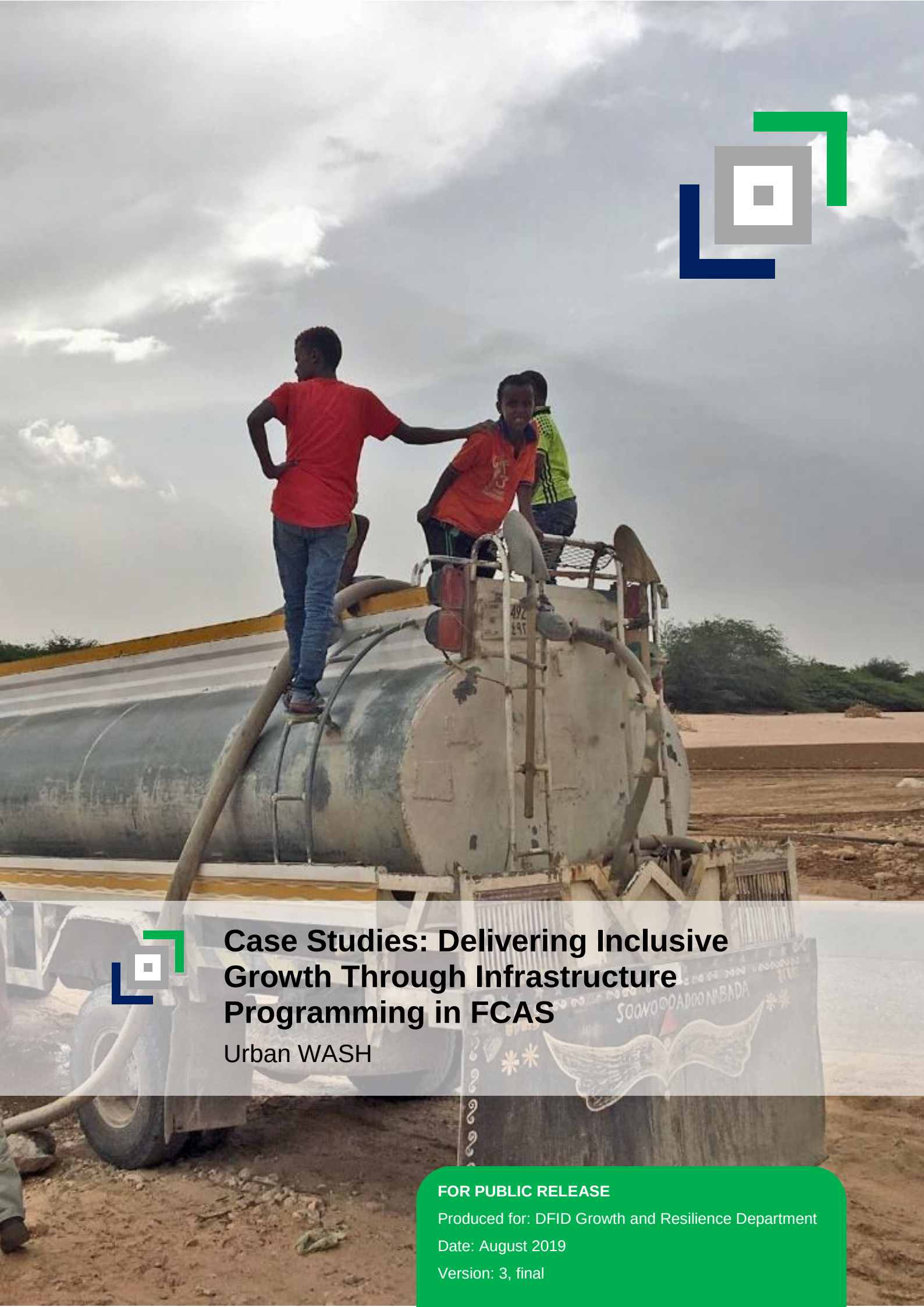

Case Studies: Delivering Inclusive Growth Through Infrastructure Programming in FCAS

Urban WASH

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Contents

Acronyms

Acronym	Definition
AfDB	African Development Bank
BTS	Bulk transfer system
CAPEX	Capital expenditure
CEO	Chief Executive Officer
DANIDA	Danish International Development Agency
DFID	UK Department for International Development
DMA	District Metering Area
DRC	Democratic Republic of Congo
E4i	Enterprise for Impact
EC	European Commission
EU	European Union
EWRC	Sierra Leone Electricity and Water Regulatory Commission
FAO	UN Food and Agriculture Organization
FCAS	Fragile and Conflict Affected States
FCC	Freetown City Council
FFP	USAID Food for Peace Program
FIDIC	International Federation of Consulting Engineers
FSA	Free Syrian Army
FSWMC	Freetown Solid Waste Management Company
FWMC	Freetown Waste Management Company
GBP	Pounds Sterling
GESI	Gender and Social Inclusion
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Development)
GSI	Gender Status Index
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GVWC	Guma Valley Water Company
HH	Household
HQ	Headquarters
HTS	Hayat Tahrir al-Sham
HUWSUP	Hargeisa Urban Water Supply Upgrade Project
HWA	Hargeisa Water Agency
ICAI	UK Independent Commission on Aid Impact
ICED	Infrastructure and Cities for Economic Development (Facility)
ICRC	International Committee of the Red Cross
IDC	International Development Committee (UK parliamentary committee)

Acronym	Definition
IDP	Internally Displaced Person
IGC	International Growth Centre
INGO	International Non Governmental Organisation
IT	Information Technology
IUWM	Integrated Urban Water Management
IWSLC	Ibb Water Supply and Sanitation Local Company
JICA	Japanese International Cooperation Agency
JSC	Joint steering committee
KFW	Kreditanstalt für Wiederaufbau
LC	Local Council
LSE	London School of Economics
MC	Mercy Corps
MCC	Millennium Challenge Corporation
MIS	Management Information System
MoFED	Sierra Leone Ministry of Finance and Economic Development
MoHS	Sierra Leone Ministry of Health and Sanitation
MoWR	Somaliland Ministry of Water Resources
MW	Megawatt
MWSSRP	Monrovia Water Supply and Sanitation Rehabilitation Project
NCP	Sierra Leone National Commission on Privatisation
NEC	New Engineering Contract
NGDPS	New Geed Deeble Pumping Station
NGO	Non Governmental Organisation
NRW	Non revenue water
ODI	Overseas Development Institute
OPEX	Operational expenditure
PBR	Payment by results
PCR	Project completion review
PIP	Performance Improvement Plan
PPP	Public private partnership
PV	Photovoltaic
REGIDESO	Régie de Distribution d'Eau
SARL	Limited Company
SDC	Swiss Development Cooperation
SDF	Somaliland Development Fund
SDM	Somali Democratic Movement
SDP	Somaliland Development Plan
SGP	Système de Gestion Pilote

Acronym	Definition
SL	Somaliland
SLL	Sierra Leone Leones
SLRA	Sierra Leone Roads Agency
SOPs	Standard operating plans
SWALIM	Somalia Water and Land Information Management
SYP	Syrian Pounds
TA	Technical Assistance
ToR	Terms of Reference
UN	United Nations
UNICEF	UN Children's Fund
USAID	US Agency for International Development
USD	United States Dollars
VfM	Value for Money
WASH	Water, sanitation and hygiene
WASHAERP	WASH and Aquatic Environment Revamping Project
WB	World Bank
WEDC	Water Engineering and Development Centre
WESH	Water, Environmental Sanitation and Hygiene project
WHO	World Health Organization
WSP	World Bank Water and Sanitation Program
WSUP	Water & Sanitation for the Urban Poor
WU	Water Unit
YER	Yemeni Rial

1 Introduction

This case study forms part of an ICED research project for DFID's Growth and Resilience Department to investigate infrastructure programming in Fragile and Conflict Affected States (FCAS), comprising case studies examining lessons learned from donor experiences in these contexts. This addresses a recommendation from the 2015 ICAI report 'Assessing Impact of the Scale-up of DFID's support to Fragile States', to provide guidance on targeted infrastructure components to ensure sustainable impacts in fragile states programming.

The research team carried out a literature review of mainly recent research (post 2011), prior to beginning the case studies, leading to an annotated bibliography which collates some early findings and identifies knowledge gaps to address in the case study phase of work. Two case studies will focus on country assessments – Somalia and Afghanistan. **This third, sectoral study will look for lessons from urban water supply and sanitation (WASH) programmes in FCAS.**

The objective of the overall assignment is to make practical recommendations on approaches to infrastructure development in FCAS. The primary audience is DFID advisers and programme managers; however, the findings are also expected to be of interest to other donors and sector stakeholders.

Specific issues derived from the broader literature review which were considered as part of this case study:

1. **Understanding the context** – to what extent has this been adequately considered in the planning and design of donor programmes, and was the changing nature of the context recognised and monitored in order to adapt/modify approaches to a changing context?
2. **Delivery of infrastructure** – were basic good practice and principles applied throughout the project cycle – or were these overridden by other political imperatives or for other reasons? Is the infrastructure that was built sustainable? Are viable arrangements in place for operations and maintenance? How will costs be covered?
3. **Impact of infrastructure** – were the services delivered and outcomes from the completed infrastructure consistent with the theory of change/intervention logic; and were there unexpected positive and negative consequences?
4. **Donor modalities, instruments and approaches** – how did these influence the success or failure of the infrastructure project?
5. **What was the role of other actors** – private sector, non-traditional donors - how was this affected by/did this impact on the operating environment?

Approach

The research approach was qualitative, involving limited desk review of academic and grey literature and project reports and interviews with key staff, implementing agencies and others with knowledge and understanding of the issues. The research team also drew from previous reports and research by the ICED facility where available (Somalia, Sierra Leone, Yemen). The research team made trips to two of the three main focus cities, with DRC being excluded due to complexities with visa and security arrangements.

Focus of Study

The sectoral focus is on urban WASH programming, looking particularly at *infrastructure* and related services. Three primary locations were selected for case studies on the basis of DFID's engagement with urban WASH: Freetown in Sierra Leone, Hargeisa in Somalia[1] and Goma and Bukavu in DRC. Each case study prioritises learning from DFID's experiences, but also describes the broader programming context.

Three further small case studies were drafted on the basis of opportunity as further information came to light from desk research and other ICED activities. These draw more heavily from referenced prior reports, and are included as additional evidence supporting the research findings. They cover Ibb in Yemen, Idlib in Syria and Liberia's broader urban context (applies also to Monrovia, the capital).

[1] Hargeisa is the capital of Somaliland, which although self-declared as an independent country is viewed by most UN members as a federal state of Somalia.

2 Consolidated findings

The case studies summarised in section 3 below have shed light on a variety of different programming types and contextual variations of conflict and fragility. There are some obvious common themes running through the case studies relating to the direct effects of conflict, the challenges of building sustainable institutions in fragile contexts and the crucial role of well governed legal and regulatory frameworks in longer term resilience of urban water institutions. There are also specific observations that were present either in only a few of the cities studied or which are demonstrated positively in one context and negatively in another (for example the often corrosive effect of short term humanitarian interventions is demonstrated in several cities but the converse – avoidance of this problem – is documented in the Yemen case study).[2]

This section outlines a sample of the commonly occurring themes, with brief references to the case studies in the remainder of the report. The reader is invited to read the lessons section of each case study for full observations on what can be learned from each, as the material presented here is not a comprehensive summary.

2.1 *Understanding the context*

There are some broadly predictable effects of conflict which are familiar from all post-war urban situations, and their effects on urban WASH performance are also predictable:

Population growth and unplanned urbanisation. In all cases, urban areas have seen major population growth, either beginning during the conflict as IDPs are displaced from the countryside and other parts of the country, or during the immediate post war period. This population explosion lasts for many years following conflict, with annual growth rates of 6% not unusual. In all post-war contexts we studied there have been issues with accurately measuring this population due to the unplanned nature of the accompanying urban development and the formation of informal communities. The knock-on effects are severe and can tip utilities into vicious circles of decline which it is difficult to lift them out of. They include the rapid development of other sources of water to meet the demand, which will usually include groundwater sources that are under increasing risk of contamination from surge in informal communities without adequate waste disposal systems.

Damage to infrastructure. This is occasionally (as in Yemen, Hargeisa and in parts of Syria not studied in this report) the direct result of war damage to water and wastewater facilities, but more often it is the incremental damage accumulated due to lack of maintenance or enforcement of regulations during and in the immediate aftermath of conflict. An increase in illegal connections, damage to water meters, damage to exposed pipes (particularly in Freetown), theft of fuel and equipment and the effects of delayed maintenance: these are typical problems inherited by post-conflict urban water projects. Emergency donor rehabilitation projects can help to repair the damage, but only in the presence of appropriate management capacity in water utilities and governance structures.

Falling revenues, higher costs. War increases levels of poverty and humanitarian interventions responding to need will often provide free water for extended periods of time, reducing both the ability and willingness of customers to pay for water in post-war cities. The accompanying deterioration of piped water services is often an exacerbating factor, as water not supplied cannot be billed and unhappy customers are less willing to pay. Costs and spare part shortages will tend to increase during conflict.

Interruption of electricity supply. Energy for pumping is an essential component of many urban water systems. Electricity is often the first major component of the system to cease operating in a conflict. In chronically fragile contexts, a resilient source of energy (diesel generators or solar energy) is a necessity to avoid the financial collapse of water utilities during emerging conflict, though humanitarian assistance will usually be needed to supply fuel or to absorb the fluctuations in price associated with wartime shortages. Water supplies in Idlib continued to operate during the conflict only until the province fell to

[2] Emergency interventions that replace capacity previously provided by utilities can have a harmful effect on longer term sustainability of water supply. The case study of Ibb city in Yemen provides one example of a situation where this has been avoided.

rebel forces, at which point the grid connection was severed and donors had to step in to install generators and supply fuel. In Ibb in Yemen, the utility had prepared for the conflict since the political crisis in 2011 (which then led to war in 2014), installing generators and stockpiling fuel. With adjustments to tariffs and donor support to offset price fluctuations for fuel, it was able to continue operating effectively and sustain revenues during the conflict. Electricity supplies are not reliable in many other FCAS contexts, including in DRC, where water in Goma can only be affordably pumped at night during the low tariff period, with major implications for the design of the system.

Skilled staff shortages. Institutional knowledge in poorly managed institutions is frequently lost with the loss of experienced staff. The staff who remain during conflict are also frequently lower skilled as they are less able to depend upon finding job opportunities as a refugee or IDP.

The specific context of conflict or fragility has a substantial effect on the likely problems and solutions donors will encounter. For example, in Yemen a longstanding process of decentralisation to local parastatal water utilities enabled the best of the urban utilities to achieve a level of resilience prior to the outbreak of war that has in some cases excelled in weathering the conflict, in spite of the typical effects of war – particularly the influx of IDPs. In Freetown and Monrovia, by contrast, there was a very low level of institutional fitness for purpose in the water sectors going into their (linked) civil wars and in the aftermath the institutions were unable to cope with the demanding situation, necessitating repeated short-term emergency interventions while donors delayed committing to sufficiently serious long-term projects to tackle institutional shortcomings. In DRC the context is different again, with the primary challenge being to navigate a forest of political vested interests and influence to achieve a legal and political arrangement that will allow a water utility to thrive. All of these are fragile contexts but have very different implications for programming.

Political economy challenges are more severe obstacles in fragile states, requiring a deep understanding of the context both within donor teams and implementers. Examples of this include the DFID-supported IMAGINE programme in DRC, for which political economy has been a significant challenge and the cause of delays and redesigns. The present project design has tackled most of these issues. Political economy challenges are also frequently felt in the imposition of unsustainably low tariffs on public utilities, driven by political weakness in authoritarian or newly democratic governments (Sierra Leone, Syria).

The careful selection of implementers can help to ensure successful politically aware programming. In DRC, DFID's grantee/implementer Mercy Corps put in place expatriate personnel who were likely to commit to the full length of the 5-6 year project and made provision for families, ensuring continuity of institutional knowledge. They have recognised the need for and therefore incorporated strong community engagement and communication elements for the success of the project. This contrasts with water supply infrastructure works in Hargeisa, which have focused only on improving the bulk supply to the city and will have little immediate impact on local communities. Lack of community support has been a hurdle to the water agency, for example in trying to regulate the water tanker industry. In Syria, GOAL has been able to operate in a highly insecure environment, understanding and navigating the relationships between rebel local governance groups and the technical remnants of the former central government water authorities. It has also been able to advise DFID on how the programme should deal with the interference of violent jihadi groups, resulting in a locally led solution that successfully disengaged this interference.

It is essential for sustainable programming that the mandated local and national authorities are involved in decision-making. In Hargeisa, utility staff were reportedly excluded from some decisions on funding and choice of technology within current programmes. Similar observations have been made about past programming in Freetown. In DRC, by contrast, DFID DRC did not submit to pressure for quick results prior to achieving an agreement on tripartite governance of the programme, which required local and national authorities to agree on plans and made future problems less likely.[3]

2.2 *Delivery of infrastructure*

The recurrent and serious challenge present to a large extent in all of the cities studied is the long-term difficulties donors have in building sustainable, properly functioning water utilities in fragile states. In

[3] It is significant that although authorities were consulted during international procurement processes, they were not given a controlling vote in the final bid selection.

Freetown, Liberia, DRC and Hargeisa, the common theme from sector observers has been that **capacity building was not attempted early enough**.

In Hargeisa, the vacuum in water management provided space for the private sector to pick up the majority of water supply responsibilities, with major effects on the cost and equity of supply. By the time there was a policy framework in place and donor support had begun working with the Hargeisa Water Agency, the agency was so dysfunctional that donors preferred to tackle supply issues through other means including NGOs – referred to by the World Bank as the 'capacity conundrum'.[4] **The same situation – an immediate focus by donors on emergency solutions with no long-term sustainability, undermining the public utilities and leading to a donor reluctance to subsequently engage – has been observed in Sierra Leone, Liberia and DRC and appears to be common across FCAS contexts.**

From the above, it would appear to be advisable to begin working on sector governance and capacity building immediately upon encountering water supply problems in any FCAS context. However, this is not always realistic. It is clearly extremely difficult to start capacity building of institutions very early in post-conflict scenarios, before a political solution has been settled upon and water and wastewater policy frameworks have been decided. **In Syria**, GOAL's work on introducing cost recovery to urban supplies in Idlib province during the conflict has so far failed to gain traction because of unanswerable questions about the authority of the local institutions to demand and enforce tariffs and longer-term uncertainty about how water will be managed when the war ends. The Ibb case study **in Yemen** shows that it *is* possible to support good urban WASH management during a conflict with emergency donor programming, but Ibb has an unusually resilient utility and the task will be harder across the rest of the country.[5]

Box 1: WSP framework for emergency to development transition in urban water supply[6]

The World Bank's Water and Sanitation Program (WSP) published in 2017 an assessment of progress on improving urban water supply systems in post-emergency contexts in Africa which includes learning from work in most of the cities examined as part of this report (Monrovia, Freetown, Hargeisa and cities in DRC). Below is a framework describing the outcomes from key action areas in a post-emergency situation, along with progress assessed by the World Bank in 2017. The same table with descriptions in place of scores (0-4 for level of progress made) is annexed to this report.

Intermediate Outcomes	1. Reestablish country leadership in sector coordination and policy development	2. Institutionalize rigorous sector monitoring and joint sector review processes	3. Restore cost recovery in urban utilities, small-towns, and large rural piped water schemes	4. Establish an inclusive sector investment plan (SIP) and process that mobilizes infrastructure investment	5. Increase domestic investment in the sector	6. Increase use of country systems by development partners	Cumulative 'transition progress' across IOs by country
DRC	2	1	1	1			5
Liberia	2	3	2	3	1	1	12
Nigeria		1	1				2
ROC	2	1	0				3
Sierra Leone		1	3				4
Somalia		2	3	1	2	2	10
South Sudan							0
Zimbabwe	3	3	2	3	1	2	14

Legend:	No WSP intervention	No progress	Slight progress	Moderate progress	Good progress	Substantial progress

[4] WB WSP, 2014, Delivering Water, Sanitation and Hygiene in FCAS: Learning Review.
[5] Significantly, GIZ has recently carried out a thorough analysis of urban water utilities in Yemen and designed a project combining infrastructure rehabilitation with capacity building. The intention appears to be to implement this as soon as funding has been secured, *before* the end of the conflict.
[6] de Waal et al / WB WSP, 2017, Water Supply: the transition from emergency to Development Support Evidence from Country Case Studies in Africa.

Our recommendation is to look at the earliest opportunity the operating environment allows, to transition from short-term emergency/humanitarian responses to longer term responses to address urban water issues. Support capacity building/institutional strengthening ideally prior to, and in parallel with, capital investments. See Box 1 and annexes for references to an approach to this developed and championed by the World Bank.

Where the water or sanitation infrastructure is not known in detail in advance, flexibility in contracting procedures is essential to achieve VfM. The current DFID rehabilitation programme in Freetown has been designed using a form of contract that is flexible at various stages while retaining appropriate incentives to keep costs down. A notable success of this approach was in significant cost savings achieved through rehabilitation of the vital scour valve at the city's main reservoir, which was significantly cheaper than the original plan of replacing it, which would have required major engineering works.

