operation and maintenance throughout the civil war and negligible financial investment. The population in Freetown has continued to grow rapidly since 2003 and Guma's supply area now covers an estimated 1.5 million people (Statistics Sierra Leone 2017). The GVWC Water Act (2017) extended Guma's supply area as the entire peninsular and therefore includes Freetown, Waterloo and the peri-urban and rural areas along the peninsula. This includes more than 70 unplanned or informal settlements that have emerged in the past 20 years.

Figure 3.1 shows how Guma's operational area is divided into three supply areas that broadly consist of: urban communities and households in the west, business and trading areas in the central district, and people who live in densely populated eastern Freetown.

Recent work to measure the flow of water from the Guma dam determined the reliable supply is in the order of 60 MLD. This is enough water to supply only 40 lpcd assuming the water can be distributed equally with no losses to a population of 1.5 million people. In truth, losses are considerable and equity



**Figure 3.1** Guma valley water company operating area. *Source:* Guma Valley Water Company (2019), Business and Investment Plan; Available from Guma Valley Water Company, Freetown, Sierra Leone.

across the city is a major challenge. New raw water sources have to be protected, harnessed and developed, however, small local water sources are threatened by urbanisation that is damaging all potential catchment areas. Many hydrometric monitoring networks across the peninsula have also been destroyed, which means there is much uncertainty regarding the actual relationship between rainfall, surface runoff and infiltration. Despite very high annual rainfall it is evident that Freetown's water security should not be taken for granted.

Projecting future demands and predicting risk is fundamental for all water companies. In the case of Guma, historical feasibility assessments were completed. In 1967 the Orogu dam scheme was identified as the second major water supply option for Freetown. Further studies were undertaken in the 1980s, and a feasibility study for Orogu dam was completed in 1985 reflecting its status as a priority investment for Freetown. The civil war halted this project, however, in 2008 recommendations were made once again to safeguard the catchment area and restrict further encroachment. The [Atkins study \(2008\)](#) warned that: *If development continues for any length of time then the Orogu scheme may not be feasible, and massively more expensive water resource options requiring pumping over large distances will have to be developed.* Assuming that the Orogu dam is constructed, it would provide a gravity-fed supply of water, with low operation and maintenance costs, to eastern Freetown. This would enable Guma to expand its services to the east, which is a rapidly expanding area of the city.

Regretfully, repeated delays in securing and protecting the catchment area for Orogu dam has at worst made this option potentially unfeasible and at best a significantly costlier investment. The armed conflict side-tracked many of these important planning processes. However, the limited actions taken by successive government's have been a major contributing factor and external donors have not collaborated adequately to ensure financial investment and support for this critical investment. Alternative long-term solutions (other than Orogu) are expected to be either the proposed Rokel river abstraction option, with its high treatment and pumping costs, or the Bumbuna with Yiben option. This will incur higher capital costs and will likely take time to construct, but, due to the gravity flow supply, should have a significantly lower long-term operating cost. The seriousness with which governments work with water companies to advance these mega infrastructure projects is an indicator of their desire to deliver water security for their people.

The Freetown water supply network also needs infrastructure enhancements on a massive scale. Without significant capital expenditure (CapEx) it is reliant on an inadequate and aged water supply network. This propagates a vicious cycle of poor infrastructure, high non-revenue water (NRW), poor service levels, unwillingness to pay, low tariffs, low revenues, limited investments and consequently continued poor infrastructure.

Guma supported a condition assessment of its distribution network in 2018. The study identified that water pressures in the distribution network range considerably from 4.1 Bar in Lakka to less than 0.35 Bar in Freetown's Central Business District.

Water pressure in the water supply network declines rapidly from the distribution take-off points due to high pipe headloss caused by undersized pipes and/or pipe wall roughness (SMEC, 2018). The assessment also highlighted that it is unlikely that main pipeline leakage is a significant contributor to water loss as pipeline bursts only occur sporadically and are repaired quickly. However, leakage across the water supply network caused by ‘spaghetti’ connections and lines is estimated to be 40%.

These physical losses are estimated to be in the order of 13.3–20.4 mega litres per day (MLD), which equates to enough water to supply 140,000–225,000 people per day at 90 litres per day. However, in reality, the vast majority of consumers in Freetown receive their water supply from public standpipes or bowsers rather than household connections. This means their daily consumption is relatively low, estimated at around 25 litres per person per day (l/p/d), because water still needs to be fetched and carried back home (GVWC 2019).