Use of appropriately simple systems and components for the context is essential for sustainability of impact. Most of the case studies showed positive examples of this, in particular the procurement of equipment and materials locally wherever possible (for example in Syria). In Bukavu, the water treatment plant provides basic but adequate treatment, and Mercy Corps decided to simplify the existing treatment process further rather than upgrade to a more complex system. However, there have been some clear examples of mistakes, such as the installation of a bulk transfer high pressure system in Freetown by the World Bank around the end of the civil war in 2003. This was never fully commissioned after installation and has since degraded and requires rehabilitation to fulfil its original purpose. Inappropriate use also appears to be causing pressure problems in other parts of the system. **Systems that are <u>too</u> simple may also not be fit for purpose, however.**

Water infrastructure works in FCAS appear to be characterised by long delays before improvements are evident. In Hargeisa, six years after the start of work to improve bulk supply to the city, there is still no increase in the bulk supply level. This appears to be attributable to rules that the implementing agency must follow which are not suitable for the context, referring all procurement decisions to its regional headquarters in Nairobi and from there to HQ in New York, resulting in delays. However, this is only one of a great number of possible hurdles that delay projects in FCAS contexts. There have been years of delays in DRC due in part to changes in the political context, delays in Idlib due to conflict factors and corruption in logistics systems and long delays in Freetown (a water supply masterplan completed with DFID funding in 2008 has yet to have any significant elements implemented). Donor strategies should be designed in the knowledge that seeking fast results will likely be to the detriment of sustainability and that delays should be expected, with the accompanying continued reliance of infrastructure on recurrent donor capital funding.

In situations where corruption is endemic, cash management systems can be an obstacle to progress. Mobile payment systems are not available in Syria and the inability of water utilities there to manage cash payments safely and without leakage in an unpoliced environment are holding back cost recovery efforts.

The employment of local labour in construction projects is a desirable design feature, in particular in the immediate aftermath of a conflict when employment opportunities have not yet recovered. This has been observed by the DFID programme in DRC: direct benefits from salaries, further engagement of the community and development of skills for future maintenance of local elements of the system. **However, there are pitfalls associated with work creation programmes in water provision in urban environments**. In Sierra Leone, the rapid expansion of water points in low lying areas of Freetown after the war was actively supported by government funding for employment creation purposes. It appears that the programme was primarily about work creation and was not designed with long-term plans in mind, because a lack of safe sanitation facilities or disposal routes in these areas led to an escalating health risk. This culminated in a cholera epidemic in 2012 directly linked to this post-war groundwater infrastructure and subsequent unplanned development and unmanaged faecal waste.

Currency fluctuation and particularly depreciation is both a more likely and higher impact risk to programming and to water utilities in FCAS environments. The impact is particularly acute locally when there is a heavy reliance on imported energy sources. This is documented in several of the case studies in this report. In Syria, the depreciation of the local currency has led both to a reliance on donor support for obtaining imported fuel for water pumps and to a perverse situation whereby donor-supported salaries (paid in USD) at water utilities have ballooned to four times their original value in local currency, causing resentment in communities and sustainability issues (these salaries keeping

skilled staff in post cannot be maintained if donor funding ends). In Somaliland, a reliance on imported fuel and the steady depreciation of the local currency has damaged the financial viability of the Hargeisa Water Agency. Currency fluctuations also cause practical issues with donor project management. The World Bank in Sierra Leone reported that the devaluation of GBP against USD during the 2008 financial crisis resulted in an effective 24% cut in the value of a crucial DFID funded programme component that was supposed to tackle emergency repairs and TA to the Freetown water utility. Increasing value of project currency vs local currency also tends to increase pressure to spend, which can result in poor VfM decisions.

2.3 *Impact of infrastructure*

Distributional benefits of WASH interventions in fragile urban environments need to be approached pragmatically. While community sanitation programmes can be targeted at the poorest communities provided there is sufficient public infrastructure to handle disposal pathways[7] and well-designed individual water points that rely on protected local resources can similarly be targeted, major water and waste infrastructure tends to have a much broader impact. This can be necessary to tackle political economy challenges, as in Goma, where Mercy Corps agreed a capacity and financial model such that the majority of demographic groups in Goma are likely to benefit from their programme's increased water supply. This was considered important, given the complex operating environment, to avoid problems by including powerful players who could act as spoilers to the programme.

Particularly when donor support is on an emergency basis, it is important to consider the impact of newly installed infrastructure on operations and maintenance requirements and consequential impact on tariffs. This appears to be an obvious point, but there is substantial evidence that it is not always adhered to in FCAS environments. This should have been fundamental to consideration of options for the upgrading of the bulk water supply system to Hargeisa, but interviewees suggested that a full analysis was not done, perhaps due to an inability to address longstanding capacity problems at the HWA.[8] The World Bank noted this was a serious problem in the donor response in Liberia from 2003-2007, leaving a wide array of emergency infrastructure which post-war water institutions were unable to effectively manage.

Broken promises – whether related to programmes that are delayed by many years, suffer cuts due to operational setbacks or which install unsustainable infrastructure which subsequently degrades – can erode public goodwill and lead to an uphill struggle for public utilities to regain the trust of their customers. In Goma and Bukavu, a repeated cycle of short term projects implemented by NGOs which lead to failed infrastructure (either technical failure or poorly planned ownership handovers to communities which are left with unfeasible maintenance requirements) has created a level of scepticism of donor projects such that the Mercy Corps team were often told that the communities did not expect the water to flow from the tap stand for more than a few weeks when the first phase of the IMAGINE project came into operation. Similar fatigue can be observed in communities across the other studied cities.

2.4 *Donor modalities, instruments and approaches*

Adaptability can be the key to success in FCAS contexts, but caution is required with complex construction projects. In DRC, DFID structured the IMAGINE programme to enable a flexible approach that would enable adaptation to a changing context. This proved to be important when a new Water Law was passed in the second year of the programme that fundamentally changed the institutional arrangements, and when the project had to terminate an agreement with the local NGO responsible for operational management. Although flexibility can result in delays, inflexible donor funding structures also cause delays – as they have in Hargeisa – and other implementation issues. In Freetown, the current DFID water network rehabilitation programme is being implemented under an NEC contract. While this is an appropriate form of contract when specifications are expected to change during the project as more detail on the works becomes available, it is still expensive to make changes

[7] Not the case, for example in Freetown, where there are many donor funded upgraded latrines but as yet no disposal route that avoids waste being simply dumped in the environment.
[8] These problems are outlined in section 4.5.3.

when design work has already been carried out and therefore needs to be redone following a change in context.

There is some capacity within the NGO sector for complex, politically aware non-emergency development programming in the water and sanitation infrastructure space. Expertise from NGOs' longer-term engagement in sectors throughout emergencies and into development stages is a potential asset to donors when compared with implementers that have more advanced sector experience but little understanding of the local context. The arrangement in DRC with DFID agreeing to a proposal put together by an INGO with strong contextual understanding, while contracting expert engineering and utility management advice from Mott MacDonald (an international engineering consultancy) is one way of marrying together both skillsets. It has been suggested that in Yemen one of the strengths arising from the conflict for future development prospects is that it has significantly expanded the capabilities and contextual understanding of humanitarian actors compared to the situation prior to the war. This is an asset that – properly exploited – could improve the contextual performance of development programming in post-war Yemen.

However, in fragile states there can be little depth in the market for implementing organisations with the necessary expertise and will to engage. A GOAL programme building sustainability into water supply institutions in Idlib was suspended for a year and a half due to procurement irregularities discovered by USAID on a separate GOAL Syria project and there was no suitable alternative implementer to transfer the project tasks to. Other examples exist in other FCAS circumstances outside active conflicts, such as the experience of DFID in Sudan,[9] in which the designer and only credible bidder for an urban water supply project pulled out of contract negotiations very late into procurement due to concerns about the ongoing after-effects of repealed US financial sanctions against Sudan. This set back the project by nearly a year while alternative implementers were sought.

2.5 *The role of other actors*

Private sector provision of water and sanitation services is a reliably enduring feature of fragile states, but private provision without strong public regulation and infrastructure is expensive, inequitable and risky. Private providers will emerge to fill the market gap left by a lack of public provision. While some service is invariably better than no service, in many cases private services unsupported by public infrastructure are of substantially higher cost and can leave the poorest and most vulnerable communities at much greater risk of harm. There is a risk that donor interventions focusing on improving the volumes of water supplied by piped water systems have limited positive effect on poor communities which may remain unconnected to water supply and reliant on trucked water or long walks to public standpipes.

The high price of private water supply can also drive augmentation of a meagre supply with unsafe sources and also to poor sanitation practices. In Idlib, poor households served by water trucks alone spend over 30% of their income on water. In the poorest parts of Freetown, lack of access to sanitation facilities for many has driven an increase in open defecation. For households emptying pit latrines, inexpensive private providers will bury the waste on-site, or dispose of it in a watercourse nearby. These disposal routes contaminate groundwater used by many for domestic supply.[10]

Private investment prospects are not strong in water utilities we have observed in fragile states. Most utilities struggle to meet financial obligations from customer collections and are not close to meeting normal performance targets for water supply management. Chronic underinvestment in infrastructure from insufficient revenues necessitates repeated cycles of donor support. The only PPP arrangement in the cities reviewed has been in DRC, and this is supported by a donor programme and owned by a charitable vehicle. Nevertheless, it could be used as a model for future private participation, when donor or public funds are available to offset capital investment costs.

[9] Information from previous ICED work; this programme is not further referenced in this report.
[10] Burial on-site can be an effective solution if handled appropriately with properly lined pits, however surveys suggest that this accounts for only a minority of disposal by burial in Freetown.

3 Case study summaries

Hargeisa (Somalia)

The Hargeisa case study looks at water services in a post-conflict city that relies on strong private sector involvement in provision. This has resulted from a vacuum in public provision and failure to maintain and expand supply to meet the needs of a growing population. Twenty-five years after the end of the last conflict, the water supply situation in the city remains dire, in part due to a population that has grown at an average of 6% annually since 2005. Water provision is largely by private tankering services to 70% of the city's population, creating an excessive cost burden that falls most heavily on the poorest. DFID and other actors have lined up major investments to increase the supply of bulk water to the city, but these have been severely delayed due to procedural hold-ups and are only proceeding now, six years after the funds were originally committed. There remain questions about the further development of supply systems after more bulk water becomes available from the city's distant sources.

Lessons drawn from this case study are around the 'capacity conundrum' which has historically prevented serious donor engagement with the Hargeisa Water Agency and the substitution of capacity by other means. This became an obstacle to creating a viable public water supply that will lower prices and improve quality and resource management for all.

Goma and Bukavu (DRC)

This case study focuses principally on a 2013-2020 £38m DFID programme to fund an expansion of water supply service in Goma and Bukavu. Both these towns are located close to the border with Rwanda in eastern DRC, which is a conflict-affected area currently in the grip of an Ebola outbreak which began in 2018. The programme is one component of a £164m WASH programme which represents one of DFID's largest single country WASH interventions. The Goma and Bukavu programme has a unique structure designed specifically for the DRC context, in which authority is highly centralised in large state institutions and privatisation of service delivery has been challenging. The relatively recent (2016) passage of a Water Law[11] theoretically decentralising water services and enabling locally-led service delivery and cost recovery has yet to be translated into practical effects on the ground, and the DFID programme is in the vanguard. The programme has set up a structure similar to a user-pay PPP, involving a new DRC-registered water operator company owned by a UK-registered charitable entity, which has a contract to deliver services on behalf of the national water utility REGIDESO. This replaced an earlier model involving a local NGO, which proved to have limited capacity to deliver services.

Lessons from this are around the adaptability and patience that are necessary to pursue urban utility interventions in a highly politicised and fragile context, including the careful navigation of the political economy and the willingness to stop, start and change approaches as necessary. Strong donor leadership based on an understanding of the political economy (as demonstrated by DFID DRC) is necessary to protect projects and implementers against insurmountable political hurdles. Additionally, it was observed that frequent over-promising related to short-term donor projects in water and roads had damaged community trust and engagement, which had to be painstakingly rebuilt in order for the project to be resilient at the ground level (against neglect and vandalism of infrastructure).

Freetown (Sierra Leone)

This case study charts the course of water infrastructure development over the past 16 years since the end of the civil war, focusing on the repeated short-term donor interventions to rehabilitate piped networks, the unregulated development of groundwater sources and the possible causes of the difficulties donors have had in building up the capacity of local institutions. It also briefly covers the dire sanitation situation in the city – a largely unmanaged sector with waste dumped informally and liquid waste polluting groundwater and waterways throughout the city. DFID is the leading donor in the WASH sector in Sierra Leone and has been engaged there since the immediate aftermath of the civil war in 2003.

Lessons drawn from this study are primarily concerned with the effects of lasting post-conflict fragility on urban development and the knock-on effects on water and sanitation. Dynamics examined include

[11] Loi n° 15/026 du 31 décembre 2015 relative à l'eau. Journal Officiel de la République Démocratique du Congo, 13 janvier 2016. http://leganet.cd/Legislation/JO/2016/JOS.13.01.2016.pdf

the ongoing instability of political economy in young post-war democracies, the attritive effect of the unwillingness of authorities to enforce rules, the in-built vulnerability of self-funded water utilities in this kind of environment and the ever-present post-war dynamics such as massive population growth.

Ibb (Yemen) – short case study

The Ibb study – based on existing analysis for the World Bank – explores a successful urban water and wastewater utility which has so far not only weathered a protracted conflict – experiencing all of the typical effects of conflict outlined elsewhere in this report – but has actually *expanded* its water services during this period. This with a minimum of stabilisation support from donor programmes. The overall lessons from Ibb are around the need for humanitarian organisations and donors to properly assess the problems and existing solutions prior to providing short term substitutes for water supply that could undermine longer term sustainability. Notably, in Ibb a decentralisation policy framework predating the conflict by two decades has been an essential precursor to a resilient utility that can handle conflict.

Liberia – short case study

This case study – drawn from a World Bank report and briefly covering urban contexts across the country – demonstrates the effects of failing to prioritise better management of WASH services in the early post-conflict period: when humanitarian aid wound down, there was essentially no national capability to take on the WASH services that humanitarian programmes had provided. A short-termist donor response undermined the longer-term sustainability of water institutions. The World Bank holds this up as another example of the 'capacity conundrum' experienced in Hargeisa.

Idlib (Syria) – short case study

This case study explores a quite unusual conflict context, in which donors are supporting only semi-functional rebel governance bodies which lack the depth and mandate to support sustainable water services utilities. It illustrates some of the common problems that programmes face in an active conflict scenario and the uphill struggle that can result from trying to build water services in a void without some of the key functions provided by a centralised policy framework.

4 Somalia case study - Hargeisa

4.1 *Introduction*

Hargeisa provides an important case study of a post-conflict city, that has enjoyed relative stability for the last 25 years or so. The water supply situation in the city is dire, due to a number of factors:

- major water resource challenges in a semi-arid area with around 300mm of annual rainfall;
- the distance of the water source from the city (25km) and its elevation 260 m. below the main city reservoir – which results in very high pumping costs;
- a population more than 5 times the size of that for which the system was designed;
- poor quality of existing infrastructure;
- limited distribution coverage within the city, meaning that the majority depend on very expensive water supplied by tanker and donkey cart.

Funding agencies responded with a combination of investment and capacity building support around 2012. However, despite the publicity around the initiatives and resultant expectations of water flowing from taps – the tangible improvements to date are very limited. This should change in the next year, as the new bulk water pumping main comes on line to more than double available supply to the city. However, the challenge will then be to distribute the increased supply to those who are most in need.

The obvious need for increased water supply and distribution across the city, and relative stability of Hargeisa, raises an important question on the readiness of funding agencies to commit funding in a post war situation. A joint HWA/WSP[12] report traces this lack of investment in service through state agencies in post war situations to what it terms a *post-war "capacity-conundrum"*.[13] This refers to donors and finance ministries avoiding investment in run-down state institutions. They suggest that this further denudes the capacity of these institutions – and reinforces a vicious circle of decline. The vacuum caused by a lack of effective governance results in non-state actors (UN agencies and NGOs) implementing projects and programmes (with funding from other agencies) and in some cases taking over the role of government agencies.

Somaliland and Hargeisa provide an important example of a transition from short term humanitarian funding to a longer-term development approach. There are opportunities in such situations to demonstrate a peace dividend. However, the challenge is to deliver on the high-profile announcements in order that the residents, and particularly those currently unserved, see water flowing to new distribution points.

> Sustainability of urban water supply systems goes well beyond physical engineering and managing water flows.
>
> *Farah, K. et al, WEDC Paper, op cit*

As part of their preliminary assessment, funding agencies identified the lack of sufficient bulk flow from the water source to the city of Hargeisa as a critical bottleneck to increasing supply. However, it is clear from the research that there are multiple interconnected constraints to improving urban water supply in Hargeisa, as in any post conflict situation. These cover a range of technical, institutional, political, social and environmental issues. This case study provides some lessons on the importance of taking an integrated approach to addressing the challenges.

The case study team also planned to research the effectiveness of support to basic sanitation in the city. However, the overwhelming focus of international agencies has been on water supply, with very limited consideration of sanitation. This is therefore reflected in the balance of coverage in this report.

[12] HWA/WSP, 2017, Attracting Investment and Delivering Services in Fragile States: The Story of Hargeisa Water Agency. Draft pre-publishing report provided to ICED team by HWA.
[13] See also Section 7.2 below, summarising another WSP report which dealt with same concept.

4.2 *Context*

Following independence in 1960 there were significant tensions in Somaliland. The roots of this were in part a result of the inequalities from the union of two former colonies – British Somaliland and Italian Somalia.

Power was principally with Mogadishu, leading to clans in Somaliland being marginalized. The dominant Isaaq Clan, in Somaliland, felt excluded from the political process – and under threat from Siad Barre's military regime. The Somali National Movement – one of many clan-based political and military groups formed during this era – was started in 1982, made up mainly of the Isaaq diaspora and opposed to the Barre regime. An insurgency by the group escalated into civil war by 1988, drawing in Hargeisa.

Heavy bombing and shelling of Hargeisa in 1988, resulted in many civilian casualties. More than half a million people, many from the Isaaq clan fled to Ethiopia and around half and million became internally displaced. However, there was strong resistance, and by the end of 1990 the government controlled a relatively small area (10-15%) of Somaliland. The rest was controlled by various clan-based political movements. This, and an intense drought and subsequent famine, led to Barre's forces retreating to Mogadishu. Somaliland unilaterally declared independence in 1991, following the overthrow of the Barre regime in 1991. Its status as an independent country has not been recognised by the international community. This continues to be a source ongoing tension between the governments in Hargeisa and Mogadishu. However, unlike the south of Somalia, and with the exception of the disputed border with Puntland in the East, Somaliland has enjoyed relative levels of peace and security over the last quarter century.

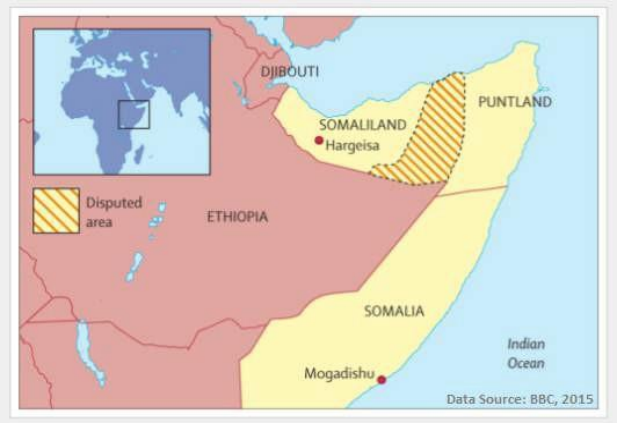


Figure 1: Map of Somalia (BBC)

Reflecting this, a joint UN/WB report[14] summarised the situation improvements in 2007:

'Since the beginning of the 1990s, Somaliland has seen remarkable progress on many fronts, not least in a unique reconciliation process, the creation and implementation of functioning governance and judiciary systems, and a democratization process that has led to free and fair elections and a multiparty legislative system. This has been made possible primarily through the active involvement of a vibrant private sector, non-governmental organizations (NGOs), civil society, the participation of traditional leaders, and large inflows of remittances'

The physical destruction of Hargeisa during the war was near total. A process of reconciliation between different groups in Somaliland, through a clan led process, resulted in the establishment of a relatively stable security regime, with local and national institutions of government. Somaliland's reconciliation model is unique in international experience of peace building and local reconciliation, and has benefited from a remarkable understanding and incorporation of key cultural and societal features.[15]

Since 1994 there has been significant positive progress. The relative peace and security in Hargeisa, as well as rural hardships as a result of recent droughts, have resulted in a rapid increase in the population. There are no official figures based on reliable data. However, estimates suggest that in 2005 Hargeisa had

> "There was no electricity or running water after the conflict. We used oil lamps, but within a year everything had changed – we got water and electricity. It was all the private sector. The transformation has been the result of the business community, it was all local initiative.
>
> Before the conflict I was a truck driver and I was travelling to Djibouti bringing home goods. During the conflict, I couldn't do this and I became a warrior against the Somali government. Immediately after [the] war I became a truck driver which delivered water to Hargeisa."
>
> *Brown, A. op. cit.*

[14] UN/WB, 2007, Somaliland Joint Needs Assessment
[15] Brown, A. 2017 The Informal Economy in Civil War: Hargeisa – Somaliland, DFID - ESRC

a population of 300,000 inhabitants. This has risen steadily to what is widely considered to be a current population of around 1 million, including IDPs, refugees and returnees to the country.

Not surprisingly, given its history, the provision of basic services including water in particular remains a major challenge. As with other cities in Somalia, the destruction of basic services led to small enterprises starting up to fill the gap. Many families in Hargeisa rely on the informal economy – and private water providers are one part of this. Estimates suggest that they provide around 65% of the city's water requirements – through tankered supplies, donkey and hand carts.

4.3 *Hargeisa Water Supply – Current Situation*

The Chinese Government renovated and expanded the current Hargeisa Water Supply system in the early 1970s. The source of the city supply is a large underground aquifer (Geed Deeble) 20 km from the city. From here the water is pumped to the 'Chinese Reservoir' from where water is distributed into the water supply system. The Chinese also installed pumps and extended the distribution system to new settlements. The system at the time was designed for 180,000 people. With a capacity of around 10,000 m^3 this is equivalent to 55 litres/p/day[16] - far higher than the current per capita capacity today.

To the extent that it was able, Hargeisa Water Agency managed and operated the existing system, despite the damage caused over the intervening years. This was supplemented by short-term emergency funding support for the Hargeisa system. With continuing relative stability in Somaliland, international agencies started to take a longer-term view of support, and funded a number of technical and institutional assessments.

The existing system provides water to 21,000 household connections, 400 water kiosks, and 3 water tanker standpipes - currently serving an estimated 30 - 35% of the city's population. The bulk of the supply is provided to the northern half of the city with households in the south depending on alternative sources of water, delivered by tankers and donkey carts at far greater cost than the piped water. There continues to be a political dimension to access. Some communities known to have supported Siad Barre 30 years ago remain marginalised.[17]

4.3.1 Hargeisa Water Agency (HWA)

Established in 1974, Hargeisa Water Agency (HWA) is a state-owned water supply utility with a board of directors, that is mandated with the management of the assets and supply of water for the city of Hargeisa. It enjoys fiscal and administrative autonomy, and currently has a permanent staff of 329 – whose salaries are fully covered by HWA.[18] The President of Somaliland appointed Mohamed Ali Darod as the CEO, in 2016, and he remains in the position.

4.3.2 Institutional Arrangements

In spite of the many challenges Somaliland embarked on a reform process in the WASH Sector over 15 years ago.[19] This includes the approval and implementation of a National Water Policy, a Strategy and the National Water Act.

The Cabinet passed the National Water Policy in 2004. This sets out the objectives, general principles and guidelines to be followed by the MoWR in developing the water sector. It also approved the Water Strategy in the same year. The Water Act establishing the legal framework to support the National Water Strategy, defining organizations, mandates, responsibilities and procedures was approved by parliament and the President in 2011.

However, further efforts are required to complete this reform. Policy and regulation functions are not yet clearly defined in the sector, and the MoWR still retains a considerable and very wide-ranging responsibility. Combined with capacity limitations, this results in insufficient and inadequate implementation of policy and service delivery standards.

The sector has formalised a process of quarterly co-ordination meetings, chaired by the MoWR, with four sub-groups addressing more detailed issues:

[16] UHL, 2012, Geophysical Survey of Hargeisa Well Field
[17] Interview with donor representative, July 2019
[18] Somaliland Ministry of Water http://somalilandministryofwater.org/
[19] SDPII, 2017–21

- Water supply sub-group chaired by the Ministry of Water Resources
- Hygiene and sanitation sub-group chaired by the Ministry of Health
- School water and sanitation sub-group chaired by the Ministry of Education
- WASH emergency sub-group chaired by NERAD and CARE International

The First Somaliland Development Plan (SDP) 2013 -18, emphasised to importance of water as part of the country's growth and development. Its aspirational vision was to build a nation which is water secure, where every citizen has access to clean affordable water throughout the year. It also emphasised the importance of advanced sanitation and waste disposal systems that is sustainable and environmentally friendly.

More recently the Second Somaliland Development Plan II (2018–22) highlighted the following objectives for the Water sector:

- Increasing the availability of water by developing the surface and ground water resources
- Coordinating water infrastructure initiatives to optimize access
- Setting standard management practices of water for improving gender equity, community mobilization, and private sector participation
- Setting priorities of use and rules for sharing resource
- Developing integrated water resource management systems

The Somaliland Government used the First SDP as a basis to approach agencies to provide funding support to address priorities.

4.3.3 Financial viability

The energy needed to pump water from the well-fields to Hargeisa is substantial - almost 1 MW for 23 hours a day using 7,000 litres of diesel. The daily cost to HWA is around US$4,400 a day, or over 55% of its revenue. All fuel is imported through Berbera port, leaving HWA vulnerable to currency devaluation and global diesel price shocks. This has had a major impact on HWA's finances, which struggles to achieve a surplus on basic operating costs (it has a debt of $750,000 in 2017), because revenue is collected in Somaliland Shillings, which has seen significant depreciation in recent years.[20]

Despite the challenges, the World Bank's technical assistance team consider that HWA's operations are relatively efficient with steady revenues of $200 - 300,000 each month since 2014. This represents 90% of billings, indicating that HWA has a strong commercial side to its operations. Theoretically the tariff increases depending household/commercial users' levels of usage. However, they generally charge a flat rate as a result of the non-functioning meters. The cost of water is 14,500 Sl.Sh (approx. $1.4/m^3) for households, and 13,500 Sl.Sh at kiosks. High use commercial users pay double this amount.

Water Production 280,000 m^3/month
Monthly billing $292,000
Revenue collection $280,000
Population served 350,000
Non-revenue water 20%
2015 HWA data

This issue of improving financial viability is critical to the sustainable operation of the system – particularly once the new transmission main has been commissioned and is operational. The World Bank Technical Assistance Team has recommended some priority actions to improve financial sustainability:

1. A tariff structure review with associated asset management plan
2. Reducing non-revenue water – both through physical losses (leakage) and non-payment of bills
3. Optimising pumping arrangements (with possible inclusion of some solar pumping capacity) – given the high costs in relation to revenues.

4.4 *WASH in Somaliland*

4.4.1 Water Resource Availability

With a semi-arid climate and an average rainfall of about 300mm, water is a scarce resource in Somaliland. There are no lakes or permanent rivers, and rainfall is limited to two brief seasons.

[20] Depreciation 2015-2017 was from 7,500 to 10,500 SLSH against the USD, equivalent to 30%.

Underground water is the main source of supply particularly in urban areas. The pressures on this scarce resource are mounting due to increasing population and urbanization.

Given the scarcity of surface water, Hargeisa is fortunate to have good quality aquifers at Geed Deeble in western Somaliland towards the border with Ethiopia. A British Geological Survey assessment,[21] drawing in particular on an FAO/SWALIM study[22] gives a depth of aquifer of over 150 m although this varies across the aquifer – with boreholes in the range of 10 m and 50 m deep. These boreholes generally have good yields ranging from 12 to 20 l/s, with drawdowns typically less than 20 m. The water quality is also good. However, despite the size and potential yield from Geed Deeble, and other aquifers, hydro-geologists have concerns about their sustainability given likely future demands. In view of this FAO/SWALIM have installed borehole logging equipment to monitor drawdown.

Water from the boreholes is pumped to a reservoir at the Geed Deeble Pumping Station and on to Hargeisa's main reservoir – via a booster station at Byo-Khadir. The borehole pumps are operated for 23 hours each day and extract an average of 50m^3 of water per hour from each borehole. Total water production is not currently metered but is estimated to be 13,500m^3/day.

Local farmers use some of the water abstracted from the boreholes to irrigate nearby fields. The volumes provided were previously not monitored. However, with World Bank support HWA has financed the installation of meters to improve how they measure water production and distribution. This will provide important information on the relative volumes pumped into supply and used for irrigation. This will enable a clearer assessment of the value of the water provided for irrigation, and the options for more closely managing this. Although, given that this is an historic arrangement, with (presumably) local farmers who will consider this to be their resource, it will be difficult to make any changes that in any way appear detrimental to their livelihoods and habitual rights over the water.

There is no monitoring of the volume of water distributed by tankers in Hargeisa. However, based on just 15 litres/person/day for the 650,000 people who are currently not served from the main system this implies that tankers and others sourcing water close to Hargeisa, draw around 10,000 m3/day – the equivalent of the volume currently pumped from Geed Deeble – with a value equivalent to around $50,000. There is no overall assessment of sources of supply. However, given the water scarcity in areas surrounding Hargeisa it is likely that other communities' livelihoods and well-being are affected.

A firm of Danish Consultants (NIRAS) African Water Facility through the African Development Bank has been undertaking a comprehensive assessment of surface and groundwater resources across Somaliland. Their findings[23] are that, contrary to some perceptions, there are potentially high yielding aquifers in south-west Somaliland and also along the coast. However, the hydro-geology is far more complex in the east of Somaliland both in terms of availability of groundwater and also quality.

Although Somaliland has no perennial rivers, NIRAS have identified a number of dam sites that provide potential for water storage – including some possible multipurpose schemes for hydropower, irrigation and water supply. However, these 'mega dams' as they are being termed in Somaliland come with high estimated costs up to $100 – 200 m. However, levels of evaporation > 2000 mm/year, imply substantial losses from open storage reservoirs. The time horizon for development is also seen in terms of decades. For this reason, groundwater will be the main, and probably only, source of Hargeisa's water for the foreseeable future.

4.4.2 Current WASH Situation in Hargeisa for those Unserved by Piped Supplies

With a rapidly increasing population (now estimated at over 1 million), and an existing water supply system designed for 180,000 people, lack of access to basic water supply has and continues to be a major challenge for the city of Hargeisa. A World Bank poverty report[24] suggests the focus of government and donors has been on peace building processes, with limited attention to the delivery of basic services and significant disparities in access to basic services between poor and non-poor households. There were some small-scale interventions prior to 2012 to rehabilitate parts of the Hargeisa water infrastructure. However, overall the city's water system remained dilapidated and

[21] Africa Groundwater Atlas: Hydrogeology of Somalia. http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Somalia

[22] SWALIM, 2012, Hydro-geological survey and assessment of selected areas in Somaliland and Puntland, FAO

[23] Author interview, June 2018.

[24] World Bank, Poverty Global Practice (January 2015): SOMALILAND: Poverty Profile and Overview of Living Conditions

critically close to failure. Around 65% of the estimated one million population remain dependent on unsafe trucked water delivered by private water tankers and other forms of informal provision,[25] which is estimated to be 5 times more expensive than water provided by the HWA. Private water suppliers collect surface water from poorly maintained and marginal sources, including from shallow wells in seasonal river beads from neighbouring areas in the East and West of Hargeisa.[26]

The high level of reliance for water supply on the private sector, means that most poor people are at the margins of supply with regard to quality and quality. It is also apparent that the poor pay the highest prices for water from vendors. HWA/WSP recognise[27] that there are 'significant disparities in access to basic services between poor and non-poor households.'

For example, water kiosks that are intended to provide water to poorer unserved communities are located in areas that already have access to piped water.

4.4.3 Basic Water Requirements for the City of Hargeisa

The World Health Organization (WHO) indicates a survival limit of 15 litres/person/day, in desert environments. However, WHO has set 20 litres/day as the absolute minimum to maintain health and hygiene. Expectations for urban supply are significantly higher. For example, Nairobi is designed for around 120 litres/capita into supply.

The current transmission pipeline was built under a project financed by China in the 1970's and consists of two parallel 300mm pipes that supply up to 9,000m^3 of water to the Chinese Reservoir a day. HWA states that it provides water to 300,000 people. This implies an average of 30 litres/person/day without any losses in the system. Based on assumed minimum of 30% physical losses this reduces to close to the WHO absolute minimum of 20 litres/capita/day.

The proposed supply volume, following upgrading of the system, pumped from the well fields is 20,000 m^3/day. Assuming the same assumed level of physical losses, this would provide sufficient water for approximately 700,000 people at 20 litres/person/day.

As set out in the next section, even though the donor support for the Hargeisa water upgrades is one of the largest infrastructure investments in Somaliland at about USD 50 million, more investments will be needed in the future to meet absolute minimum needs for the people of Hargeisa.

4.5 *International Agencies Active in WASH in Somaliland*

Recognising the dire situation with water supply for the City of Hargeisa, and implications for future growth and stability, international agencies have responded with a number of significant projects to support HWA. The main agencies providing support to WASH activities are the European Union, and the UK, Denmark, Norway and the Netherlands through the Somaliland Development Fund (SDF). The German Government through KfW/GTZ are also providing support. Coca Cola Foundation is also funding a project.

The World Bank through its Water and Sanitation Programme (WSP), has supported a capacity building and institutional reform programme within Hargeisa Water Agency. Although the formal support has now concluded they continue to provide advice and support to HWA on an as needed basis.

The main component of the donor funding, in terms of cost, is the ongoing Hargeisa Urban Water Supply Upgrade Project (HUWSUP). The infrastructure works involve rehabilitating the wellfield collector network, building a new Geed Deeble Pumping Station (NGDPS), and increasing water production by rehabilitating existing boreholes and drilling new boreholes in Geed Deeble, Las Dur, and Hora Haadley. These interventions will increase HWA's water supply by 50% to an estimated 15,000m^3 a day. The HUWSUP project was initially meant to be commissioned in April 2018 but has had significant construction delays and is currently scheduled to become operational towards the end of 2019.

[25] K. Farah and Ibrahim Yonis (2015). Water, Sanitation and Hygiene Services Beyond 2015: Improving Access and Sustainability. Challenges of Sustaining Urban Water Supply for Rapidly Growing Post war City: Case Study of Hargeisa City. Proceedings of 38th WEDC International Conference, Loughborough University, UK, 2015. p2.
[26] Farah & Yonis, 2015, op cit.
[27] Hargeisa Water Agency/WSP, 2017, Op. cit.

The current plans involve decommissioning the existing pipeline once the HUWSUP project is complete. The research team understand that this decision has been questioned on the grounds of risk. Dependency on the single new 600mm pipeline leaves Hargeisa vulnerable to a problem with this trunk main should there be a major failure, or the need to take it out of service for maintenance. Retention of the existing 300 mm pipes would improve resilience of the system, and potentially provide additional supply options.

Given the dependence on underground aquifers for supply to the city, the earlier work of the FAO's SWALIM provided some basic hydro-geological data. This is now reinforced by an integrated water resources study, covering Somaliland, which was funded by the African Water Facility through the African Development Bank.

The table below provides a summary of the main investment projects in support of HWA since 2013. As a result of the combined funding support, Hargeisa Water Agency is currently implementing one of the largest infrastructure projects in Somaliland.

Project	Location	Funders	Implementers	Status
Construction of well-field collection lot 1 10 km pipe line, including feeders from Borehole to Geed-Deeble New Pump Station.	Hargeisa - Geed-Deeble	SDF (DFID led)	HWA	Ongoing, 10% completed
Construction of Transmission mains from Chinese reservoir to four satellite reservoirs. Four Satellite reservoirs and Water Supply Distribution network, Water Kiosks. Liquid Waste Treatment Facility. Public Sanitation Facilities like toilets and septic tanks at selected public institutions in town.	Hargeisa	KFW	HWA	Contractor Mobilization
Hargeisa Water Supply extension Construction of 3 reservoirs with a 250 m^3 capacity and 10 m^3 elevated tank. 62 km distribution main lines.	Hargeisa	Coca-Cola African Foundation	HWA	Ongoing, 60% Completed
Hargeisa Urban Water Supply Upgrading Project Construction of New Geed-Deeble Pump Station. 23 Km transmission main from Geed-Deeble to Hargeisa.	Hargeisa-Geed-Deeble	EU, SDF (DFID led)	Un-Habitat	Ongoing 90% Completed. Electrometrical equipment and installation remains to be completed.

Table 1: List of Projects provided by HWA

The EU announced in 2011 that it would invest $21.3 million in the Hargeisa Urban Water Supply Upgrading Project (HUWSUP). The primary objective of HUWSUP was to increase the daily supply of water to Hargeisa from 9 to 20 million litres. This would increase the quantity of water abstracted from the Geed Deeble wellfield, with a combination of rehabilitation of existing and drilling new boreholes, a new pumping station and laying a larger capacity pipeline to the city.

A significant design aspect of the project is that the 'Chinese Reservoirs' are 260m higher than the wellfields. This in addition to the head loss over the length of the transmission mains requires large pumps, with high operating costs.

The first phase of the Somaliland Development Fund (SDF)[28] began providing support to the HWA in 2013. It also focused, initially, on the drilling of new boreholes to complement the EU investment, in

[28] The SDF is a joint fund established by DFID and Danida in 2012 with further funding subsequently provided by Norway and the Netherlands. DFID contributed about 60% of initial funding and has initially committed 100% of the funding of the recently started second phase of the fund. See further description of management arrangements below.

order to increase the supply of bulk water to Hargeisa. The SDF project was to replace 8 km of pipework at Ged Deeble, and establish the new Hora Haadley well field to further boost capacity.

However, when the construction of the HUWSUP component for the new pipeline was well underway developers realised that there was a missing link to the system: the well field collector and linking main to the pipeline. This was a fundamental oversight, and implies a problem with planning or coordination. Fortunately, SDF was able to redirect funds originally planned to support the extension of the distribution pipelines within the city. As a result, the joint donor-government Steering Committee (JSC) decided to change the investment focus on replacement of the pipeline to Hargeisa and limit SDF support to designing, but not implementing the extension of Hargeisa's water distribution system.[29]

SDF1 – Support to HUWSUP – Key Findings Project Completion Report (PCR)[30]

The SDF activities with the Hargeisa Water Agency (HWA) changed significantly during implementation. The original plans were to increase the output from the wellfields and extend the in-city water distribution system. However, as design started on the city distribution system the expected funding for financing for a new water pipeline from the new boreholes failed to materialise. The SDF Joint Steering Committee responded by shifting the focus on the SDF work to replace the main water pipeline into Hargeisa and only design (not implement) the extension of the in-city water system which was passed on to KfW to deliver. HWA responded positively to this flexible response from SDF. The End of Project Review reports that work on the wellfield collector is underway and when completed an additional 3,411 m^3/day will become available for around one third of the population of Hargeisa (300,000 people).[31]

The cost of water remains high at $6-7 per cubic meter for areas that are not receiving publicly provided water from the HWA that depend on tankers, donkey carts and other informal providers. Once the additional water from the boreholes is pumped to Hargeisa and connected to the water supply network, this should improve public perceptions.

A particular recommendation emerging from the End of Project Report was that the SDF partners should devote additional time to improve donor coordination in support of the Hargeisa Water Authority (HWA). It also recommends agreeing common international standards for equipment and construction. It gives the impression that the funding agencies and implementers underestimated that challenges of implementing a project of this complexity. As a result, the review gave a clear recommendation for the second phase of SDF to ensure that sufficient time and resources are allocated to manage projects of this scale.

A significant finding in relation to the quality of delivery was the role of the Fund Manager in providing technical assurance. Mott MacDonald's appointment into this role, given their particular expertise in this area, meant that they were competent to review the Hargeisa technical designs from the implementing agency, UNHabitat, before tendering. They also certified, in China, the pipes ordered for the transmission pipeline, prior to shipping to Somaliland.

There were challenges in hiring contractors, willing and with relevant skill and experience to bid for contracts. SDF used tender processes under the SDF to build capacity and confidence of suitable contractors, without experience of international bidding processes and contracts. They also supported less experienced contractors in improving their technical performance – one example being the pressure testing of completed pipelines to check for leakages. Other development agencies have adopted similar approaches.

The German Government through KfW and GTZ is now funding implementation of the extension of the distribution network, based on the design funded through the SDF, with a $20m investment. This will link the bulk water storage in the Chinese reservoirs to smaller reservoirs, and enable HWA to extend its water services to customers in the southern part of the city. The programme also includes some basic sanitation, as well as some capacity building support to HWA. It relies on the increased water supply from the HUWSUP project to be successful.

[29] This paragraph based on interviews with organisations involved.
[30] SDFI PCR December 2018
[31] Without any losses in the system this is equivalent to only 9 litres/person/day if distributed to 300,000 people.

The EU appointed UNHabitat to implement HUWSUP. In addition to increasing the supply of bulk water to Hargeisa, UNHabitat's work has also included hydro-geological studies, groundwater modelling and monitoring of the Ged-Deeble aquifer and neighbouring aquifers. A further component was capacity building for HWA.

SDF launched soon after this, with the expectation of an early appointment of the SDF Fund Manager. However, the process was delayed for a year, in part because of DANIDA's decision to pull out as the lead SDF donor on security grounds. DFID took over the lead, but this change contributed to the delay, with the SDF Fund Manager deployed in mid-August 2013.

A positive outcome was that the then DANIDA Adviser embedded in the Government used the time to establish the governance arrangements of the SDF, and provided technical advice to the Government to prioritise Somaliland's National Development Plan (2012–2016) – which includes clear WASH priorities. Out of these priorities, the National Planning Commission prioritised a number of infrastructure investments, including support to HWA.

However, the delay increased political pressure on SDF to demonstrate "boots on the ground". As a result, the Fund Manager was required to deliver early tangible activities, during the six-month inception phase. UNHabitat was already implementing the EU-financed project, and as a one-off decision, the Joint Steering Committee of the SDF decided to award the support to HWA to UNHabitat on a non-competitive basis. There have subsequently been some delays which we understand have been in part due to the procurement procedures of UNHabitat, which must refer procurement decisions for a contract of this size to headquarters in New York via the Nairobi Office.

The Coca-Cola Africa Foundation has provided funding (2017–20) to Terre Solidali to build an additional 62 km of primary and secondary distribution mains, with four 250 cum reservoirs and pumping stations;[32] a new IT based billing and accounting system; and the granting by HWA of 400 kiosk licenses (including 14 in the general and meat markets) to women and youth, upon providing adequate capacity building in water kiosk management. A further objective is to strengthen capacity within billing and accounting section, increasing capacity by 40% and gender balance to 50%, with an expectation to positively impact empowerment of women and youth.

4.5.1 Issues of Prioritisation and Co-ordination

The situation in Hargeisa resulted in a particular focus on the need to increase bulk water supply to Hargeisa. This was a clear bottleneck to increasing supply. However, it is clear from the research that there are multiple interconnected constraints to improving urban water supply in Hargeisa and in any post conflict situation. These cover a range of technical, institutional, financial, political, social and environmental issues.

Based on HUWSUP's experience, a focus on only increasing supply of bulk water to Hargeisa a city is unlikely to result in early benefits to those without access. This will require the addressing of a much wider set of institutional and technical issues, such as extending the distribution network and tackling leakage, in parallel.