The network condition assessment also estimated that eliminating illegal connections could assist in serving an additional 225,000 people in Freetown. The overwhelming contributor to leakage is the exposed ‘spaghetti’ service connections, which are prone to physical damage because they are not protected, often bundles of thin high-density polyethylene (HDPE) service connections which are highly prone to failure, laid on the surface or more commonly in the surface water drains, often stretching for several hundred metres with an estimated length of 990 km. Overall analysis conducted in 2018 estimates that the NRW rate, adding commercial losses to the physical losses, was estimated to be 56.5% during dry weather and 57.8% during wet weather periods (SMEC, 2018).

Unsurprisingly, Guma is still some way off its desired performance levels. Customers report just 22% satisfaction with ‘quality of services’ and 24% with ‘reliability’, district metered area (DMA) survey 2018. Those who do have a water supply service receive water on average for 4 days per week, averaging 45 hours of service over the week (less than a third of the time). Too many customer meters are not working, and the company is unable to bill according to volume consumed. Guma also has challenges in getting correct bills to customers and in making it appropriately easy and convenient for them to pay. Despite the introduction of bills’ payments through mobile platforms (such as Orange Money and AfriMoney), most of the customers still pay directly to Guma offices. This in the context of the water tariff being approximately one half to one-third of comparator utilities in Africa.

Most urgently, there is not sufficient water available to supply existing customers at the level they desire, forcing Guma into a rationing regime that must suppress demand for water. Lower-income consumers are most affected by the shortage of water, particularly those residing in eastern Freetown. In the dry season (December–April) this means walking and carrying less than World Health Organisation recommended amounts of water (40 l/p/d) over significant distances in containers which may not be hygienic. This presents a major

challenge to public health and a particular challenge to women and children, who generally fetch water. Developing a pro-poor service focus is therefore a key requirement for Guma, something which can only be built upon an adequate revenue-generating base of conventional customers.

### 3.4 APPROACHES FOLLOWED

In recent years, the policy environment in Sierra Leone has been more supportive of efforts to improve water resources management and water supply services in Freetown. Sierra Leone revised important water legislation in 2017 that provides Guma with a strengthened mandate. Sierra Leone has also embraced water and land resources management approaches by passing a new water resources law. This directly led to the formation of a new National Water Resources Management Agency (NWRMA). A new financial regulator was also established in 2014, termed the Electricity and Water Regulatory Commission (EWRC). Their role is to help Guma break the repetitive cycle of weak infrastructure, poor service levels, low tariff, low tariff revenues and low investment. However, there are ongoing constraints to implementation that include collaboration among various stakeholders and a focus on priority tasks that are important areas for strengthening resilience.

Realising these problems are chronic, Guma began a programme of step-by-step transition back in 2012. The initial intention was to motivate Guma's employees to address some of the entrenched service performance problems that persist. The process involved participatory workshops, facilitated by consultants from Adam Smith International and 2ML, so there was a sense of collective responsibility for improving the company's performance. Although the project had limited resources and duration it focussed on demonstrating that Guma had the desire to undertake necessary institutional reforms. Specifically, the following approach was implemented by the project:

- Identify, in confidence, some of the problems and poor performance ongoing within the company. This included, illegal connections, limited staff numbers, lack of resources and low levels of motivation.
- Identify realistic actions that could be achieved within the scope of the project.
- Focus, in the short term, on increasing revenue generation, including the payment of long-standing arrears.
- Sensitise employees to committing to performance targets, and set SMART (specific, measured, achievable, realistic and timebound) targets for western, central and eastern area field offices.
- Incentivise good behaviour and better performance on a monthly basis.

The workshops identified some major institutional problems, which included low motivation, low salaries, inadequate staffing levels and a sense of mistrust

between senior management and Guma's employees. However, over a short period Guma were able to significantly increase their revenue generation and importantly they created the necessary awareness about the challenges faced by the company. In this respect, this was the most successful aspect of the programme because it demonstrated to donors the potential within Guma and the commitment of its staff. It raised awareness on the major water supply issues in Freetown and it encouraged external donors to re-engage with the utility, where previously there had been scepticism.

From 2014 to 2016 Sierra Leone was struggling to deal with the West African Ebola outbreak. This did not have a direct impact on water supply infrastructure, but it did mean the main water utilities and service providers were busy supplying water to hospitals and Ebola Care Facilities that had been set up across the country. Guma and other service providers also had to adopt guidelines for the management of solid and liquid wastes. Sierra Leone was the worst-affected country in West Africa and the repercussions to its people, institutions and finances went way beyond the final death toll. During this period the successful staff-incentive programme had to be suspended.