> Delivering water is more than just conveying bulk water to the city, and managing pipe systems. It's a complex undertaking/enterprise.
>
> *Farah, K. op. cit.*

The funding agencies' response to meeting the urgent need to improve water access for the people of Hargeisa is impressive. However, the multi-agency approach has also led to some challenges in co-ordination between and within the different components. The failure to include the well field collector main within the original project plan implies the lack of a thorough, sequenced plan taking all actors into account. The research team has not been able to establish whether there is now a (master)plan for development of the complete water system – from source to kiosks/taps across the city including currently unserved areas.

4.5.2 Challenges of hiring construction companies to implement the projects.

Implementing agencies have struggled to find well qualified contractors willing to bid for work in Somaliland – in part because of the insecurity and operational insecurity elsewhere in Somalia. For the EU financed projects, supervised by UN-Habitat, the contractors were Ethiopian and French. There was initial strong interest for the SDF contract, with 36 companies expressing interest with six

[32] Conditional upon completion of increased supply to the city, with successful completion of interventions by other donors (EU, SDF, KFW, UN-HABITAT and possibly the WB) – to increase daily yield from 8900 cum/d to around 30,000 m^3/d

companies submitting bids. The component funded by KfW was put out to tender – however none of the bidders, including three from China, met technical requirements and a new call for bids was issued.

4.5.3 Capacity Building/Institutional Support

In parallel with the donor funded infrastructure programme, the World Bank's Water and Sanitation Programme provided institutional capacity building support to HWA. This aimed to build a "corporate culture" at HWA, to adopt robust plans and strategic actions to improve operational efficiency and reduce the service gap. Prior to this support, HWA department heads had limited involvement in the initial stages of the EU-funded project. There was also no adequate asset management system.

The WSP support ($0.5m) focused on corporate governance reform, improving HWA's poverty focus, human resources and financial management, together with the appointment of a board of directors.

Major challenges addressed were:

1. A lack of capacity within HWA
2. Insufficient financial revenues to cover full operating costs.

A joint HWA/WSP information note[33] suggests that this began a process of longer-term development planning, as distinct from short term emergency responses. It highlighted a number of early lessons:

1. The lack of baseline data generally and about informal settlements in particular. The Government's poor coordination of service delivery was one of the reasons for failing to extend water supply to informal settlements.
2. Top management commitment is important for successful implementation of investment plans.
3. Projects implemented by international partners provide transparency, accountability and impartiality.
4. Institutional reform and capacity building to improving the capacity and capability of HWA to improve water supply delivery was an essential component of the programme of support from external partners.

A 2014 report,[34] early in WSP's capacity building work, found that revenues were insufficient to cover operating costs let alone expand series coverage and capital maintenance costs of the wider system. The cost of pumping alone from the well fields to the 'Chinese Reservoirs' in Hargeisa cost the equivalent of 50% of the HWA annual budget at the time.

As a result, increasing income has been a primary objective for HWA, with encouraging results as indicated in Figure 2 below. Albeit, as noted earlier in this report, depreciation of the Somaliland Shilling significantly reduces the value of the income in USD which effectively increases the cost of fuel which is a major cost driver.

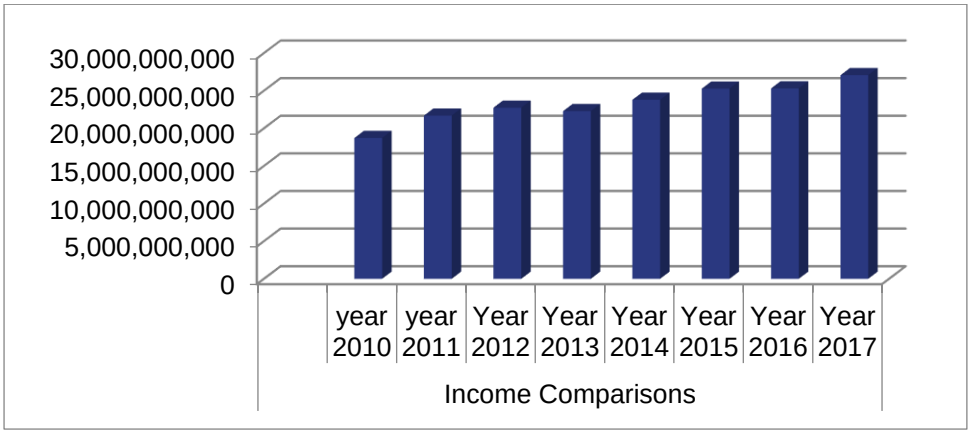


Figure 2: Increase in Revenue collections (Somali Shillings)

[33] HWA/WSP (op. cit.)
[34] EY/WSP, 2014, Corporate Governance Advisory Services Report

4.5.4 Strengthened engagement with consumers

There are a number of lessons from HWA's customer relations, as part of the WSP capacity building support:[35]

- Promote good customer relations and keep customers informed about the efforts in progress
- Support transparency and accountability with both internal and external stakeholders
- Conduct negotiations through dialogue in a fair and transparent way, consistent with local approaches to resolving conflict. This helped with the introduction of water rationing and facilitated cooperation with other private water vendors, of which there are many
- HWA actively encourages the involvement of women. More than 95% of kiosk operators contracted by HWA are women.

> HWA established a committee representing the truck drivers and HWA/Municipality. This resulted in a deal, with the Municipality reducing the road tax levied on truck drivers, and a controlled selling price $12/cm.
>
> HWA believe that a fully sustainable solution is only possible once there is an increased level of supply to meet demand, which will enable HWA to lower prices.
>
> Donkey carts fetch water from HWA owned/managed kiosks. Following completion of HUWSUP, HWA plans to lower the price for low income families who fetch water from our kiosks.
>
> *HWA – private communication*

For many Hargeisa residents, having access to piped water remains a distant dream. The current efforts to strengthen both the infrastructure and the institutional arrangements should ensure that many will soon start to see the benefits. However, the challenges to increasing access to unserved areas of the city are significant, and many still rely on private vendors from trucks, donkey carts and wheelbarrows.

Kiosks are the major channel for distributing water to the consumers. During the last ten years the share of water delivered through the kiosks was more than 30% of the total amount delivered. Today there are more than 500 public kiosks in operation all over the city. Most of the kiosks are found in the poor settlements which are densely populated residential areas. A substantial proportion of the kiosks are also located in the sub-urban settlements i.e. the parts of the city occupied by low-income families. This is intended to give the opportunity to collect water at a reasonable price.[36]

Further findings were that:

- The lack of budget for recurrent costs, and weak systems for operations and maintenance. Sustainability needs to be more strongly embedded across: financial, human resources; political; and social issues.
- The need for an integrated approach to WASH interventions to secure better health outcomes as opposed to just providing water supply systems without accompanying hygiene promotion and sanitation. Providing water alone is likely to have only limited impact on health outcomes.[37]

A WEDC conference paper[38] cites from its interviews that "most departmental heads were not fully and practically involved in the initial stages of current donor funded projects for upgrading Hargeisa water supply". The paper raises a concern that this is likely to lead to challenges with managing the system once it's complete. However, it suggests that the main challenge facing effective operations is the impact of weak institutional capacity.

4.6 *Gender and Social Inclusion*

The majority of the population of Hargeisa struggle to obtain sufficient quantities of safe drinking water to meet their basic survival needs. Those buying water from tankers and donkey carts are paying around 5 times the cost of those connected to the piped network. This is a significant exclusion issue.

[35] HWA/WSP, 2017 (op. cit.)
[36] Hargeisa Water Agency, http://www.hargeisawateragency.org/our-work/
[37] Mills, J. et al. London School of Hygiene and Tropical Medicine, 2016, The Impact of Water, Sanitation and Hygiene on Key Health and Social Outcomes, DFID Evidence Review
[38] Farah & Yonis, 2015, op cit.

Funding agencies are focused principally on increasing the bulk supply to the city, and it is not clear when poorer communities will benefit from access to kiosks closer to their homes.

Hargeisa Water Agency (HWA)[39] has drawn lessons from dealing with water scarcity issues. These include promoting good customer relations, keeping customers informed about progress with new works, and being transparent and accountable. According to HWA the culture of conflict resolution has helped the introduction of water rationing and improved co-operation with private water vendors. However, with the publicity around the investments, expectations were raised, and most remain disappointed that what was promised has not yet been fulfilled. This is reflected in protests, and articles highlighting the problems (see box).

A newspaper article from 2018 (Abdisalaan, Somaliland Sun, 8 August 2018), following demonstrations in the city, gives voice to the concerns of the many people in Hargeisa without access to a piped water supply either with a domestic connection or to a community standpost. It also refers to the 'mass demonstration' in December 2013, in which it reports many were injured. It raised a number of concerns, including:

- The government's tariffs imposed on water takers have resulted in increased prices.
- Truck owner cartels have divided and control areas of the city.
- Poor people paying more for their water from tankers and donkey carts than those who are better off and have piped supplies.

With the focus on bulk water transfer the research team found little information on the extent to which gender and other exclusions issues, such as disability, are being addressed. However, HWA has provided information that they are actively encouraging the involvement of women in managing the water kiosks, with over 95% of these contracted to women.

There is risk with the high degree of focus on bulk water supply that funding agencies have not given sufficient attention to the needs of the unserved. This is relevant both in relation to extending the piped distribution system, but also better understanding the parallel water service delivery system, using tankers and donkey carts, that are likely to be required for may more years.

4.7 *Emerging Lessons for Wider Application*

4.7.1 Understanding the Context

- Look at the earliest opportunity the operating environment allows, to transition from short-term emergency/humanitarian responses to longer term responses to address urban water issues.
- Support capacity building/institutional strengthening ideally prior to, and in parallel with, capital investments.
- There is a risk that funding of technical components, that do not require any direct engagement with consumers, reduces the need to consider issues of gender, social inclusion and disability as part of the programme.
- Understand demand side issues – seek to identify the needs of the population, served and unserved, to their water needs.
- Ensure that the local client, in the case of Hargeisa HWA, is directly involved in decision making processes. Previous research[40] has reported that HWA staff were not adequately involved in funding decisions and choice of technology by donor programmes. As a general principal, and basic good practice, funding agencies should involve the client in decisions on investments – both senior management and those who will be operating the system.

4.7.2 Delivery of water supply infrastructure

- Ensure good quality advisory capacity at the outset of any project of this nature to ensure a proper integrated problem-based approach to identify the critical issues and prioritisation of interventions. This review stage should include an economic assessment of the best value/least cost solutions. Ideally this should provide a good enough plan/road map to prioritise interventions and avoid some critical issues being overlooked.

[39] HWA/WSP, 2017 (op. cit.)
[40] See section 4.5.4.

- When identifying interventions, take a whole of system approach including supply and demand side issues. While the need to increase bulk water to Hargeisa is the critical bottleneck, addressing this is not sufficient to extend coverage within the city of Hargeisa to those currently unserved.
- Be aware of the risks of over promising and under delivering (in the case of Hargeisa in relation to time-scale). Announcements of major programmes give rise to hopes and expectations that may be unrealistic.
- Do not underestimate the time (and capacity/expertise) required to manage projects of this scale. This appears to have been a factor in the donor response in Hargeisa, which has experienced repeated delays to expected timelines.
- Ensure capacity and expertise in the management agency (where not the funder) to undertake due diligence on designs and quality of materials (e.g. pipes). In the case of SDF, Mott MacDonald appears to have competently fulfilled this role.
- The availability of some prior hydrogeological information provided useful early information for planning the development of existing and adjacent well fields.
- Recognise that the cost of pumping water over a distance with a significant increase in elevation will incur substantial costs in diesel or electricity. Consider use of solar PV with diesel generator backup to reduce operating costs – particularly in regions like Somaliland with high solar potential.
- Undertake a risk assessment for the resilience of supply. Apparently redundant components may, at limited cost, provide some backup capacity in the event of a systems failure, or major maintenance requirement. It may also provide a potential opportunity for alternative/additional supply. An example from Hargeisa was the earlier decision to decommission the existing bulk water trunk main, which is now being reconsidered.

4.7.3 Impact of water (and sanitation) services

Since the infrastructure funded under HUWSUP has not yet been completed there is no evidence from which to draw regarding the impact of the capital investment programme in terms of improved services. The parallel programme of institutional capacity building through WSP has, however, been completed.

There is some related learning from the information collected by the team:

- Embed sustainability more strongly: financial, human resources; political; and social (SDF PCR).[41]
- Develop a full analysis of the cost of supply and a tariff structure to cover full costs. This should include asset valuation.
- Any planned capital investments should take account of the impact on the costs of operation and maintenance, and consequential impact on tariffs.

4.7.4 Donor Modalities, Instruments and approaches

- Complex projects of this nature, with multiple components and actors, need good project management to ensure co-ordination and planning and avoid major oversights in design and delivery and duplication of effort.
- Funding agencies need to able to take a flexible approach to respond to unforeseen problems e.g. SDF's shift to include design of reticulation network for three unserved areas.
- Review the use of multi-donor funds to manage complex projects and, in particular, whether the arms-length arrangement ensures sufficient scrutiny or support for/engagement with the implementing agency.
- Beware of pressures to get 'boots on the ground' in order to achieve early results – as these are likely to result in decisions and actions leading to problems that ultimately delay delivery.
- Be cautious about appointing implementing agencies on the grounds of expediency.

[41] SDF, 2018, op. cit.

4.7.5 The Role of Other Actors

Based on the case study the most important ‘other actors’ operating in Hargeisa are the informal local private sector.

Investigate the modus operandi of informal water provision – including pricing structures, cartels, etc. They are important actors in providing access to water in many urban areas in and emerging from fragility and conflict. Funding agencies should consider ways of improving their service, and, through this, potentially reducing the cost of supply.

5 DRC case study – Goma and Bukavu

5.1 *Introduction*

This case study focuses principally on the DFID programme to fund an expansion of water supply service in Goma and Bukavu. Both these towns are located close to the border with Rwanda in eastern DRC.

In 2013 DFID approved a seven-year package of support[42] through Mercy Corps for the delivery of an urban WASH programme in Goma and Bukavu. This £38m urban water programme is one component of a £164m programme of support to Water, Sanitation and Hygiene in DRC and represents one of DFID's largest single country WASH interventions.[43] DFID recently agreed an extension to December 2020 for the Urban WASH programme, to reflect the challenges the programme faced particularly as a result of the introduction of DRC's new Water Law.

The authors are grateful for the considerable investment of time from Mercy Corps and DFID DRC in providing information on which to base this case study.

Figure 3: Eastern DRC map (Google Maps), Goma (north) and Bukavu (south), circled

5.2 *Background DRC*

DRC has the fourth highest population (86.4m) in Africa. It also has the third highest poverty rate in the world. The number of people in poverty has increased by over 7m since 2005.

It is a country that since its establishment as a sovereign state in 1997 (previously Zaire), has been plagued by conflict and fragility. The Second Congo Civil War (or the African World War), which started in 1998 was the deadliest conflict globally since the Chinese Civil War (1927-50). The Rwanda genocide in 1994 significantly affected the instability, in part due to the presence of ethnic Hutus and Tutsis in Eastern DRC – with Hutus taking refuge in Eastern DRC and Tutsi groups pursuing them because of their threat to stability in Rwanda. Since the genocide, Rwanda has enjoyed stability and economic growth. Although the war in DRC ended around 2002-3, the country has suffered from continuing instability as a result of the ongoing conflict in Kivu. As border towns with Rwanda, both Goma and Bukavu have been affected by the conflict in eastern DRC.[44]

Goma has transformed over the last 25 years from a small, dormant town of marginal political and economic importance, to a regional military and economic centre. More than fifteen years of state decline, violent conflict and massive displacement have facilitated the city's connection to extensive and flourishing transborder trade networks and have turned Goma into a notable centre of rebellion, attracting rebel leaders, businessmen, humanitarians and peacekeepers, but also vast numbers of

[42] DFID, 2013, Business Case and Intervention Summary - Increasing sustainable access to Water, Sanitation & Hygiene in the DRC.

[43] Other components covered in the overall programme were support to:

- UNICEF for Phase II of the National Village Assaini (Healthy Villages) Programme (£90 million)
- A Consortium of International Non-governmental organisations (NGOs) to deliver a comprehensive WASH package (£30 million).
- Oxfam for a sanitation marketing pilot study (£1.75 million).

[44] A precis of the Second Congo Civil War can be found in Gambino, T / World Bank, 2011, Democratic Republic of the Congo: Background Case Study. World Development Report 2011 Background Papers. https://openknowledge.worldbank.org/handle/10986/27324

refugees and internally displaced people in search of protection.[45] It is contiguous with the Gisenyi, a city on the Rwandan side of the border.

The 1994 census shows a population of 78,000 in 1984, increasing to 250,000 in 2004. No official data exists on the current population, but estimates suggest that it is now around 1 million.

5.2.1 Bukavu

Like Goma, Bukavu is a lakeside city at the southern end of Lake Kivu. Census figures for Bukavu give a population of 168,000 in 1984, 472,000 in 2004 with estimates suggestion it is now around 975,000 (CIA 2018). It is the largest city in South Kivu.

It has been badly affected by conflict, both during the DRC civil wars, and also as a result of the ongoing conflict in Kivu. Economic growth and opportunity are also held back because of the poor quality of connecting roads, both west into DRC and east towards Kigali in Rwanda. However, the improved access from Rwanda to Dar es Salaam may provide future opportunities in support of economic activity.

Bukavu is now particularly known for Dr Denis Mukenge (Nobel Peace Prize 2018), and the Panzi hospital, for the pioneering work in the treatment, physical and psychological, of survivors of sexual violence.

5.3 *WASH in DRC*

Access to improved WASH services is low in the Democratic Republic of Congo and has barely improved over the past decade. 2017 data[46] show basic water facilities in rural areas are available to only 23% (16% in 2000), and 68% (69% in 2000) of the population in urban areas; and 18% (20% in 2000) and 23% (23% in 2000) have access to basic sanitation. These access rates are substantially below Sub-Saharan averages.

A recent World Bank Report[47] indicates that Urban areas have much higher access to improved water sources than rural zones, although the difference in coverage for access to improved sanitation is extremely low in both rural and urban areas. Location is critically important: the poor in larger cities tend to have much better WASH services than small-town and rural households at the same or even higher level of income in some towns and cities.

The total number of urban dwellers without access has been rising rapidly over the past decade, precipitated by rapid population growth. The quality of supply has stagnated at low levels or even deteriorated.[48]

5.3.1 Institutional Arrangements

The WSP report[49] refers to urban water being under the shadow of REGIDESO.[50] As the former monopolistic urban water utility REGIDESO continues to dominate the urban water subsector – both with regard to investment funding and as an operator.

Due to lack of alternative options, autonomous water supply schemes[51] have become a critical part of the DRC's urban water infrastructure, in particular for the poor in peri-urban areas, small towns, and densely populated rural areas.

[45] Vlassenroot K. et al. (2009) The City As Frontier, Urban Development and Country Processes in Goma.
[46] Joint Monitoring Programme (2019) Progress on Household Drinking Water, Sanitation and Hygiene 2000–2017. WHO/UNICEF
[47] World Bank, 2018, WASH Poor in a Water Rich Country – a Diagnostic of DRC.
[48] World Bank, 2018, op. cit.
[49] Op. cit.
[50] REGIDESO was established by Royal Order in 1933 by the colonial government. Former state monopoly for urban water supply, now a state owned commercial company. Formally responsible for 97 cities, but 75% of revenue from just three. The Ministry of Portfolio, Committee for the Reform of Public Enterprises (COPIREP) represents the state as owner of REGIDESO.
[51] In peri-urban areas, a popular model has been dubbed "ASUREP" (in French, *Association des Usagers des Réseaux d'Eau Potable*; in English, the Users Association of Drinking Water Networks).

Autonomous schemes enable pro-poor water supply in urban areas, because they have been disproportionately set up in impoverished peripheral neighbourhoods that lack access to a grid supply. Prices for autonomous schemes tend to be higher than the dominant water utility, but lower than available alternatives, such as bottled water. In Kinshasa, the water price in autonomous schemes is approximately USD 2.1/m^3 compared to USD 0.35/m^3 for REGIDESO private subscribers and USD 1.54/m^3 for the small number of REGIDESO standpipes.

One reason for the growth of autonomous schemes is relatively low investment costs, which have been estimated at approximately USD 35–50 per beneficiary compared to over USD 140 in recent REGIDESO projects.

WSP concludes that despite the many unresolved challenges, peri-urban autonomous schemes have been a pro-poor success story in urban water supply of the Democratic Republic of Congo. They provide a low-cost solution to basic water supply when citywide infrastructure is not financially or technically feasible. The key challenge will be to successfully extend this model beyond the present core areas, to make the support organizations less dependent on external financing, and to coordinate investments into autonomous schemes with larger-scale suppliers, in particular REGIDESO, to avoid duplication and conflict.

Urban sanitation is the WASH subsector with the lowest improved access, the weakest institutional structure, and less funding than water. In the absence of systematic interventions, the absolute number of urban dwellers lacking improved sanitation has risen dramatically from barely 6 million in 1975 to around 30 million today. This is expected to double again by 2035. Poorer households tend to have worse access, but access to safe facilities is low even for the top 60 percent.[52]

Funding for urban sanitation has remained minimal. Total disbursed and committed financing has been less than USD 50 million for the period 2005–20. This is just 5% of funding for urban water. The sanitation challenge is overwhelmingly large, particularly given limited financial resources and capacity, and no clear institutional lead. As a result, little is done to improve sanitation access.

5.4 *Legal Framework*

Following long delays within administrative and government processes a new water law was enacted in 2015. The new Water Law provides a significant opportunity to address many of the institutional weaknesses that hinder progress in addressing service gaps.[53] However, the timing of its promulgation in the second year of the Urban Wash Programme had a major impact, requiring fundamental changes in strategy to align with the new law. However, the shift of responsibilities to the local level has eventually provided opportunities that would not have been possible if REGIDESO had retained its earlier powers.