The Ebola crisis highlighted the resilience challenges in countries like Sierra Leone, but Guma were proactive in securing additional funding in the post-Ebola recovery programme. Planning issues in post emergency programmes were twofold: first, Guma needed to be able to give a clear direction as to what financial investments and support was required. Recovery programmes are designed rapidly and it cannot be taken for granted they will identify the right priority interventions. Detailed feasibility studies are important for guiding interventions, because large numbers of external consultants may be deployed with limited historical knowledge of the water situation in Sierra Leone. The second issue concerns timeframes. Recovery programmes are often over-ambitious and set unrealistic timescales for project interventions. For Guma, effective long-term development is the best form of disaster risk reduction; and sound infrastructure investments coupled with company incentives and strengthening represents the best form of disaster preparedness.

The different priorities in improving service performance and resilience exhibited by the various donors (and their consultants), along with the different time frames for project deliveries do not make it easy for a utility still in 'survival mode' to get best value and service security from donor contributions.

### **3.5 AQUARATING ASSESSMENT**

In responding further to these long-term challenges, Guma voluntarily undertook an AquaRating assessment in 2016 – the year the Ebola crisis in Sierra Leone was declared over. This is an international rating system for water and sanitation utilities which focuses on the multi-faceted challenges they face. The rating process evaluates utility performance through indicators and management



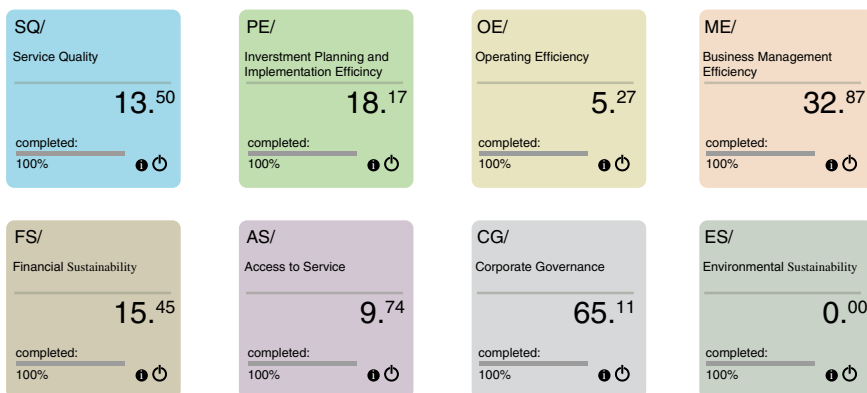
practices and defines them against an international standard. The assessments are undertaken by independent auditors accredited by AquaRating and led by the International Water Association. The primary reason for Guma using AquaRating was threefold (Guma Valley Water AquaRating Implementation, Report to GVWC & IWA/AquaRating, Eberhard, 2016):

- To establish an objective baseline of the performance of the company.
- To inform improvement action plans for Guma.
- To enable improvements to be measured over time.

Guma is the first utility in Africa to undergo this rating assessment. Perhaps unsurprisingly the overall assessment score is 10.38. This was a low score compared to the maximum score possible of 100. However, it should be noted that the standard applies to the best water utilities in the world and Guma operates in a volatile and challenging context with many known performance problems. A low score was therefore anticipated by the assessors and Guma staff.

It was also recognised that the derived score was in-fact less important than the learning that can be gained and the subsequent improvements made as a result of the assessment. It can also be noted that a lower base score provides for greater room for improvement. The assessment also suggested that Guma was being transparent and opening itself up for wider scrutiny, which is of far more interest to investors than assumed information.

Scores by assessment area are shown in [Figure 3.2](#). It is notable that the scores are variable across the areas with the highest score given for corporate governance (65) and second highest for business management efficiency (32). The other six areas scored below 19 with very low scores (below 10) for access, operating efficiency, and environmental sustainability.



**Figure 3.2** GVWC AquaRating assessment scores 2016. *Source:* Eberhard, R. (2016) Guma Valley Water Company Aquarating Assessment, Available from Guma Valley Water Company, Freetown Sierra Leone.

and environmental sustainability, and a score of 13 for service quality, 15 for financial sustainability and 18 for investment planning.

To put the AquaRating assessment into context it is helpful to highlight two of the very real challenges Guma face. For example, as Freetown's population has grown to 1.5 million, the number of household connections has stagnated to around 22,000 with just 200 actual volumetric (metered) customers. To address this problem, Guma introduced a sophisticated system of negotiated fixed rate tariffs in order to help generate much needed revenue. However, externally implemented programmes have, at times, proposed the widespread introduction of water meters, yet this could actually serve to undermine Guma's revenue when available water supply is so limited. A second example is the ability to increase revenue by serving customers in the Central Business District (CBD) of Freetown. For some time now Guma's own headquarters office, located in central Freetown, has been reliant on bowser water delivery. This is an indication of the company's struggles to prioritise water supply to the best potential revenue stream (business customers) in the CBD. This would also serve to boost the morale of Guma staff members by improving the functionality of company toilet facilities.

Guma's staff are often frustrated with the current circumstances. They are trying to do their best for customers and consumers but are often restricted by the system in which they work. Salaries have been below national and international comparators and they lack adequate equipment, logistics and finances to perform essential utility functions routinely. In the recent past they have also been criticised by the national media and government. Some of this criticism may be justified but not entirely. The major challenge Guma continues to face is the shortage of water to supply customers as growing demand continues to outstrip available supply. Guma has advocated repeatedly for catchment areas to be protected and has requested direct support from mandated Ministries, Departments and Agencies responsible for law enforcement, land management and preventing environmental degradation. Without increased support to safeguard raw water resources it is not realistic to think Guma can work independently to be a resilient utility, because a lack of water, coupled with limited political will to support the water sector directly affect all aspects of their operations.

### 3.6 INSTITUTIONAL REFORM

Institutional reform is primarily concerned with transitions. The change from one (inferior) situation to a much better one. The intention for Guma is to demonstrate a vision and real commitment to deliver water for all so it can attract ongoing technical and financial assistance. The process involves Guma doing *what they can with what they have*, with each department and unit developing detailed workplans, focus areas and key performance indicators. These timebound

plans are detailed in Guma Valley Water Company Strategic Performance Improvement Plan (2019–2023).

GVWC is committed to delivering the internal reforms required to improve services for customers and to provide assurances to all stakeholders that the company is committed to supporting Sierra Leone's national targets and the sustainable development goals. However, GVWC cannot meet these longer-term goals without government assistance and external support to finance and develop new water sources under larger capital investment programmes.

In the short-term, delivery of this plan along with many other planned improvements is subject to Guma receiving approval to increase water tariffs by the EWRC. While the company benefits from the low operating cost of the Guma dam, which enables a gravity-fed system, Guma has only been able to operate on a very limited tariff by not undertaking critical investment in capital maintenance to the supply network. 'Spaghetti connections' are a visible sign of the Company's inability to install mains pipes in the city's streets. All of the necessary reforms need to be supported with improved customer engagement and quality data on existing situation to ensure buy-in and support and to explain the reason for the necessary increase in cost. The first tariff revision submission to the new economic regulator was requested to be postponed for over a year.

One way Guma has tried to address these issues is to set out its vision and ambition in its 2019 Business and Investment Plan. This plan sets out Guma's starting point and details the challenges they currently face, their future vision and ambition, and how they intend to progress towards these timebound targets. The plan is ambitious, but it sets out the utilities vision for transformation. It is structured around five main corporate objectives (COs):

- (1) To improve core utility operations and customer care, including to the poor.
- (2) To empower staff: strengthening HR capacity and incentivising company productivity.
- (3) To achieve financial sustainability and increase investment planning.
- (4) To enhance water resources and network infrastructure; expanding coverage.
- (5) To develop professional corporate support services and information communications technology.

### 3.7 INFRASTRUCTURE

Guma's improved performance is directly dependant on repairing, rehabilitating and replacing critical infrastructure. Immediate problems to address include: massively increasing new raw water storage capacity, replacing large sections of the transmission and distribution network, utilising the full capacity of existing infrastructure, increasing water pressure in select areas, repairing pumping stations, and improving access for customers and consumers. At present, water

supply is rationed year round to try to maximise efficiency and equity. With a population growth rate around 3% per annum investment and infrastructure work is pressing to avoid growing numbers of unserved.

The lack of investment in water infrastructure has created the potential for significant water contamination, particularly in the wet season. According to data collected during the network condition assessment, there are 18.1 km of submerged distribution pipes, the majority of which are located in storm drains and ditches on the side of the road. Both pipes in submerged ditches and leaking spaghetti connections create potential contamination points due to contaminated water being drawn into the mains when pipes empty due to rationing cuts. This is a significant issue given high rates of open defecation in Freetown and the inadequate sanitation systems for routinely removing, treating and disposing of solid and liquid waste in a safe and responsible manner.