Important inclusions in the Water Law are full cost recovery, the principle of decentralisation and separation of asset ownership from service delivery. However, achieving the provisions and intent of the water law are likely to be challenging in the light of the complex political realities and vested interests.

Overall planning continues to reside with central government as does the power to set the national water policy, and being the regulatory authority. The major changes are with the local responsibilities, with provincial governments, local authorities or user associations being the asset owner. As such they are responsible for investments. They are also required to delegate service provision to public or private entities.

These changes have been difficult to implement in a fragmented sector, with centralised asset ownership and investment decisions. However, the challenges for the project from the new Water Law were compounded by key changes in local politicians and civil servants, and forthcoming national elections.

It also became clear that Mercy Corps' local partner NGO was not in a position to provide sufficient guarantees for a well-governed water system management. The level of revenue earnings from an

[52] World Bank, 2018, op. cit.
[53] Op. cit.

urban water network require a commercial orientation, which in Mercy Corps' view was not the strength of the appointed NGO. For these reasons Mercy Corps decided to bring the partnership to a close.

This was followed by an attempt to let a PPP contract with REGIDESO. However, no tenders were submitted, reflecting the view in the market that the private sector considered the risks to be too high to make it a viable proposition. This is the reason for exploring alternative options **leading to the establishment of Congo Maji** to take on the operational management role.[54]

5.5 *International Agencies Active in WASH*

Water supply has historically received significant donor support in DRC. Over the ten years 2006-16 development assistance to the sector totalled US $1 bn. Commitments for the four years, 2017-21, are US $ 458 m. There has, however, been a significant shift in allocations. For the period 2006–16 this was 56% urban: 46% rural. For the current funding period, 2017-21, the allocation is 78% urban: 22% rural – a significant increase in allocations to both large urban centres and secondary cities/towns.[55] The proportion of the funds allocated to urban wastewater collection/treatment and basic sanitation is very small.

Germany[56] (KfW and technical co-operation through GIZ) is currently the largest bilateral donor focused only on urban water supply in secondary cities/towns. DFID as the second largest bilateral donor has a mix of support to rural and urban water supply and sanitation. The European Union, France, Belgium are the only other donor agencies providing support for urban water supply – although the World Bank and African Development Bank previously funded urban WASH programmes.[57]

DFID's support for urban water is focused on Goma (North Kivu) and Bukavu (South Kivu) through its IMAGINE programme, where is has been the principal funding agency. Others have also had some historic involvement – including ICRC and USAID in Goma and Swiss Development Cooperation (SDC) in Bukavu. There are indications of further funding interest from other agencies.

World Bank – has made available (ongoing since late 2009) a grant of $294m to improve access to drinking water in Kinshasa, Lubumbashi, Kindu and Matadi and improve the efficiency of REGIDESO at the national level. Implementation initially suffered severe delays and difficulties, particularly as a result of REGIDESO reform.[58]

African Development Bank cooperation since 2002 focused on either multi-sectoral emergency projects or large-scale infrastructural projects with commitments of around US $200m from 2006-16.

In addition to the main donors, there is an abundance of international and national NGOs attempting to fill the shortfall in drinking water and sanitation services in peripheral areas of big cities and in rural areas, predominantly as part of a broader humanitarian and emergency relief effort. Many of these NGOs currently bid for funding under the Humanitarian Pooled Fund programme, even though some of the projects are developmental in approach.

5.6 *Summary of water and waste water systems in Goma and Bukavu*

Goma's position on Lake Kivu provides it with an inexhaustible supply of raw water. Annual rainfall in Goma is also high at around 2.5 metres. A pumping station to abstract the water from the Lake, dosing with chlorine and further pumps to distribute to the population of Goma has been in place since colonial times – when the population was around 5% of current levels. The influx of refugees and IDPs into Goma, living in camps and elsewhere overwhelmed the existing water supply system.

[54] Further information on this new arrangement is provided in section 5.8.1, below.
[55] Figures from UNICEF/DRC WASH Donor Group
[56] With REGIDESO
[57] No figures included in the UNICEF/DRC WASH Donor Group data for the IFIs – World Bank and AfDB – which were previously active in the sector.
[58] For a discussion of these issues, see page 4 of the Project Paper linked to additional financing for this project (World Bank project ID P155266), published 3 February 2016. http://projects.worldbank.org/P155266/?lang=en&tab=documents&subTab=projectDocuments

Recognising the situation in Goma as a humanitarian emergency led to a range of short-term interventions to supply water to the camps. The source of the water was from Lake Kivu and also from inland spring sources for the refugees/IDPs located on sites distant from the lake. A number of international agencies and NGOs were involved in delivering these emergency supplies. ICRC has been active in Goma for many years – installing in new pumping station around 15 years' ago and also providing some maintenance support to REGIDESO. Recognising the need to move beyond short term interventions ICRC worked with REGIDESO in 2009 to develop a more long-term and comprehensive plan for water supply to Goma. However, despite further support to improve Goma's water supplies, Mercy Corps recognised that interventions continued to be limited in scale and relatively short term in outlook. This is the situation that prompted Mercy Corps to approach DFID with the design for their current programme.

Bukavu's water supply and treatment system has similar origins back to the colonial era. However, there is significant difference in the geology between the two cities. Goma, lies close to the Nyiragongo volcano, which erupted in 2002 resulting in a lava flow that ran through the city to the lake. This affects the laying of pipes in many areas, and also limits the availability of other sources of water, apart from the lake. Groundwater is also contaminated by gas from the volcanic activity.

Bukavu also has mountains close to the city, with perennial rivers. As a result, water for the Bukavu water supply network comes is river water, that is treated prior to supply. The population of Bukavu are opposed to Lake Kivu as the source for the city's water supply, on grounds of taste.

5.7 *History of donor interventions*

Mercy Corps has been operating in the DRC since August 2007. It has a staff of more than 200 people, and has a presence in North Kivu and South Kivu. Mercy Corps started its urban WASH intervention in Goma with USAID Food For Peace (FFP) funding (initially 2009-11 but extended to overlap with the EC funding). The main objective of the emergency intervention was to provide food to the population. As a result of the intervention, a reservoir of 700 m^3 was built and linked to a couple of pumping stations constructed by the ICRC, and a distribution network with approximately 25 tap stands was developed.

The European Commission and DFID built on that intervention with funding (2012-14) to expand the network to approximately 50 tap stands, and added a similar reservoir to improve storage capacity. This second phase of funding was accompanied by a pilot management system designed by Mercy Corps and implemented by a local NGO together with the State water utility.

In the current phase, Mercy Corps is scaling its infrastructure activities up in Goma, with the addition of two 5000m^3 reservoirs and the expansion of the tap stand network at least four-fold, and replicating a pilot model in a different context (i.e. Bukavu). The infrastructure works are tied to the existence of a management system, to secure the assets funded by DFID.

> "A comprehensive long-term plan is better than a series of emergency projects."
>
> *ICRC 2009*

The International Committee for the Red Cross (ICRC) has also played an active role in water provision in Goma. In 2009 ICRC supported the development of a master plan for Goma[59] – claiming that this was the first comprehensive plan to bring water to the population of Goma. The existence of a plan, that was subsequently updated to a 15-year masterplan, as part of the DFID funded IMAGINE programme, has enabled a rational and targeted approach to prioritising investments to improve access. For example, Mercy Corps initially targeted its efforts using the USAID and EU/DFID funding) on two zones to have greater impact and minimise the problems in one area – rather than spreading limited resources too thinly. However, the relatively smaller scale and short-term nature of these interventions meant that Mercy Corps were not able to address structural issues affecting operations and maintenance.

[59] Key informants have advised that the time horizon of the ICRC plan was only 5 years, which also had the effect of some short-term investments not consistent with longer-term needs.

5.8 *The Urban WASH Programme*

The DFID Business Case gives a **total cost** of the Urban WASH Programme through Mercy Corps (excluding design) would of £36.9 m from 2013–2017.[60] The **unit cost** of the programme was estimated to be $36.93 per capita. The annual maintenance cost is estimated to be $0.97 per capita.

The Business Case does recognise that DFID has a role to play in the reform process and commits through direct advocacy to 'influence the current donor and government coordination mechanisms in order to make incremental improvements to sector management and to improve the quality of dialogue between donors in order to facilitate a communal view of changes required to the institutional framework'. This commitment was and is important for future progress of the programme, when it was stalled as a result of the introduction of the new Water Law – seen as vital for the much-needed institutional reform.

> An example of targeted advocacy/diplomacy to address institutional bottlenecks Parliamentary Under Secretary of State, Nick Hurd, communicated a message to the DRC government and former national water utility company REGIDESO by highlighting that "decentralization and private sector participation are crucial in paving the way for making further UK investments in the water sector". This high level intervention was critical in addressing major challenges that Mercy Corps was facing in making progress with the WASH programme in Goma.
>
> *From Mercy Corps' submission to the International Development Committee's Inquiry in 2016 into Fragility and Development in DRC*

DFID's renewed engagement with the WASH donor group after a hiatus in 2016, during the transition between WASH advisers, was seen as significant. The strengthened relationship assisted DFID, and Mercy Corps, in driving negotiations on the water service delivery. It also enabled DFID to better understand the sector and coordinate with other donors in a more informed manner.

DFID's DRC programme had previously identified lessons in relation to a rural roads programme in North and South Kivu. One particular element of this had been the quality of preparation and design, which had resulted in some sections of the project not being successfully completed on the roads programme. For this reason, DFID DRC included in the programme budget funds for an external WASH technical assistance to support the design and quality assurance of the urban WASH component with Mercy Corps over the life of the project, including the design phase. However, DFID was clear that this was complementary, and would not replace DFID's input or DFID's relationship with Mercy Corps. DFID would still undertake all review missions, as well as joining some of the proposed quarterly missions to be undertaken by the Consultant.

Additional technical advisory was intended to provide both a safeguard to DFID's interests, as well as regular support and advice to Mercy Corps during design and implementation. This was considered necessary since NGO's are not typical implementers of large scale infrastructure works, and would need support in some areas – in particular preparation of bidding documents for construction under FIDIC contract rules.

Mott MacDonald are able to bring in much wider international best practice and lessons learned. This decision was taken despite having some technical capacity in the DFID DRC team – but reflects the importance of ensuring sufficient attention is given to the technical aspects of infrastructure projects.

The intermittent conflict in Goma was recognised as a risk to the programme. Mercy Corps therefore proposed to phase the implementation of each component of the water system. This was to complete a section at a time, to provide a usable element of the system should DFID decide to end its support in the event of heightened conflict. The Accountable Grant was structured to take account of this approach. Given this arrangement, the timeline and design of the programme were subject to approval by DFID DRC head of office. This provides another example of lesson learning to avoid, to the extent possible, the creation of stranded/partially completed assets – that are generally written off as a total loss due to damage or deterioration.

[60] DFID, 2013, DRC WASH Programme Business Case

5.8.1 Current Activities Under the Urban Programme

Mercy Corps has been building water and sanitation (WASH) infrastructure in Goma for more than a decade, with funding from a range of agencies.[61] This has included two reservoirs of 700 m^3 each, 27 km of pipelines, 2000 public latrines and 53 public tap-stands (would be useful to differentiate pre-urban programme activities from earlier funding sources).

Under the DFID programme Mercy Corps developed and put in place a **pilot management system** (named Système de Gestion Pilote – SGP) for the 53 public tapstands, in March 2014, targeting 200,000 under-served poor people. The SGP, is a Public-Private-Partnership (PPP) type arrangement between the former national water utility company REGIDESO, a local NGO operator and Mercy Corps (providing oversight).

Mercy Corps piloted the approach to address the failures of public infrastructure projects in the DRC. This was based on theirs and others experiences of assets handed over to existing entities, utility companies, water associations or local NGOs that were not competent to manage or maintain them. There were multiple reasons for this including weak governance and capacity, poor transparency and financial mismanagement.

As referenced in section 5.4 above, the Water Law required a fundamental change in approach with regard to the management arrangements for service delivery. The original project delivery structure included a Mercy Corps Water Services Delivery team seconded to a local NGO that had entered into an agreement with REGIDESO. However, the new Water Law meant that this arrangement had no legal basis, considering that the provincial authority, which is the asset owner according to the new law, was not included in the agreement. An innovative setup, inclusive of the Provincial authority had therefore to be designed.

Out of this situation Mercy Corps developed a revised strategy for service delivery through the creation of a Public Private Partnership management model. The main achievement of the project is a 5-year contract (twice renewable) with the state-owned water utility company REGIDESO, for the management of parts of the network financed by donor funds. This is similar to a user-pay PPP, a novelty in the DRC water sector, and it required the creation of a specific independent structure, namely Congo Maji and Enterprise for Impact (E4i), to secure the model sustainably. Congo Maji is a DRC registered utility company (limited by guarantee) 100% owned by E4i – an England & Wales registered charitable company. Thanks to the PPP contract, operating expenditure (OPEX) is fully covered and a dedicated fund has been built in for renewal and extensions (capital expenditure - CAPEX) and audit purposes.

Congo Maji operates the tapstands. It collects water fees, currently in cash, using hired tapstand operators and revenue collectors. Collections are automatically recorded centrally, which enables tracking of revenue in real time – with checks on the system to identify misappropriation of payments. Tap stand users pay approximately \$0.06 for a 20 litre jerry can (equivalent to around \$3/m^3).

Construction of the major infrastructure components are reaching a critical point. The contractors are now on site in Goma and Bukavu constructing the main infrastructure elements needed to extend the system coverage. This is due for completion by the end of 2019 but is already experiencing delays.

Other components of the programme such as governance, behaviour change communication and gender are all continuing and scheduled for completion by the initial close date in August.

Another one of IMAGINE's components/ objectives is to build robust and effective governance mechanisms for the wider stakeholders in the water industry. This supports complaints handling, lobbying for improvements and communicating changes.

Although progress with the new institutional arrangements is encouraging, a recent review[62] recorded concerns about the fragility of the new operational management structure. It notes that: "the sustainability of this new governance mechanism is strongly reliant on both parties continuing to see mutual benefits. As these benefits start to materialise, trust in this accountability mechanism can be strengthened. Mercy Corps must ensure adequate resources are provided to sustain this new accountability link and maintain enthusiasm in both parties until infrastructure works are completed."

[61] From Mercy Corps' submission to the International Development Committee's Inquiry in 2016 into Fragility and Development in DRC.
[62] 2018, DFID, Annual Review of Urban WASH Programme

5.8.2 Sanitation

IMAGINE does have a component dedicated to sanitation, although not yet implemented. As part of this it is developing a case for implementing a sanitation improvements Master Plan for Goma. However, the challenge is how to make sanitation a financially sustainable industry across the full life cycle from defecation to disposal.

5.9 *Gender and Social Inclusion*

During the inception phase, Mercy Corps commissioned studies in a number of areas including environment, gender and socio-economic aspects of the programme. This early work informed the design of the programme. As a result, gender is central to the interventions, and aims at transformative change in the lives of women and girls. Mercy Corps is expanding the scope of their gender approach to include consideration for other vulnerable groups, through the development of their Protection and Integration Strategy.

Through the programme Mercy Corps has been developing a 'Gender Status Index' tool. The purpose of the tool is to support data gathering and interpretation for key statistics defining the status and impact of water access for women and girls. This appears to be a robust and useful tool for the global WASH sector and is applicable for dissemination outside DRC. Although currently MC does not have a dissemination plan for the GSI tool. IMAGINE has developed a manual on how to adopt the GSI to other DFID programmes.

In its submission to the IDC,[63] Mercy Corps included a reference to the integration of its Behaviour Change and Communication approach highlighting the importance of gender transformative practices that also involve men and boys. The communication campaign included some specific activities with the husbands of the women. Mercy Corps focus on 'positive masculinities', as part of its gender strategy, reflect the importance of involving men and boys as part of a gendered approach, particularly in situations of conflict and fragility where violence against women is a major threat.

With the price of water at the tap stand projected to be US$3/m^3 this does raise issues of affordability, and ability to pay. Mercy Corps collect data on the willingness and ability to pay for various water services through a biannual survey. The impact of pricing on the ability of poor people/families to access safe drinking water is a fundamental issue. The annual review noted that affordability in the urban component should be more concretely incorporated into the DFID output for the programme. In response to this Mercy Corps has commissioned a study, through the London School of Economics (LSE), to investigate the price of water in more detail and how changing water tariffs might impact household economics.

It seems apparent that each community has a particular way of identifying vulnerable persons. The outcome of this exercise is to stimulate the community to help the vulnerable access water.

Mercy Corps is addressing vulnerability as part of their safeguarding strategy. There is scope for deepening the approach, not only to safeguard vulnerable persons, but also to address the particular needs of more vulnerable groups – in particular people with disabilities. Mercy Corps has put effort into expanding the work that they do on safeguarding, identifying more vulnerable groups and developing tools for assessing the impact of programming on them. The location and the design of the tap stands have both been informed by focus group discussions including individuals with reduced disability.

Mercy Corps engaged with a specialist in accessible design to improve the efficiency, safety, security and accessibility of the tap stand cage. For example, the entrance and exits of the cage are wide enough to allow for wheelchair access and the tap height and reach of the taps allows for a person with a disability ease of water collection.

[63] Op. cit.

5.10 *Risk*

Mercy Corps have from the outset used a comprehensive risk matrix to identify and monitor risk in real time. Although the security risks have receded, there are many programme related risks that threaten the successful completion of the programme and achievement of planned outcomes.

In progressively realising the water service delivery goal in Goma and Bukavu, there are multiple technical, legal, demographic, and political uncertainties and hazards. In their own risk assessment, Mercy Corps have identified 100+ risks and defined various mitigating actions for each.

There remain some risks with the operational management arrangements – although to a degree these have been mitigated by the signing of an agreement between REGIDESO and Congo Maji SARL, as the operator of the system responsible for supply of water to customers and collection of tariffs. Under the agreement a proportion of the tariff collected is transferred to the owner of the infrastructure assets for long term maintenance and replacement costs.

5.11 *Emerging Lessons for Wider Application*

5.11.1 Understanding the Context

- Recognise that the political economy will be the main factor determining the rate of progress, the ability to influence institutional change and ultimately successfully deliver improved WASH services. The complexities of the political economy and institutional changes slowed the pace of implementation of IMAGINE. This reality implies the need for implementing agencies to be attuned to and able to respond effectively to the realities of the political economy.
- Prior experience of the operating environment is a significant advantage. The Mercy Corps team developing and implementing the programme already had several years' experience operating in this particular context. This enabled a "reality check" on what was realistic/possible. Prior experience enabled staff to pick up the signals and sense when something was not right – whether in relation to security or broader programme/relational/institutional issues.
- Continuity of involvement of expatriate staff is important. This was achieved with some key members of the team likely to complete the 5/6 years of the project. Mercy Corps made efforts to accommodate some of the key personnel's family situations – allowing families to be based in the region but outside DRC (e.g. Kigali and Nairobi).
- Ensure sufficient capacity, through staff or consultants, to research and advise on cross-cutting issues.
- Track security and other risks in real time. Mercy Corps used a comprehensive risk matrix that was updated regularly to monitor and track changes in the situation. Despite the conflict in the area, albeit low level, Mercy Corps did not see security in Goma and Bukavu as a major threat to the programme.
- Regularly monitor political shifts. Identify individuals with influence, particularly those likely to remain in position, and work with them rather than the institutions, given the importance of personal relationships in a failed state. Use tools to map influence as relevant to the changes and project implementation.
- Clear communication with stakeholders and interest groups is an essential part of operating in a fragile environment. However, this requires sufficient capacity.

5.11.2 Delivery of Infrastructure

- It is essential in situations such as Goma and Bukavu that WASH interventions transition from a series of unconnected emergency interventions, to forming part of a longer-term plan. A 5-year plan, developed by ICRC in 2009, provided the basis for funding agencies to support projects on a more rational basis. However, 5 years is still relatively short-term. The 15-year masterplan developed as part of the inception phase for IMAGINE, has enabled a more coherent targeting of priorities, and included systemic institutional issues in relation to operations and maintenance.
- Ensure sufficient technical capacity with a high level of competence, appropriate to the project, for the infrastructure component. Mercy Corps hired a regional engineering consultant, in addition to its own team of engineers, to design and supervise construction of the main

infrastructure works.[64] This, together with the consultants (Mott MacDonald) hired by DFID, has been important in ensuring a thorough approach to ensuring good quality planning, design and delivery.

- Agree the preferred form of contract, and identify suitably qualified, competent and reliable contractors. Mercy Corps placed significant importance on the bidding process – including the use of FIDIC conditions of contract (as adopted by the World Bank) and proactively informing prospective international contractors of the opportunity. This has resulted in the award of contracts for Goma and Bukavu to contractors with good track records for quality of work and delivery on schedule.[65]
- Involve local partners in the selection process for contractors. Both REGIDESO and the provincial authorities were involved in the selection of the contractors following the international tender – although did not have a controlling vote in the final selection.
- Engage with and involve the community. The community was engaged in selecting public tap stand locations. Men, women, girls and boys (inclusive of persons living with disability) were consulted separately during focus group discussions, and provided Mercy Corps with a pre-selection of locations from which the infrastructure team made a final call based on technical feasibility. At tap stands locations, community groups have played an important role to address violence, vandalism and malpractice.
- Recognise local community groups as an important resource for communicating messages and receiving feedback. Community groups were reformed/reinforced during the programme and were useful as relays of information to the community, and also called upon to sort out issues when there was some questioning by the community.
- Use labour from the local community where possible. This results in direct benefits from salaries, further engagement from the community and development of skills for future maintenance of the system – particularly for tap stands and pipe repairs.
- Adopt a rigorous approach to assess the relative merits, where relevant, between rehabilitation of the existing system, or replacement/renewal of the assets. An emerging principle from this is that an economic assessment of options, engaging with the entity responsible for operations to ensure their views are reflected, as well as customer acceptance, should be fundamental to decisions on rehabilitation of existing, or replacement with new assets.[66]
- Technology choices should be realistic based on the availability of skills to operate and maintain. For example, the water treatment plant in Bukavu provides basic but adequate treatment and the technology is well understood, although sometimes not operated and maintained adequately. For this reason, Mercy Corps decided on-balance to simplify the existing treatment process further, rather than opting for a new and more complex system.
- Ensure the acceptability of water sources to communities. Water from Lake Kivu is acceptable to the inhabitants of Goma, but not to those of Bukavu who favour treated river water. For this reason, Mercy Corps opted for the pragmatic option to further develop an existing river source, with capacity based on population growth projections through to 2030.
- Consider availability and cost of limited electricity. Providing sufficient elevated storage in Goma means that water is pumped during the hours of low electricity tariff. The elevation of the river intake and water treatment works for Bukavu means that there is limited need for pumping into supply.
- In a situation where corruption is endemic, ensure that systems are in place and policies are clear. One example from this case study is registering cash payments in real time over the mobile network. These are cross checked against water meter readings. Financial reconciliations and issues logs are all in real time, which helps identify issues quickly. Congo Maji applies strict zero tolerance against stealing funds.