### **3.8 ACHIEVEMENTS SO FAR**

Building resilience of water supply services in Freetown will take considerable time. It is therefore concerned with transitions. Not all of these transitions have been completed yet, but the process improvements being undertaken by Guma point to a more resilient water utility.

The first transition, which is perhaps the most visible, is the replacement of aged and crumbling infrastructure. Guma has been working closely with IMC Worldwide, BAM Nuttall and Mott MacDonald (and others) to rehabilitate its Water Treatment Plant and replace large parts of the water supply network. The Freetown water supply rehabilitation project, which aims to improve water quality, reduce leakage and extend water supply to eastern Freetown, is the first of many much needed infrastructure projects.

Guma is also partnering with Millennium Challenge Corporation to improve capacity and to develop core systems and processes to improve services. This includes establishing 'District Metering Areas' (DMAs) to reduce NRW in two pilot areas in Freetown, with the broader goal of replicating the process across GVWC's entire network. This should be completed over the coming decade, anticipating distribution of additional treated water from the planned and much needed new water source/s. Also, African Development Bank (AfDB) and partners are sponsoring the Freetown WASH and Aquatic Environment Revamping programme. This work aims to deliver the rehabilitation of five malfunctioning raw water intakes and the development of 10 new water intakes, along with 30 km of raw water transmission mains, to provide approximately 51 MLD additional potable water supply, distributed through the rehabilitation of 100 km of distribution mains and the expansion of the distribution network by 150 km, delivering through 56,000 new metered household water connections. The approximately \$192 m budget for this work (which also includes watershed protection and sanitation elements, spread over 48 months) has been incorporated

in the 2020–2025 Business & Investment Plan, assuming a four-year implementation period. The project is currently in its inception phase.

In advance of future major water resource investments, GVWC has also planned to invest, with Government support, approximately Le 100 billion in small-scale water source development and enhancements wherever possible on the Peninsular (Kissy, Dwarzak & New England Communities, Kossoh Town, Hastings Town & Jui, Boama, Angola Town & Philip Street in Wellington; approximately 5 MLD total) and other hard-to-reach communities within Freetown. However, that addition, along with water conserved from fixing leaking pipes and connections, will not be sufficient to meet the immediate shortfall of over 100 MLD, let alone for the future overall demand as the newly mandated ([GVWC Water Act 2017](#)) Western Area population grows. Guma is also planning in advance for the next major investment in water resources. This is being achieved with the support of the African Development Bank (AfDB) who are funding the ‘Freetown Water Master Plan & Sanitation Master Plan and Investment Studies’.

The oft-repeated saying is ‘software without hardware goes nowhere’ which implies ongoing support to Guma should combine both capital investment and utility reform to maximise impact. The second transition therefore has been to improve knowledge so management decisions and utility performance improves. Extensive work has been undertaken to help Guma better understand the location and condition of its water supply network. Infrastructure has been mapped extensively and a detailed condition assessment completed to inform Guma about the status of its critical infrastructure assets. Flow monitors have been installed to help Guma understand ‘where the water is going’ and areas of ‘low flows’ in order to improve water distribution. Based on this recorded flow data, Guma has been able to revise its rationing regime and inform people when their localities will receive water.

If there is ignorance concerning the status of assets and water supply then there can be little hope of managing services well and making informed decisions. But, the reality is that multiple processes also need to be improved to establish asset management systems, improve customer engagement and use survey and real-time data for better decision-making. In the past, Guma’s core utility operations have not performed well. A lack of data collection, analysis and follow-up action, limited systematic process and a lack of resources meant it was not easy for Guma to improve its operational performance. But times change and embedded technical support programmes and new technologies have allowed Guma to begin to address some of these entrenched problems. A third transition, ongoing within Guma, is to improve its management processes in a systematic manner. There has been significant progress in embedding data-driven management processes that will enable GVWC to achieve improvements in its operations. Data and information have been emphasised as a core driver of utility performance. For example, an initial assessment found that many existing information systems and databases were underutilised and there has been a

concerted effort to improve the way these data systems are utilised and applied. Guma's Customer Information System (EDAMS), for example, is a robust system that already has a lot of valuable data that can provide the utility with critical insights on how the water 'inventory' is converted into revenue. The GVWC Operations Report relies on data from EDAMS to develop the water balance and to provide analysis on its DMAs. Used effectively EDAMS also provides critical inputs for non-revenue water management and with technical support from Adam Smith International, Guma has developed a process for dealing with customer queries in order to generate reports for senior management and strengthen the companies standard operating procedures (SOPs). Further, critical information has also been collated on the status of water supply network assets, including the generation of visual GIS maps and a condition assessment of all pipes, reservoirs, valves, and other critical operational assets.

Due to the extensive number of illegal connections and extensive open defecation water quality is also problematic across Guma's water supply network. New water quality management process have been introduced. This required a process of: first embedding new SOPs to test water regularly at key locations across the network; second analysing the data and ensuring corrective follow-up action to improve water quality. This has required substantial resource increases in equipment, transport, and laboratory facilities, including on-site portable testing. Guma has worked intensively to ramp up testing and field operators are now able to apply automated analytical tools in Excel to help GVWC quickly produce summary reports from the raw data. This has already had a positive impact on the ground, where Guma has invested in cleaning and safeguarding service reservoirs at Tower Hill.

An important way in which Guma have tried to drive performance is through the introduction of an improved results based financing (RBF) programme. This programme or intervention has primarily focussed on addressing revenue collections and technical losses and has been one positive way to incentivise better company performance and improve staff morale. However, RBF programmes can have a positive but temporary impact if they do not focus on improved processes rather than just outcomes. This is because outcomes cannot be sustained unless internal operational, commercial and financial processes are improved. An important way the RBF programme has been pursued is through linking it to a Performance Incentive Sharing Plan (PISP). This has been achieved by engaging with area managers (western, central and eastern) so they can play a more meaningful leadership role in helping the utility to meet its objectives. This has been achieved through collaborative planning, implementation, data collection, analysis and distribution of incentive payments, based on performance targets and results. While the PISP programme will not resolve all problems it is an important first step in problem solving, improving processes and motivating staff. It also challenges improvements in management and oversight in order to build trust between frontline staff and senior management. Examples of initiatives

being taken include: improving response times to reported leaks, installing new sub mains, improving water quality, handling customer complaints efficiently, and registering new customers.

There has also been a transformation in Guma concerning customer engagement, particularly since the appointment of a new managing director in July 2018. This has focussed on prioritising customer engagement but crucially also with corresponding changes in Guma's own accountability and behaviour. This is evidenced by work in the two DMAs to manage leakage, change Guma's behaviour and to develop better customer engagement strategies. The GVWC Stakeholder Engagement Plan now embeds the concept of 'Key Influencers', for example, which emerged as a very useful strategy in the pilot DMAs. Part of this transformation in customer engagement also includes outreach and using media channels to engage with the public more widely.

The introduction of two DMA demonstration has provided multiple benefits. They have created a practical learning-by-doing environment that has been a critical part of Guma's institutional strengthening strategy. The process of planning, developing, and implementing pilot DMAs required an extensive effort to meaningfully understand services and challenges on the ground. The process required digging deep into data that is stored in EDAMS and provided the team with an understanding of how to use data to drive service improvements on the ground. An outcome of the DMA work has been the ability to categorise customer accounts into: (1) accounts billed and paid, (2) accounts billed but not paid, and (3) accounts not billed – usually because water was not supplied. This has allowed the Guma's area teams to improve the correlation between service levels on the ground and customer payments.

The DMA work and analysis also demonstrated that pro-poor services cannot be treated as a niche. Over the past few years poorer communities have always been served by water bowsers, which are often discontinued due to high operating costs and breakdowns. This is not a sustainable model. It does not help poor people and it does not help GVWC. In response the primary objective of support to CWS now has been to reorient the bowser unit to a strategic unit that supports area teams in extending services to ALL residents of Freetown. The efforts around embedding this internal change have been driven by work under a social behaviour change and communication programme to influence behaviour change within the utility. The CWS unit now works with area teams to identify supply gaps and then help the teams assess options for extending services. Where possible, area teams must provide household or yard connections and where this is not possible, there are a menu of options that include meter banks and water kiosks.

A fourth transition has been to focus attention on Guma's own human resource systems in order to improve utility performance. Staff motivation and capacity continue to be major challenges that GVWC need to address. There are four aspects in particular that Guma has focussed on. The first has been to introduce a