[64] Mercy Corps also considered hiring additional technical staff directly to fulfil this function, but opted to hire consultants in order to limit the number of staff on their team. There were some performance issues with this contract.

[65] It is somewhat early for Mercy Corps to draw lessons, as works have only just started. What can be said already is that the tender packages attracted a variety of internationally experienced contractors, which are willing to risk venturing into a fragile context.

[66] In retrospect Mercy Corps suggest that there should have been a more comprehensive assessment of the options – to take account of costs and also the operational considerations of any rehabilitated or new system. However, at the time of the design options were to a certain extent constrained by the existing assets, which were built with emergency funding with a short horizon in mind

- Considering the minimal regulation by authorities, it is of utmost importance for implementing agencies (and funders) to monitor the works closely from a technical perspective, but also for health safety and environmental impacts.

5.11.3 Impact of Infrastructure

From the perspective of the potential beneficiaries, successful completion of the infrastructure represents the beginning of what should make a significant difference to their lives and well-being. The reality is often very different. There are numerous tap stand projects implemented by NGOs and INGOs in Goma and Bukavu, most of which ended up failing, either for:

1. technical reasons (e.g. building a tap stand network without considering the supply of water), or
2. poor management of the assets – handing over the assets to local committees setup in the course of the project with the unrealistic expectation that they will be able to maintain the assets and sustain delivery of the service.

Unsuccessful delivery of benefits, or over promising and under delivering, creates mistrust with the community that is difficult to restore. The level of scepticism in Goma was such that the team were often told that the communities did not expect the water to flow from the tap stand for more than a few weeks when the first phase of the project came into operation.

Key learning points from the Urban WASH Programme are:

- Address operations and maintenance and sustainable delivery of services as a critical issue, from project inception.
- Consider the distribution of benefits from the programme. Be pragmatic. For example, Mercy Corps chose to improve services not just targeted to poorer communities – but also to better off areas. The capacity and financial model agreed was such that the majority of demographic groups in Goma are likely to benefit from IMAGINE's increased water supply.
- Ensure that the revenue stream, or committed recurrent budget allocation, will be sufficient to cover operations and maintenance costs. This is for a fundamental requirement for any infrastructure project/programme – particularly in FCAS where sustainability/resilience of infrastructure and delivery of services is a major challenge and government budgets are low. With its focus on sustainability Mercy Corps calculated a user fee for tap stand users of approximately 0.06 USD for a 20-liter jerrycan of water – approximately 3 USD/m^3. A percentage of this is payable to the asset owner for their maintenance. Perversely, the water from private connections is less expensive than from tap stands. Mercy Corps has commissioned a study by LSE to see to what extent low income household using tapstands has had an impact on households' spending. Prior to the launch of the tapstand network, customers were paying between 4 and 10 times the price for a 20-liter jerry can. Mercy Corps commissioned the survey to assess how the potential savings were used at the household level.
- Early delivery of some outputs is resulting in positive outcomes – and helps to address earlier comments about lack of trust that the project will deliver. Feedback from consumers benefitting from the tap stands is that they no longer have to take the long, exhausting (when carrying 20 kg of water), and at times dangerous walk to the lake for water. For those without access to tap stands the price of water from vendors is reported to have dropped to 25% of its pre-project value.
- Do not over promise and under deliver against expectations. In this context be aware of past performance of other projects and how this has coloured views of potential beneficiary groups. Mercy Corps were aware of a DFID-funded road construction project around Bukavu that did not deliver expected outputs. This has led to a certain level of mistrust from local authorities. It also increased donor pressure to deliver this programme. Awareness of this led Mercy Corps to be cautious with its communication about outputs and timeframe. For example, Marcy Corps informed the public that, despite the size of the project, it would not solve all the water problems in those towns.
- Recognise that improved access to water is likely to increase land values that may adversely affect poor people living in those areas without tenure. Property values, on the edge of Goma that previously had no local supply, have gone up 10 times.[67] Although the proportion of this attributable to the improved access to water is not clear.

[67] Information provided by Mercy Corps

- Innovative management arrangements are possible and worth testing in FCAS – if adapted to the context. With the introduction of the new water law, and with support from a consultancy team, Mercy Corps created an innovative social business model for managing service delivery.[68]

5.11.4 Donor Modalities, Instruments and approaches

A significant proportion of funding in FCAS, particularly involving infrastructure investment, is funded through multilateral agencies or other multi-donor instruments. The Urban WASH programme provides a useful opportunity to learn from a bilateral programme, implementing a major WASH programme, with a significant infrastructure component. This was a viable option for DFID because the level of funding was arguably proportionate to the additional transaction costs of a bilateral programme. In terms of scale the overall WASH programme (£164m) is larger than many multi-donor programmes. There are some important lessons from the bilateral funding approach – although some of these apply equally to multi-donor programmes.

A distinctive of bilateral programmes is the level of exposure – to reputational risk in particular. Multi-donor funds operate more at arms-length, and major failures are, therefore, less directly attributable to any one funding agency. There is also less ability to influence/steer the programme. Conversely, there is more of a direct association for the donor government with bilateral programmes that are successful.

From the Urban WASH Programme in Goma and Bukavu there are a number of emerging lessons for donor modalities, instruments and approaches:

- Recognise the importance of being an intelligent and informed funder, with a consultant providing advice, if necessary, in support of the implementing agency. A specific example was including an additional budget for an international firm of consulting engineers (Mott Macdonald) to represent DFID's interests in the design and delivery aspects of the programme, and play a supportive role to Mercy Corps. This was significant as it reduced the risk of major or minor oversights through the programme cycle, that could have resulted in technical, legal or managerial problems and subsequent partial or total non-delivery of programme outputs and/or outcomes. There are numerous examples in DRC of substantial investments failing for want of basic technical competence. The cost (< 5%) is relatively small in relation to the total value of the investment.
- Allow time for a long enough inception period for the project to enable a full contextual assessment to inform design, even where the implementing agency is relatively familiar with the operating environment. DFID granted a one-year inception phase prior to the actual project that allowed Mercy Corps to hire consultants for a series of assessments (including environment, gender, water governance, social economy). Other studies followed – in particular the legal and governance implications of the new Water Law.
- DFID, and other funding agencies, need to stay engaged[69] and not consider that all responsibility for achieving a successful outcome has been contracted out to a third party – in this case, Mercy Corps. To ensure collective agreement throughout the programme DFID imposed a requirement for a trilateral agreement on management arrangements between Mercy Corps, the water utility and the Provinces (owners of the assets). DFID required this to happen prior to the signature of construction contracts.

5.11.5 The Role of Other Actors

Other donor agencies

Look for opportunities to secure complementary funding to extend the scope of work. Early in the programme, Mercy Corps identified the need to increase the quantity of raw water to enhance the supply to the water treatment works in Bukavu. Since this was outside the scope of the DFID funding, Mercy Corps approached other agencies for possible parallel funding. The Swiss bilateral agency Swiss

[68] Consisting of two entities: Congo Maji, a Congolese company (limited liability) owned by a second charitable company (Enterprise for Impact – E4i). Congo Maji then negotiated a management contract of 5 years (renewable twice) with the water utility REGIDESO and the Provincial Government to manage a section of the town of Goma. This PPP model will also be applied to the Panzi area of Bukavu.

[69] DFID's ability to convene government to government discussions helped move some things forward, while Mercy Corps' direct government discussions were able to move *different* things forward, without the international political dimension. DFID/UK and NGOs take a different view on political economy – which also affects awareness of risks, particularly any with reputational implications.

Development Cooperation (SDC) agreed to fund this discrete component. Mercy Corps facilitated exchanges between DFID and SDC, which enabled the inclusion of the missing component (increased supply into the distribution system) with SDC support based on a master plan that was done with REGIDESO during the inception phase of IMAGINE.

Informal Sector/Private Water Vendors

Understand the role of private water vendors, as this is an important source of information on system failures. For example, at the start of the programme, the water utility was providing services in parts of the cities, while local water vendors – sometimes with linkages to the water utility – were covering other parts of towns. However, the price of this water was unaffordable to most of the population. The introduction of a tap stand network has shifted their business to more distant areas, or forced the vendors to modify their service (e.g. home delivery for people not willing to walk to the tapstand and queue). There are significant political economy/vested commercial interests in current arrangements. Early work in seeking to understand how the informal water sector works, and is controlled, may be useful in avoiding unnecessary conflict in relation to any new water distribution and delivery systems – while seeking to root out the most egregious forms of corruption. As water vendors are likely to remain vital medium/longterm providers of water services there is also a case for looking for opportunities to work with them as part of the solution.

Monitor the extent to which the poorest are still accessing unsafe water sources. In Goma access to the lake remains the least costly alternative for the more destitute. In Bukavu they access water from unsafe shallow wells and surface water sources. The extent to which the poorest continue to access unsafe water, and the market shifts for the private vendors, are important indicators of the impact of the programme. Mercy Corps has commissioned LSE to research the issues of access and affordability (from the tapstands), which should provide some further important insights into these issues.

6 Sierra Leone case study – Freetown

6.1 *Introduction and context*

Freetown is the capital and largest city of Sierra Leone, with a population of around 1.2 million. It offers the opportunity to examine the progress of donor interventions to improve water and sanitation in a country which experienced a brutal civil war (1992-2002) but a comparatively fast cessation of hostilities and a post-war period largely free from continued political violence.

This case study focuses on the post war period, from 2002 until the present. This is a long period for a case study, but it reflects the slow pace of change in the sector since the immediate post war years. Although DFID has been one of the leading donors in the WASH sector in Freetown (accompanying significantly larger investments in WASH outside the capital), there has been a history of tentative projects and stop-start capacity building. DFID has recently begun a large water infrastructure rehabilitation programme in Freetown and the AfDB has also initiated large projects, but lessons learned from these are not yet available and impact will only be apparent several years from now.

The country has been subject to additional shocks and crises since the war, with the most prominent being the Ebola crisis of 2014 which was initially met with 'confusion, chaos and denial'[70] and revealed the poor state of Sierra Leone's health systems, while absorbing the energies of the whole of government for an extended period.

Although seemingly free of conflict, Sierra Leone is broadly considered a fragile state with political systems still heavily influenced by structures and tensions that dominated in the pre-war period and led to the conflict.[71] This deep instability and hidden contestation for resources affect visible actions and confound donor driven reform programmes. In the water and sanitation sector, the relatively small economic goods involved have resulted in a broad lack of political drive to solve longstanding problems with urban services, accompanied by donor reluctance to engage major capital resources.

6.1.1 Methodology

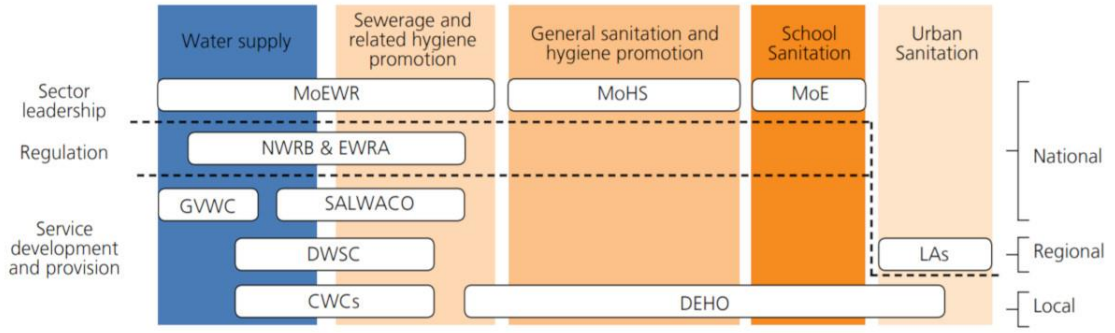
This case study is based on: donor and implementer project documents; government records and statistics; maps, reports and data published by NGOs; academic studies (to a lesser extent); and around 10 interviews with sector stakeholders individually and in groups. These were primarily conducted in person in Freetown in May 2019. Some former DFID staff kindly contributed their observations. We are grateful to all interviewees for their time and kind support. To promote open discussion, we have not named individuals. Information derived solely from interviews is indicated.

[70] Chatham House, 2017. Sierra Leone's Response to the Ebola Outbreak: Management Strategies and Key Responder Experiences.

[71] For more detail, see an up to date analysis by M'cleod and Ganson / IGC (2018): The underlying causes of fragility and instability in Sierra Leone https://www.theigc.org/wp-content/uploads/2018/04/Sierra-Leone-Report-v2.pdf

6.2 *Water and waste water systems in Freetown*

6.2.1 Roles and responsibilities



MoEWR: Ministry of Energy and Water Resources, lead for water resources and the custodian of the Water Law. Exercises oversight over sector agencies through Water Department.

MoHS: Ministry of Health and Sanitation, lead for overall coordination of sanitation and hygiene activities, through the Environmental Health Department (EHD) taking the lead in the promotion of sanitation and hygiene programs.

MoE: Ministry of Education, lead for sanitation and hygiene education in schools

LAs: Local Councils, focal entities at the district level for implementation of water and sanitation delivery. Work through District Water and Sanitation Committees (**DWSC**).

NWRB: National Water Resources Board, regulation and oversight for water resources management.

EWRA: Energy and Water Regulatory Authority, economic regulation of water and related sanitation delivery.

GVWC: Guma Valley Water Company, provision of water to Freetown and its environs.

SALWACO: Sierra Leone Water Company, water and sanitation in all urban areas outside of Freetown and some rural areas.

DEHO: District Environmental Health Officers, responsible for health, sanitation, and hygiene promotion at the district level.

CWS: Community Water Committees: management of water and sanitation delivery at the community level. Additional actors include the private sector and a significant number of international and local nongovernmental organizations

Figure 4: Institutional roles and relationships in the water supply and sanitation sector (World Bank WSP, 2011 - based on National Water Policy)

The public water utility supplying Freetown with treated, piped water is the Guma Valley Water Company (GVWC). This is a parastatal organisation established in 1961, currently under 99% ownership by the National Commission on Privatisation (NCP) and 1% owned by the Freetown City Council (FCC). It is regulated by the Energy and Water Regulatory Authority (EWRC), which among other things sets water tariffs. The Ministry of Energy and Water Resources is the overall water sector policy body for Sierra Leone. The Mayor of Freetown sits on the GVWC Board on behalf of FCC, along with a representative of the NCP.

The arrangement between FCC and GVWC in theory allows for coordinated municipal development planning, but in practice there has been little coordination and planning in urban development. A recent (March 2018) mayoral election and change of mayor may improve things, as the new mayor is pursuing a coordinated municipal development strategy, the Transform Freetown Initiative, which includes water as a technical pillar.

Responsibilities for sanitation in Freetown are complex and have historically changed quite often. The FCC bears responsibility for managing solid waste within Western Area Urban, which comprises the original built up area of Freetown (see map in Figure 6), while a separate authority has this mandate in the Rural Area. In practice, public management of solid waste is piecemeal and reactive, and there are ongoing discussions about how to set up sustainable managed solutions. The MoHS has overall policy

responsibility for dumpsites and managed landfills, though in practice has had very little role in managing Freetown's sites.[72]

Faecal and liquid waste services are not provided by government authorities (see section 6.2.3 for details on how these are handled), though in Freetown the FCC is considering taking on more responsibility for this.

6.2.2 Water supply

Geographical context

Freetown is built on a mountainous coastal peninsula referred to as the Western Area, administratively divided into the older urban extent – Western Area Urban – and the remaining area – Western Area Rural.[73] The city's growth is constrained between the mountainous forested area in the centre of the peninsula and the Atlantic Ocean and Rokel river delta and swamp areas in the east. Figure 5 shows a satellite view of the city, with urban extent identifiable as lighter coloured areas.

The shape of the city is a major challenge for urban planning. Access to the central business district and other economically important areas of the city in the northwest requires long transport times along roads through built up areas. The same is the case for water and waste management services, which have to travel around the long curve of the city. Solid and liquid waste management has been in a state of crisis for a long period of time due to the lack of identified suitable transport and disposal solutions which can serve a city with this geography at a price that is affordable for a poor country with weak governance institutions.

Rainfall is relatively plentiful, at around 5,200 mm/year, but is strongly seasonal. Half the year is a dry season from November to April, during which water resources are strained and up to 40% of water points reliant on small surface and groundwater sources will dry up. May to October is the rainy season, with rainfall building to a peak around August. Rainfall events are often extreme, leading to recurrent severe flooding in low lying – especially poorer – areas of the city and occasional disasters such as the 2017 mudslides which killed over 1000 people in the central Regent district and surrounding areas of the Babadorie river valley.

[72] There is only one known sanitary landfill in Sierra Leone, built and managed by a mining company. This does not serve Freetown. The remaining waste sites are uncontrolled dump sites. These sites in Freetown are a severe and ongoing environmental and social problem.

[73] The naming distinctions are outdated, as Freetown's city limits have expanded to the east and west into the rural areas, to the extent that about a third of the city's population lives in urban areas located in Western Area Rural. The FCC only has jurisdiction over Western Area Urban district. As the two areas have shared development and service delivery challenges and the city is a single unbroken urban area, these administrative distinctions hinder effective urban planning.

Figure 5: Satellite image of Freetown peninsula (Western Area). Image and map data: Google.

Guma Valley Water Company supply

There are two significant piped water networks and three associated source and treatment systems serving Freetown, which are controlled by GVWC and formally supply around 22,000 registered connections, including households as well as government and commercial customers. GVWC also supplies public standpipes – the primary source of water for much of the population in poorer areas – and bowser filling points, which are a major source of water for households not served directly by piped supply.[74]

Numerous minor run-of-river sources are exploited but not all are managed by GVWC. The main water source for the GVWC network is the Guma Valley Dam, which supplies a treatment plant and reservoir at Spur Road in the north-west of the city (the first node in the network map in *Figure 6* below). Distribution from Spur Road is gravity-fed to the districts comprising the 'low level system' (90% of Freetown's demand)[75] while the higher altitude districts ('high level system') of the city which receive piped water are supplied by another source and treatment plant at Babadori or water pumped up from service reservoirs supplied from the Guma Dam. There is a significant additional source and treatment plant which feeds into the distribution network in the east of the city at Charlotte, using water from the currently underexploited Orugu river watershed.

[74] Statistics showing percentages of people by primary water source appear not to be collected. 2018 GVWC / MCC documents make assumptions based on what is known about GVWC customers alone. NGOs in the WASH sector have specific data applicable to their areas, but we found no city-wide census data quantifying the relative use of different supply methods. This is concerning, considering that the number of household customers is a small fraction of the total urban population.
[75] Atkins, 2008

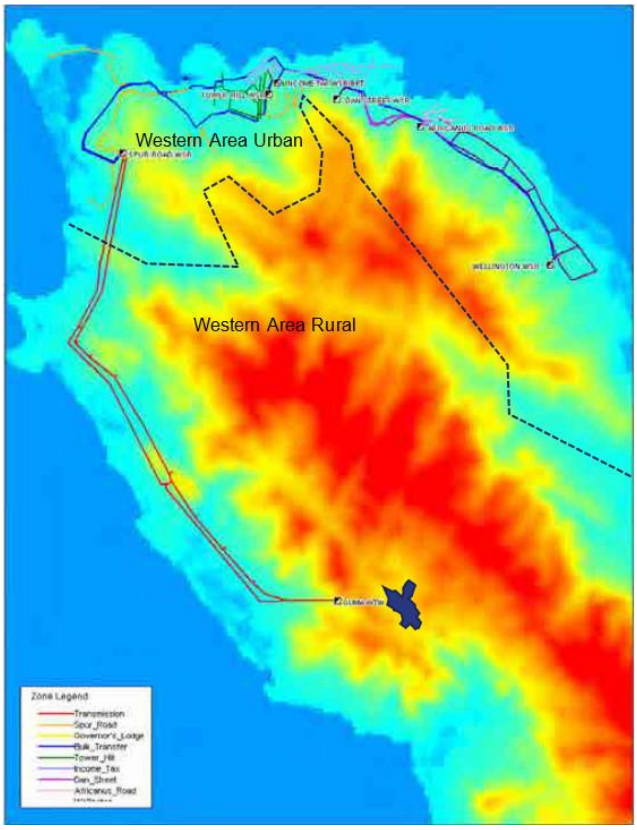
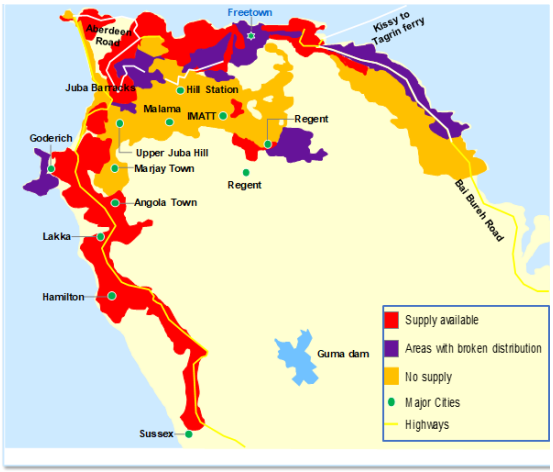


Figure 6 (left): Guma mains and service reservoirs as mapped in 2008 (Atkins/DFID), on topographic heat map. Additions of Guma Valley Dam and reservoir and border between Rural and Urban areas.