performance incentive sharing programme (PSIP), which focussed on improving revenue generation and reducing technical losses across the water supply network. The core intention of staff incentivisation is to drive performance improvements and the concept builds on earlier ideas of empowering GVWC staff and a results-based framework that incentivises good performance on a monthly basis. Area managers and area teams, who interface with customers on a daily basis, in particular need to be empowered to play a more meaningful leadership role in helping the utility meet its objectives. While the PSIP will not resolve all the issues that prevent this from happening, it is a useful starting point. The second aspect has been to improve HR processes and disciplinary mechanisms. Detailed HR manuals have been developed and line managers supported to ensure higher professional standards, where previously working arrangements and the influence of trade unions were considered unworkable. GVWC staff now have an HR handbook that informs employees of their contracts, benefits, disciplinary and grievance mechanisms. The third aspect has focussed on reducing and eliminating gender-based violence including policies and SOPs related to sexual harassment, bullying and discrimination to prevent incidents for both GVWC staff and its customers. These important measures are all part of a wider initiative to substantially address the way the utility operates. The fourth, relates to the introduction of ongoing continued professional development, which includes practical embedded training, study tours to other utilities and a series of thematic Master classes for managers. GVWC has also formed stronger links with the Sierra Leone Institute of Engineers so ongoing utility training is recognised and accredited.

The fifth transition has placed the spotlight on financial sustainability and investment planning. If Guma is not financially sustainable then there will be little prospect of building resilience for future shocks and threats. A number of initiatives are ongoing that include: first, improving financial management systems within Guma. This has included internal restructuring within Guma to strengthen the Finance and Administration Department, introducing new financial management systems (such as SAGE) and improving financial management capability. The Finance & Administration Department are expected to provide strategic and analytical support to provide better financial analysis, cost–benefit analysis and tracking staff productivity. The second is about sound investment planning. Priority-based budgeting has been introduced so scarce resources are targeted to maximise impact, leveraging new sources of financial investment; and moving towards a new cost-reflective tariff area all efforts to generate revenue so service improvements are undertaken. Guma’s proposed tariff increase will maintain the existing lowest domestic tariff to ensure lower-income customers with household connections can access water at an affordable rate. It is anticipated that this rate will eventually be reflected in the charges for water from stand-posts and kiosks. In future the company needs to generate sufficient



revenue to ensure that existing systems can sustainably deliver to customers at its renewed and rehabilitated state with ongoing regular maintenance.

### 3.9 OUTCOMES

Guma are now recognised as being serious minded about improving water supply services in Freetown. Government also realise that water resources management and water supply in Freetown is at a critical stage. Across the city, people openly talk about annual water shortages, frustrations with service levels and inequity across the city. Businesses have spoken about willingness to pay for a more reliable service. Now people start to see action on the ground. One clear indication is the rehabilitation of the main treatment works at Guma dam and the rehabilitation of transmission and distribution lines. The separation of commercial bowser operations from the community water service delivery has increased efficiency in the delivery of water to community tanks and private individuals. In early 2021, Guma received 13 new water bowsers and now have 18 functioning bowsers to deliver water to communities, especially those without piped connections. A number of projects are introducing new water kiosks and a new rationing regime has been designed by Guma so people know when water can be expected in their local area. Moreover, infrastructure feasibility studies are planned to determine the most viable and cost-effective long-term water supply options.

The formation of the two regulators, NWRMA and EWRC, is also an indication of government's desire to ensure sound stewardship of water resources and a fair deal for consumers. Guma now interacts with both regulators with the support of the Ministry of Water Resources. This provides an opportunity to coordinate activities and ensure meaningful progress on some key issues. These multi-stakeholder platforms need to become more prominent in the future and would benefit from ongoing engagement with Freetown City Council, which is led dynamically.

As part of the ongoing Freetown water supply rehabilitation work, multi-stakeholder platforms and local consultations have also been held with customers and local residents. Working collaboratively is viewed as a way to resolve water issues at a local level. This includes catchment encroachment, illegal land occupations and vandalism to the main water supply network.

There is still a considerable amount of work to do over many decades. However, this early progress has attracted growing donor interest and many are committing to further programmes of technical assistance. These programmes also need to empower Guma staff so they have better working conditions and are incentivised to participate. Incentive-based performance contracts have already been introduced within Guma at the organisational and institutional level, and should be considered routine to drive the desired change. As an example a staff loan scheme has also been introduced with 10.5% interest rate payable within 18 months to motivate staff.

### **3.10 KEY LESSONS**

#### **3.10.1 Ownership of the change process**

When countries are susceptible to repeat shocks and crisis' it is vital that all water sector stakeholders (such as government, water companies, external donors and INGOs) collaborate meaningfully so they recognise which actions will deliver maximum improvement. The challenge that Guma has often faced is that many development and humanitarian support programmes are planned remotely, which makes it difficult for Guma to communicate their exact requirements. It is only when the most pressing actions are identified that utilities can build their capability in a step-by-step manner. There are also problems around quick fix programmes trying to address long term, chronic issues. Often these short-term interventions fail to deliver the necessary impact and staff are sometimes resistant against changes that transform their usual ways of operations.

#### **3.10.2 Political commitment**

Government commitment to supporting utility reform is crucial. Utilities require support to protect their catchment areas to secure raw water resources. Support from the executive level of government is also required to advance discussions and planning for mega infrastructure investments. High-level consultations are required so pre-feasibility and feasibility studies can be undertaken on time and investment finance secured. There have been successive studies in Sierra Leone reconfirming the importance of the Orugu dam catchment site. Guma senior management has for many years drawn attention to this critical issue, but successive governments have struggled to secure the catchment area and no detailed designs have been undertaken following the earlier feasibility work. Urban water supply should be strengthened through supporting water utilities rather than politicising the provision of water to the population on a free of charge basis.

#### **3.10.3 Infrastructure performance**

Guma's performance is heavily dependent on the availability of adequate water resources and the state of their physical infrastructure (termed assets). Systems need to be put in place to help utilities oversee the planning, design and construction of new infrastructure, such as reservoirs, treatment plants, transmission and distribution systems.

With investments required in the hundreds of millions of dollars, government and donors are understandably reluctant to invest without seeing demonstrable institutional change. But with such capex programmes necessarily taking a decade to implement, at a minimum, stakeholders have to commit in advance.

One approach Guma has adopted is to divide its water supply network into a series of DMAs. This enables the utility to repair and upgrade the network in a

step-by-step manner to improve service levels and address leakage. This work will also generate information on the utilities non-revenue water situation. However, the utilities desire to improve service levels and generate revenue within DMAs, should also be tempered with a focus on serving the urban poor and low-income communities. In Freetown, these community groups will likely remain dependent on standpipes and tapstands for the foreseeable future and the charge per bucket should be equivalent to an appropriate subsidised lifeline tariff.

If cities and towns experience high levels of social inequality there will be little prospect of a resilient society. Vulnerable communities will likely live in densely populated and unhygienic slums that are prone to flooding or environmental pollution. Utilities and the economic regulator should collaborate to develop policies, tariffs and innovative solutions that are relevant for households and communities that are in the lower wealth quintiles. Utilities often lack organisational capacity in gender, equity and social inclusion (GESI) matters and specific units may need to be established that focus on serving vulnerable groups in a fair and equitable manner.

### **3.11 INSTITUTIONAL REFORMS TAKE TIME**

There is a critical need to move away from concentrated large-scale institutional reform processes that exceed a utilities receptive capacity. It must be recognised that utility staff have their own day-to-day roles and responsibilities to perform and it becomes a major challenge when multiple donors embed technical support programmes simultaneously. Donors should also avoid investing their efforts in producing multiple technical, social and financial reports that will probably serve a limited purpose within the utility. This inadvertently creates a problem whereby participation and trust building becomes difficult because technical support programmes are unrealistic in their timeframes and do not recognise the need for long-term support.

### **3.12 COMMUNICATION WITH CUSTOMERS**

Water utilities are accountable to their customers first and foremost. Customers have often struggled with low service levels and have not had a direct line of communication with Guma to demand better services. Previously there were no senior positions within Guma whose primary role is customer service and communication. Even though it is not an easy task, a customer charter could have enshrined Guma's commitment to the customers and people in Freetown at an earlier stage. Potentially, this could have been crucial in leveraging greater support from government. However, Guma's weekly radio programmes have created a platform for customers and consumers to express their grievances and concerns about the company's services.

### 3.13 SUMMARY

To summarise, the case from Freetown demonstrates that water companies in fragile states are starting from a low-base. All aspects of their business need substantial long-term technical, institutional and commercial support. Building resilience will take a significant period of time (decades rather than years) and it will require investments in many essential areas, such as water resources, infrastructure, institutions and finance. The key issue is arguably to support the utilities processes to develop a forward looking business and investment plan, which can be used to articulate and communicate the utilities own aspirations. It should be used to generate greater political and donor support.

In a long-term development setting it is vital that the utility can communicate what are the single most important areas for improving performance levels and resilience. As offers of financial and technical assistance are made, both utilities and government need to be more coordinated and adept at communicating what assistance is actually required and when. This is important because individual support programmes cannot deal with the entirety of infrastructure, institutional and commercial problems. Therefore, part solutions must be well coordinated and phased in a logical order. Guma's experiences show that historically opportunities or critical junctures to ensure long-term water security have been missed, which will now result in more costly interventions and operations. The failure to secure and protect Orugu catchment area and build a second major dam and reservoir for Freetown is the obvious example. This inadvertently hinders the prospect of long-term resilience.

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