Figure 7 (below): estimated status of GVWC network



SOURCE: Guma Valley Water Company (GVWC)

Ninety percent of water in the system originates in the far south-west of the city at the Guma Dam, which is situated immediately to the east of the Guma water treatment works at the anticlockwise end of the distribution system shown in *Figure 6*.

The lack of adequate supply to meet total demand results in very unreliable supply at the far end of the distribution network in the east. A bulk transfer system aimed at ameliorating the inequitable distribution arrangement was constructed but not commissioned in the late 1990s, and has as a consequence been one of many factors exacerbating difficulties with leakages and pressure management (see sub-section below).

Service levels vary seasonally and by location, but 24 hour piped water is not available anywhere in the city through Guma supply networks. Water is available to Guma customers only on some days of the week and some hours per day. The *best* averages in some of the better-served areas in the north west are around 11 hour per day in the dry season and 17 hours per day in the rainy season.[76]

The city's topography allows the transmission system design to be based largely on gravity supply, leading to minimal pumping requirements and keeping the basic energy costs for the water network down compared to other urban utilities in Africa. This has contributed to GVWC's survival as a financially autonomous institution that is not subject to civil service salary limitations and can thus 'retain a strong management team'.[77] However, this autonomy has also contributed to the lack of attention and capital investment afforded to urban water supply in Freetown by central government (see below section on political economy), and due to the existing build-up of problems revenue remains at a level that would be inadequate to extend or even sustain the existing systems without continual donor intervention.

Non-GVWC supply

Much of the water that is not directly supplied by GVWC connections to customers is indirectly abstracted from GVWC supplies through drinking water bottling/bagging and water tanker filling points. There is also a reliance on rainwater harvesting during the rainy season, particularly in poorer parts of the city, on groundwater from shallow wells and on some smaller streams. Reliance on groundwater

[76] GVWC/MCC KAP baseline survey July 2018
[77] World Bank, Delivering Water, Sanitation, and Hygiene in Fragile and Conflicted Affected States: Learning Review of WSP's Technical Assistance Program, March 2014

and unprotected surface water has adverse impacts on health, as there are no sanitary disposal solutions and invariably any urban development in water catchment areas leads to pollution of surface and groundwater downstream.

Institutional problems at GVWC

A performance improvement plan (PIP) authored by GVWC in 2014 with DFID TA support identified a recurring list of institutional challenges faced by GVWC, many of which have been plaguing the institution since before the civil war and have led to the repeated failure of infrastructure rehabilitation works to achieve sustained improvements in water supply.[78] This analysis was completed at a time of notably high performance for GVWC following several successful PIP initiatives supported by DFID. The latest analyses from 2018 show subsequent declines in many performance areas, underlining the problems with sustaining improvements. Problems included:

- Inadequate staff capacity to sustain and improve upon performance gains made during PIPs, especially in engineering, accounting and management.

- Inadequately resourced project teams and highly bureaucratic human resource, stores and financial management systems which slow down all activities.

- No long-term corporate, investment and business planning; inadequate budgeting.

- Insufficient/obsolete operational, management and corporate policy manuals and guidelines

- A cluttered and ineffective customer database that includes arrears of over 50 billion Leones, most of which is not collectible. An updated figure from GVWC in October 2018 is 133 billion Leones – the equivalent of USD 14.4m, or about 4x annual revenue.

- Insufficient Management Information Systems (MIS).

- Aging water transmission and distribution infrastructure with additional engineering and network design issues accumulated over time. Some of the pipes and fittings are exposed and prone to damage and vandalism. The distribution network is characterized by rampart bursts and leakages, high and low pressure zones, dry zones and intermittent water supply.

- Insufficient developed water sources to meet demand.

- Insufficient capital to invest in the transmission and distribution network, and in source improvement for increased water supply.

- GVWC supplies public standpipes which are not adequately designed or managed to promote equitable water supply to the urban poor. The standpipes are not metered, and are paid for by Government of Sierra Leone at a flat rate. Many poor households are excessively distant from a standpipe and some end up illegally cutting into water mains to obtain water.

- There is limited metering and hence low volumetric water usage billing. This harms water conservation and precludes active water leakage management techniques.

- The water tariff is very low and cannot adequately cover operation and maintenance costs.

- There is developing encroachment on and deforestation of key water catchment areas.

According to a former DFID infrastructure adviser in Sierra Leone,[79] summarising: the fundamental problem GVWC faces is a vicious circle. They cannot deliver the services they are responsible for efficiently but have no money to invest in improving this. They cannot generate more money without first improving services. Donors have focused on improving revenue collection through metering initiatives and targeted TA addressing customer databases and billing system shortcomings, but significant capital investment has been in short supply. The current DFID infrastructure rehabilitation

[78] WIN-WIN 365 Programme description document, April 2014. List has been paraphrased directly from the report.
[79] Interview December 2018

project (2016-2019/20, £43m) is a significant contribution to resolving some of the longstanding network issues. However, even this is "essentially emergency rehabilitation", according to interviewees:[80] trying to get the water to stay in the network, rather than expand the system significantly. If successful it improves the strength of GVWC's position but there remains a risk that they do not significantly raise their revenues in the next few years and so the infrastructure will again slip into a degraded state and require yet another emergency donor project.

Metering is severely lacking, both at customer level and in the distribution and transmission systems, leading to customer overuse of water, a lack of operational knowledge about how much water is supplied to different parts of the network and no ability to proactively detect leaks through metering data. Meters are frequently installed, through donor projects or otherwise, but rapidly cease to function through a combination of theft, vandalism and lack of maintenance. Investigations into commercial performance in 2018 as part of the ongoing institutional reform work by MCC revealed that of GVWC's 22,000 registered connections, only 6,796 are metered[81], of which only 2.4% are read and typically only around 150 of the readings from these are actually used to generate bills (other metered customers were billed flat rates due mainly to either complete failure of the meter or suspiciously low readings). These proportions are illustrated in Figure 8 below.

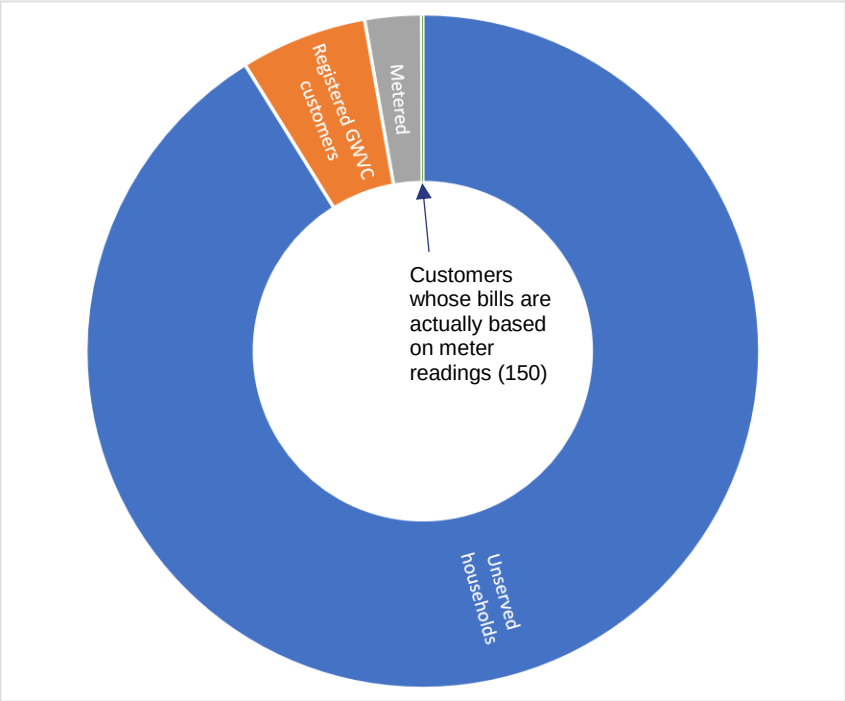


Figure 8: Metered connections in Freetown - to scale

When bills are issued, an average of 25% are returned or not delivered, mainly due to customers reporting there is no water in their supply pipes. Of the 75% of bills that are successfully delivered, over 40% of their total value goes unpaid. The collection ratio figure (value of bills paid / value of bills issued), has fluctuated around 65% over the past three years but was at just 56% over the first 6 months of 2018. By comparison, a notably well-run African utility in a more permissive context will have a collection ratio over 90%,[82] while peer utilities in similar contexts of fragility can manage around 75%.[83]

Use of public standpipes is not charged. Some are billed to the government, however this account is typically in arrears along with most other government water bills. Private water tankers / bowsers are supposed to be charged at filling points, but in practice this is not consistent or revenues are not always received by GVWC.

[80] Interviews with two infrastructure technical specialists who had design input into the programme.
[81] September 2018 GVWC data
[82] van den Berg & Danilenko / World Bank, 2017: Performance of Water Utilities in Africa
[83] World Bank, 2017, Water Supply: the transition from emergency to Development Support. p17.

Overall, taking into account non-revenue water (NRW) and billing and payment issues, we estimate that 75% of water produced by GVWC is not paid for.[84]

Future water sources and encroachment

Freetown faces a fundamental shortage of developed sources to supply water to its piped system, on which the majority of water supply in the city depends. Failure to increase this supply will inevitably lead to further exploitation of unsafe sources and accompanying health and development issues.

Table 11.1 - Baseline deployable output

	'Normal' dry year*	Drought year*
Deployable output (Mld)	86.5	80.0

** 'normal' dry year conditions are based on 2006, drought year on 1987*

The figures above are taken from Atkins / Oxfam (2007/8). They show the modelled maximum available water to GVWC from current sources. These sources have not changed since the modelling was done. 95% of piped water is from the Guma Dam system.

Table 11.2 - Baseline Supply-Demand Deficit (Standard Mid-Range Demand Forecast)

Date	Baseline Supply-Demand Shortfall (Mld)	
	Drought Years	Normal Dry Years
2008	48.3	41.8
2035 (year 25)	116.21	109.71
2038 (year 30)	135.00	128.50
2043 (year 35)	153.79	147.29

The 'normal dry year' deficit currently represents 35% of demand and is projected to increase to 68% by 2043. It will be important to address this shortfall to enable a sustainable water supply for the city.

The figures above show the scale of the supply/demand deficit. They were based on an assumption that an effective leakage reduction programme would be implemented, which has not happened in the 11 years since the report was published. The volumes of water that could be saved through leakage reduction are a significant proportion of total available water (the Atkins team modelled this at between 10 and 25 Mld), but do not eliminate the need for additional sources to be developed.

Atkins assessed various schemes for providing additional water supply to meet this growing demand, concluding that no other options are available that approach the scale of additional water required other than developing the Orugu catchment, which is in the high altitude areas above Wellington in the east of Freetown.

Unfortunately, the Atkins study also included a sharp warning about developing urban encroachment on this catchment:

> "However, recent development has begun to penetrate the Orugu catchment via the Babadori saddle. A recent satellite image showing development encroachment and the limits of the Orugu catchment is shown in Figure 3.3. This is a potentially extremely serious development. The Orugu catchment and Orugu Dam site represent the largest, most reliable potential water resource for the future of Freetown. **It will be almost impossible to cost effectively ensure the future reliable supply of water to Freetown if large scale development occurs within the Orugu catchment**. If this degradation continues, then outputs from resource schemes will reduce (due to more rapid recession), dams and impoundments will silt up much more quickly and nutrient loads from pollution will cause algal blooms and other water quality issues."

[84] This is a basic estimate from multiplying the various percentages when water and revenue leak out of the system. Data is insufficient for an accurate estimate. DFID's estimate was even higher (85%) in the 2007 ToR for the project that Atkins and Oxfam implemented.

Since the study was published, there have been no significant efforts to either develop the Orugu catchment as a new GVWC water source or to protect it from further encroachment.

Political economy

The political economy of Sierra Leone in the post-war period is characterised by a highly complex interplay of competing interests any dynamics which have not changed greatly from those which led to the civil war. Apparently confusing actions by government institutions such as the blocking or lack of cooperation on essential sector reforms are understandable in terms of a broader expression of competing interests by some senior politicians who have their personal political agendas and allegiances in mind. A useful analysis of these dynamics is given in a recent paper by IGC / M'cleod & Ganson (2018) analysing the roots of fragility in Sierra Leone. Without going into these dynamics in too much detail, this section outlines some of the consequences for WASH sector governance.

Low water tariffs are major long-term problem for the GVWC. According to 2012 political economy research commissioned by DFID on tariff setting in the water sector,[85] the tariff agenda is influenced by high level political dynamics pitting populist narratives on free water for all against a privatisation agenda which emphasises cost recovery. After considerable analysis of the issues around this topic, the 2012 research concludes that the lack of capacity in sector institutions is the primary obstacle to building up political momentum and public support for tariff reforms and longer term sustainability of GVWC's operations.

It was suggested in some interviews that corruption is one issue that damages donor trust and prevents significant capital investment in the water sector. The form of corruption is important to distinguish, however. We have not found any public domain evidence of direct financial benefit accruing to officials from their positions within the water sector, although many interviewees have been happy to confirm that procurement and quality issues attributable to corruption affect many infrastructure projects in Sierra Leone more broadly. The prevalence of corruption more broadly in Sierra Leone's public sector is also well documented and the subject of several new Commissions of Enquiry by the recently elected government.

Corruption and rent seeking are prevalent at the ground level. Processes highlighted by ODI include:

- Utility staff taking personal payments for connecting people to water supply without indicating this corporately (which means this connection is not billed), or re-connecting connections that have been removed during crackdowns.
- Damage and theft of water meters, which ensures bills are based on a lower flat rate
- Intermediaries controlling public standpipes and charging for supply
- Use of filling points free of charge by private water suppliers who should be paying

There are other examples from the waste sector, where for example tipping fees drive local corrupt payments or result in significant illegal dumping after working hours.

There is an ongoing effective immunity provided to public sector institutions against paying their bills for water use to GVWC, resulting in significant arrears (19.2bn SLL in October 2018 – around USD 2.1m or 2/3 of GVWC's annual revenue). The apparent lack of motivation[86] by the Ministry of Finance and Economic Development (MoFED) to require departments to budget for these costs and pay the bills is a good indicator of the low priority urban water supply is given compared to other sectors.

Institutional relations between ministries and departments in Sierra Leone are often dysfunctional, broadly as well as in the water and sanitation sectors.[87] A recent change in government has exacerbated some of these issues, with officials appointed by the previous government facing problems collaborating with institutions headed by new political appointees.

Powerful vested interests are a deterrent to serious reform wherever there are economic incentives involved. This can literally be a life-threatening issue. According to a donor interviewee who was in Freetown between 2005 and 2008, during this period the Water Distribution Manager at GVWC (a senior position) was beaten and killed by soldiers while trying to stop them

[85] ODI, The political economy of the urban water-pricing regime in Freetown, Sierra Leone, 2012.
[86] ODI 2012, ibid
[87] See e.g. IGC 2018

illegally drawing water out of the GVWC network using a tanker truck. While this was over ten years ago, a culture of official impunity remains over smaller issues such as non-compliance with rules or non-payment of bills. NGOs in the sanitation sector have also been informed of illegal use of government sludge tanker trucks by sanitation teams working within the police and military to run jobs on the side to supplement their income, undercutting the services of private suppliers who must buy and maintain their own equipment.

Elections have remained highly charged in Sierra Leone, accompanied by sometimes violent protests. The political system and politics are divisive and tribal. The elections themselves are deeply disruptive to development programmes working with public institutions. According to one interviewee: "Donors will not offer anything new in the year prior to elections, and when the elections happen the government stops functioning for six months before and six months afterward". This expanded uncertainty limits the scope of infrastructure programmes, which need to fit within the limitations imposed by the electoral cycle.

Structural inequality: the Bulk Transfer System

Freetown's water supply system is over-subscribed and constructed around one linear supply main that circles the city from west to east. Consequently, water is comparatively plentiful in the low lying parts of the west of the city (generally wealthier) but supply is far less reliable in the newer parts of the city to the east (generally poorer). An attempt to adjust the system to even out this inequity was made by the World Bank in 1993-2003, during which a high pressure 'bulk transfer' main was installed to bypass the distribution networks in the west and shift water to reservoirs in the east.

The World Bank described the BTS as complete in 2003, and DFID and GVWC subsequently described this system as 'achieved' and operational in the ToR to be implemented by the Atkins consortium in 2007/8, although the ToR did note that "Transportation networks are also functioning as a distribution network for areas adjacent to their routes."

Atkins subsequently investigated and put this much more strongly: "Unfortunately improvements constructed under the relatively recent World Bank Rehabilitation Project **have not been fully implemented and are therefore not effective** - the proposed Bulk Transfer System (BTS) conveying water from west to east through the city is cross connected into the zonal distribution systems, which prevent pressures in the BTS from building up to the level where water will fill the service reservoirs."

Effectively, the BTS was constructed but never used for its intended purpose. Rather, it was essentially used as an expensive means of supplying additional water to the low pressure local distribution networks in the west. Commissioning the BTS for its intended purpose is now a difficult engineering problem that has not been addressed by any donor support since 2003 and will not be addressed by the current DFID rehabilitation programme.[88]

In the words of an interviewee with extensive engineering experience of Freetown's water systems: "Nobody knows what will happen if you push up pressure [in the BTS] to the levels originally intended. It is clear that things will go wrong, but it is difficult to cost the advice before it is needed, so this problem has been left up to Guma to sort out". The fact that – directly acknowledged by Atkins (2007/8) – operationalising the system will result in more rationing of water in the west of the city may be related to the lack of political will to push through this intervention.

As well as representing a fundamental constraint to equity in water supply, the current condition of the BTS contributes to leaks in the low pressure networks because of poor maintenance of valves intended to step down pressure, leading to over-pressure in parts of the low pressure network under certain conditions.[89]

[88] Correct at time of drafting; this position may since have changed. See DFID's Devtracker website.
[89] DFID/GVWC (2007)

6.2.3 Wastewater and sanitation

There is essentially no public sanitation infrastructure in Freetown other than a short sewer system under the central business district, which discharges untreated into the sea (estimated 4% of Freetown's faecal waste).[90] There is limited collection and there are no treatment options.

NGOs have been very active in the sector, building and managing public toilets and working with communities and private service suppliers to improve sanitation practices. The Irish NGO GOAL has taken the initiative on improving systems, including public organisation and management, and is working with the Freetown City Council to secure additional funding from DFID for this work. Much of what is known about sanitation in Freetown is derived from research commissioned or conducted by GOAL, Oxfam and other NGOs.

Wealthier citizens have lined pits and septic tanks, which they pay private companies to empty. The resulting waste is either discharged into the environment by dumping in watercourses or burying (the population density and hydrology of Freetown does not present many safe opportunities for burying faecal waste in situ), or transported to an approximately defined area of the city's main dumpsite (Kingtom), where it is discharged onto the surface of accumulated solid waste.

Figure 9: Current faecal sludge disposal 'arrangements' in Freetown. Note informal picking community structures on dumpsite. Image credit: GOAL

Poorer citizens are more likely to be using shared toilets and unlined pit latrines, or toilets that discharge directly into watercourses. There is also significant open defecation, amounting to perhaps 7% of faecal waste, according to 2011 estimates.[91]

According to the WB WSP's 2014 FCAS WASH learning review:[92] "The proportion of households with access to sanitation in urban areas of Sierra Leone stood at 22 percent in 2011 **and is slipping backwards**. The urban component of the Millennium Development Target for sanitation will be missed by a large margin. In 2012, Sierra Leone experienced its worst cholera outbreak on record, reporting 22,614 cases. Freetown was the most affected location with more than 50 percent of total reported cases."

[90] Mikhael, G. / GOAL (2011). Sanitation market assessment, Freetown, Sierra Leone.
[91] Mikhael / GOAL (2011), ibid.
[92] World Bank (2014). Delivering Water, Sanitation and Hygiene in Fragile and Conflict Affected States: Learning Review of WSP's Technical Assistance Program (P131964).

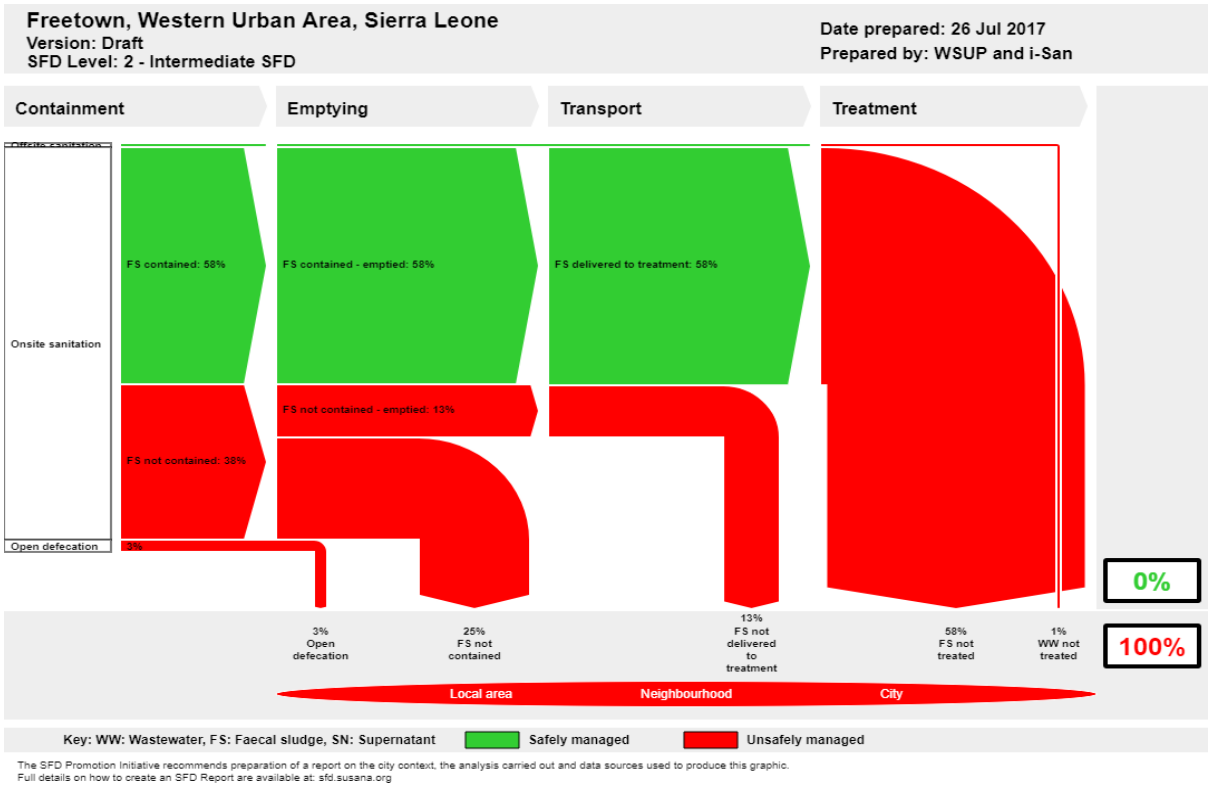


Figure 10: Freetown 'shit flow diagram' (WSUP / i-San, 2017). Note that all outcomes are 'unsafely managed'. Some sector stakeholders consider even these figures to be highly optimistic.

Figure 11: Typical heavily polluted watercourse, Kroo Town, Freetown. Credit: ICED.

An 'emergency' solution to the glaring absence of treatment and disposal has very recently been constructed by AfDB within the Kingtom dumpsite, consisting of a collection pond and drying beds, along with an access road constructed by GOAL. However, this is not in operation and its operating parameters and functions have not been made clear.

Institutional responsibility for sanitation and hygiene in Freetown has been passed around between ministries and departments and the government has not been keen to take responsibility. Within Freetown, this responsibility has ended up with FCC and they are engaging the NGOs previously involved to try to tackle the issue with DFID support. The ambition is low, however, as there is as yet no plan to treat any collected waste. The best that can be hoped for is a reduction in the amount of liquid waste that is dispersed widely into the environment, instead concentrating the pollution in low lying dumpsites, from which it will leach into waterways and pollute coastal waters, usually flowing there through the slums which occupy most of the low value low-lying land in Freetown (see Figure 11).

6.2.4 The effects of conflict

Due to the passage of time, there is not a lot of information regarding the acute effects of the 1992-2002 civil war on WASH in Freetown. Interviewees agreed that the war caused very little physical damage to the water infrastructure from the direct effects of fighting. The main acute effects were:

- Loss of equipment and vehicles[93]
- Loss of revenue and an inability to handle O&M due to a significant drop in collections from consumers who could not afford to pay
- A surge of population during and immediately after the conflict[94]
- The loss of engineers and other specialists, who fled the conflict and had little incentive to return[95]

Subsequent to the end of the war, the city faced immediate issues with immigration from the countryside to new and rapidly expanding informal communities throughout the city. The growth of demand for water services quickly outstripped both the basic capacity of the resource (amount of water available in the system) and the ability of GVWC to handle operations of the network, causing lasting damage to the infrastructure (illegal connections, piercing of pipes to fill containers, contamination of pipes with liquid waste) and to GVWC's ability to raise revenue and act on the challenges.

Deliberate policies implemented by the government after the war led to long-lasting health and environmental risks in poor areas of the city by paying for the construction of shallow dug wells with concrete rings. Atkins (2007/8) wrote:

> "Their construction was encouraged immediately after the war both as an employment measure and to address an acute water shortage. It is regrettable that these wells tap grossly polluted groundwater in shallow unprotected formations which receives the soak away of approximately 100,000 unlined pit latrines."

The continuing instability and weak governance that have characterised the post-war period were identified by interviewees as a key factor in the lack of government support for improved WASH in Freetown and for continuing unhelpful political narratives such as the promotion of the idea that water should be free and an accompanying resistance to privatisation (see political economy section above).

6.3 *Donor efforts*

Relatively few donors have supported **water supply** improvements in Freetown, with DFID and the World Bank (occasionally with DFID funding) by far the most involved in the post-war period, although there has also been some input from the EU, JICA and other donors to the water sector. Much more work has been done on water systems (rural and urban) outside Freetown. **Liquid waste management** in Freetown is (as noted in the sections above) essentially devoid of public infrastructure or services. Poor communities with access to improved sanitation are often reliant on services supported by NGOs funded by a variety of donors (DFID prominent among them).

Due to the lack of infrastructure for liquid waste and limited planning from either donors or government to change this, this section mainly focuses on donor support to water supply systems.

[93] DFID, 2006
[94] World Bank programme documents, 1993-2003.
[95] DFID infrastructure adviser, ICED interview.

MCC

The MCC has only recently become involved in the Freetown water sector through its 'Threshold Program'.[96] This has involved updating laws around water management, providing TA to strengthen GVWC (taking up the work most recently pursued by DFID), and mapping and condition assessment of the water supply network. There is only limited funding for hard infrastructure from the MCC at present, relating to the implementation of District Metering Area (DMA) pilots with GVWC. The technical assistance component includes initiatives aimed at improving revenues and reducing maintenance costs, such as a non-revenue water reduction initiative, a push to replace inefficient and leaky distribution lines and an improved customer service initiative. Significant seed capital is required for these before they will begin to be self-financing through improved commercial performance. As there are no funds available for this from donors, it is currently the subject of an interim tariff application to the regulator, EWRC.

The MCC programme is intended to conclude before the implementation of the African Development Bank's (AfDB) upcoming masterplanning process for Freetown's WASH sector (see below on AfDB). The masterplan will cover a broader scope than just GVWC's remit and is expected to include 16 other SL government organisations apart from GVWC.

DFID

DFID currently has £72.7m of WASH programming ongoing in Freetown, split between delivery of local level sanitation and hygiene interventions by NGOs and a major infrastructure rehabilitation programme implemented by a consortium of international engineering and infrastructure consultancies.

There are also plans to use existing programming to fund the establishment of solid and liquid waste management systems administered by FCC (with initial works conducted by NGOs using an accountable grant arrangement via FCC).[97]

Current projects:

- Freetown Water Supply Rehabilitation (2016-19) – ongoing hard infrastructure project £38m.

- Water, Environmental Sanitation and Hygiene (WESH) Programme (2016-21) – £29.8m ongoing modular WASH and environment programme. In Freetown it is focused on WASH Alliance NGOs, which work at community level, however it has also flexibly funded work on waste management, noted above.

Past projects:

- Supporting the Government of Sierra Leone to implement its National Water Supply and Sanitation Strategy (2009-16) - £14.8m. This was focused primarily outside Freetown. It was only in the later stages of the project that DFID moved towards engagement with GVWC.

- Water supply, sanitation and hygiene in Freetown, Sierra Leone (2016-17) - £12.6m programme implemented by Oxfam in 51 city and peri-urban areas: schools, community health centres, peripheral health units.

- Water and Sanitation in Freetown (2007-10) - £4.9m programme. Little documentation was available on this programme, but it is likely to represent the funding for two pieces of work: 1) the development of the 'Atkins Study' noted below and 2) some technical assistance work within GVWC through the World Bank (with two consulting companies implementing). Notable delays to the beginning of the World Bank element of this work caused a lack of coordination between the Atkins/Oxfam team and the World Bank's implementers, which were both working on Freetown's water systems.

[96] An MCC Threshold Program is a type of preparatory technical assistance grant managed by an in-country unit of MCC to improve governance to a level at which MCC would consider larger 'compact' grant funding for economic growth projects through national government mechanisms.
[97] The ICED Facility is concurrently involved in analysis work for FCC on waste management, funded by DFID SL.

- Freetown WASH Consortium – a consortium of NGOs funded by DFID through various programme budgets beginning in 2010 and ending in early 2019. Primarily focused on community level WASH interventions in poor areas of the city, however increasingly involved in wider management issues as time passed.

- DFID has funded much of the technical planning work done since the end of the civil war, with the major landmark document being the 'Atkins Study'[98] conducted in 2007/8. Eleven years later, this is still the primary reference document for what is known about the water system, though there is additional system mapping work being conducted as well as more detailed knowledge developed through the design of the current DFID rehabilitation programme.

The current DFID rehabilitation project has faced some delays relating to contractual and implementation arrangements, which has led to several changes in project governance structures.[99] These are now in a position to oversee implementation after an extended design process. Implementation of works has recently commenced.

World Bank

The World Bank has been a strong presence in donor support to water supply in Freetown, often in collaboration with and part-funded by DFID. The WB was the funding agency responsible for the last major system upgrade during the war period, running from 1995-2003. Since the end of the war, the Bank's Water and Sanitation Program (WSP) has mostly provided short technical support rather than long-term support from an established country office. Projects have included:

- Surveys to produce a national map of 28,000 urban and rural points, reporting location, functionality, technology, and management. This remains the most referenced and up to date survey data on water supply across the country

- 'Fixing Freetown' case study, preparatory to an upcoming project currently at concept stage: the Resilient Urban Sierra Leone Project. The Bank is in conversation with donors and urban authorities on the scope and sectors, including conversations on solid and liquid waste management.

- Replacement of GVWC's billing system (funded by DFID and GVWC)

- Developing with GVWC a complete survey of household, commercial and public customers (covering 19,500 connections).

- Power and Water Project, 2004-2011 – urban water supply and solid waste management components. The water supply elements of this project were funded by DFID as noted above (2007-10).

    - In water, small scale infrastructure improvements were made (increasing the number of functioning water meters, some pipe works), a computerised MIS was installed at GVWC and management assistance helped a modest improvement in NRW rates and billing/collection ratio. However, the World Bank's internal review concluded that the water components failed to achieve their targets and "sustaining even these partial improvements will be difficult". The reviewer also made reference to the design but lack of implementation of some critical management reforms.[100]
    - In solid waste management, the project created a new autonomous public company named the Freetown Solid Waste Management Company (FSWMC) and supplied it

[98] Strategic Water Supply and Sanitation Framework, March 2008. This included two parts, first the main report which was a problem analysis and solution framework and secondly a 'Water Supply Improvement Plan' covering the detail of necessary improvement projects and assessing the various options on relative merit and complementarity. The work was led by Atkins and the consortium also included Oxfam and 3BMD.
[99] See latest annual review, https://devtracker.dfid.gov.uk/projects/GB-1-205195
[100] World Bank, 2012, ICR Review: Power and Water Project. WB document number ICRR13772.

with startup equipment and resources, however the internal review in 2012 notes that the company was taken back under direct government management very soon after it was created (and renamed to FWMC) and showed indications of failure. When ICED conducted work on solid waste management in Freetown in 2019, there was no indication that FWMC continued to function.

African Development Bank

The AfDB is financing the development of a WASH sector masterplan for Greater Freetown (urban and rural), in collaboration with the Netherlands Ministry of Foreign Affairs. This is currently (August 2019) undergoing procurement and is behind schedule. There may well be a gap in technical assistance to GVWC after the end of the current MCC programme (scheduled for February 2020, but seeking extension to January 2021).

AfDB also beginning recruitment and procurement for a major new project called the Freetown WASH and Aquatic Environment Revamping Project (WASHAERP), which will invest around USD 96m over 5.5 years, working with GVWC and FCC on access to safe water supply and improved sanitation, using Integrated Urban Water Management (IUWM) approach. Notably, this is intended to **increase the capacity of raw water sources by 53,000 cubic metres per day** (53Ml). The means of accomplishing this is not apparent from the project design documents we were able to review, but based on the 2007/8 Atkins assessments, this figure might just be reachable with smaller schemes below the size of dams on the Orugu catchment. The plans also envisage the development of **faecal waste treatment facilities** at the Kingtom and Granville Brook dumpsites, as well as liquid waste transfer facilities elsewhere.

6.3.1 Gaps and problems with development efforts

The construction of the bulk transfer system but failure to operationalise it is a clear example of the lack of long-term commitment and cross-donor programme coherence. The system was never properly used and has caused leakage problems due to high pressure in parts of the system being used in ways they were not designed for.

Lack of action on new water sources. It has been clear for decades that the Guma Dam would be an inadequate source to supply the city's growing population. This problem became acute in the immediate aftermath of the civil war and has led to water rationing and substantial inequities in water supply. However, assistance from donors has been series of short-term emergency and urgent works, with few attempts to tackle the key overriding problem of lack of sufficient supply.

Donor plans have frequently not had practical effect due to long delays before action. For example, the Atkins plan was part of serious efforts to fix the wider water resource challenge, but it has taken more than 10 years for donor programmes to be prepared to respond to these challenges. Projects in the intervening years had limited scope.

Freetown's water supply infrastructure has been subjected to too many 'emergency' rehabilitation projects and too few larger, longer and more strategic capital investment projects. Every report on Freetown water mentions at some point the poor sustainability of previous interventions. The frequent donor-supported drives to install meters on connections result in high reported numbers at the conclusion of the project, only for the number of functioning meters to have fallen precipitously by the time the next donor project starts.

On completion of their early water supply project in 2003 – the project which spanned the civil war – the World Bank's internal evaluation group noted:

> "Despite some improvement in the financial performance of GVWC, … **sustainability of project benefits is unlikely because the infrastructure is not maintained adequately** and some facilities are already falling into disuse".

The WB project team attributed poor sustainability mainly to the effects of the civil war. However, at the end of its following project[101] with GVWC (also involving 'emergency' infrastructure works and capacity building support) in 2011, the Bank found exactly the same problem in the absence of a civil war:

> "**Sustaining even these partial improvements will be difficult** … [GVWC] needs to enhance its operational and financial performance by increasing its customer base and collection rate, recovering operational and maintenance costs, and reducing commercial and technical losses. Several factors, within and beyond the scope of the utility, need to be resolved, such as delays in the connection of new customers, large numbers of unmetered connections and meters have been stolen, the slow pace in billing and collection, the debt rate, and the insufficient tariffs."

It is clear that more sustained, higher value capital investment is required to enable GVWC to break out of the vicious circle of being unable to invest to improve and expand services because it is unable to collect sufficient revenue from services delivered at current levels.[102] Emergency rehabilitation works will lead to temporary improvements but unless GVWC is able to take advantage of these to raise additional revenue sufficient to maintain the rehabilitated infrastructure, it will not be able to build up momentum to improve by itself.

Donor reluctance to commit to significant expansion and improvement beyond repeated emergency rehabilitation is not obviously explained in public documents and interviewees did not venture extensive reasons. The suspicion is that corruption, poor engagement from central government and a history of difficult projects have discouraged donors from committing themselves fully.

6.3.2 Donor impact summary

Without donor funding, the WASH situation in Freetown would be far worse than it is today. However, the majority of donor support has been provided in the form of humanitarian assistance through NGOs. Donors missed opportunities to tackle longstanding problems and prevent deterioration in WASH practice in Freetown in the decade following the civil war. Repeated short-lived attempts both to upgrade infrastructure and improve governance have been insufficient. This has allowed problems such as maintenance issues, public behaviour and corrupt incentives to entrench themselves over time, making the sector even less conducive to short term solutions. There have been no serious attempts to tackle the challenges of liquid waste. Solid waste management is reactive, unsustainable, hugely damaging to the environment and yet still only minimally effective in keeping waste out of the environment.

The latest cycle of development attention to WASH in Freetown has so far shared the characteristics of past interventions. In water, the DFID infrastructure rehabilitation project is focused on only 'rehabilitation of the key elements' of water supply infrastructure, not on upgrading the system.[103] The MCC project supporting GVWC has short timelines and might be exceeding the speed at which the institution can change. Meanwhile, there has been very little progress on regulatory enforcement and integrated urban planning and the space for future development of new water sources is diminishing.

In solid and liquid waste, DFID and other development partners are starting a process of engagement with the city authorities to put in place a new public-private system, but there remain large open questions about the long-term plan for waste treatment and disposal.

Upcoming programmes – particularly by the African Development Bank and World Bank – are intending to change this situation. These should be long-term commitments in order to succeed, strongly supported by donor partners such as DFID. Commitments to coordinate with other projects need to be implemented and, if necessary, project plans should be shifted to ensure continued alignment and complementarity. Past failures in making governance reforms 'stick' are attributable to poor coordination

[101] The Power and Water Project, 2004-2011, the Freetown water supply components of which were mainly funded by DFID and were allocated less funding than in the previous project.
[102] This is recognised in a number of different donor reports, including by the World Bank in March 2011 (Pushak & Foster): "In order to meet the demand in Freetown, GVWC will need more vigorous actions in terms of water network rehabilitation including **extension of its water facilities production/distribution** and much more improvement in the utility management."
[103] AfDB, 2019, Project Summary page for 'Sierra Leone - Freetown Wash and Aquatic Environment Revamping Project'. Link.

between teams, gaps in time between one initiative and the next, and the lack of a single coordinated donor strategy over time.

6.4 *Lessons*

Plan for sharp population growth in major cities during and after conflict. The World Bank projects spanning the civil war based their water infrastructure designs on substantially underestimated population projections, even though the developing trends were evident to the project designers.[104] Many of Freetown's problems with water supply and sanitation stem from uncontrolled urbanisation that started immediately in the aftermath of the war. While the situation was not conducive to any easy solutions and the roots of problems pre-dated the conflict, donor and government inaction following the war led to a rapid deterioration in WASH services with a disproportionate effect on the poorest. These effects are still being felt today.

Works programmes that create employment after conflict should be carefully supervised by technical experts to guard against harm. The rapid expansion of water points in low lying areas of Freetown after the war was actively supported by government funding. The lack of safe sanitation facilities or disposal routes led to an escalating health risk from these well-intentioned post-war projects.

Weak governance and poor ability to enforce environmental regulations or control urban expansion can lead to irreversible harm. In the case of Freetown, government and donors could and should have guarded against encroachment on the Orugu catchment which is destroying the future inclusive development prospects of Freetown by choking off the most efficient future water source. Schemes apparently favoured by government to bring in water from much further outside Freetown will be more expensive to build and operate and therefore subject to longer delays and higher risks. The complexities of urban planning have been exacerbated by political tensions and poorly integrated governance in Sierra Leone, which characterises many post-conflict states. This lack of integrated planning and alignment of institutional interests and priorities across many separate agencies has been responsible for poor development outcomes in WASH and urban encroachment (leading to cholera epidemics, landslides and pollution of critical water catchments).

Invest early in diagnostic and planning studies, but do not delay following up to implement. DFID took an early lead in this area in Freetown, picking up from the World Bank after the civil war. While it was several years after the end of the war by the time the first major study was conducted and this could have been achieved earlier, the information from this study greatly improved the understanding of both donors and SL authorities and it has been a comparatively small investment with long-term impact. Studies assisted by the World Bank have also been influential, both in assisting NGOs to plan more effective WASH activities and for GVWC to make significant improvements to its commercial standing. However, it has also been clear that diagnostic and planning studies need sustained long-term effort to implement. As with any development context, there is justified local scepticism about technical assistance teams who deliver plans and then do not stick around to implement them. A donor team arriving at GVWC today would find the ghosts of old plans on shelves and in drawers – still mostly valid, but sitting unimplemented for lack of motivation and funding.

Repeated cycles of 'emergency' rehabilitation works and unsuccessful institutional capacity development must be broken in order to make progress. No interviewees or reports suggested solutions to this cyclic problem with the donor response. It was apparent from interviews that donors are wary of investing a large amount of capital in a weakly governed state with apparent corruption issues, and will hold back from support if the recipient agencies are not showing indications of serious motivation to reform. The World Bank (see Box 1 in section 2.2 of this report) advocates an approach that tackles high level policy, regulatory and jurisdictional problems in order to create momentum for reform of service provision.

[104] Staff Appraisal Report, Freetown Infrastructure Rehabilitation Project, May 1993: "the population of Freetown … is growing at a rate in excess of the national [urban population growth] figure of 4.5 percent. This is partly due to the failure of the agricultural policy and inability to sustain development in the provinces. The situation has been made worse by the war in Liberia and incessant attacks by rebels on Sierra Leonean territory. In view of the high densities in central Freetown, most of the new immigrants have settled in selected sections of the west, notably Brookfields and Congo Market, and to a larger extent in the eastern areas of Kissy and Wellington."

ODI: political economy challenges should not discourage building public capacity

A 2012 ODI report commissioned by DFID, referenced above in this report, noted in its conclusions that the political economy presents severe challenges to water systems development in Freetown, but emphasised that "this should not be taken as a call for the universal adoption of purely community-based approaches to the delivery of water services."

"Indeed, a combination of actors from communities, utilities, relevant GoSL departments and, potentially, the private sector are likely to play various roles in the service delivery chain, particularly in urban contexts where infrastructure demands are more complex and initial capital expenditure is likely to be greater. Additionally, community-level action is unlikely to address some forms of systemic rule-breaking by major actors, such as the persistence of arrears from large public actors, which may require intervention from sympathetic high-level actors in GoSL if they can be identified and/or development partners working on complementary issues (e.g. public financial management and the development of realistic budgets)."

Ensure the right expertise is available in country and support a long-term strategic focus on problematic sectors. A lack of continuity of focus and expertise can allow chronic issues to inflict substantial damage on both infrastructure and positive public behaviour. DFID and the World Bank have been the major donor agencies funding and working on WASH issues in Freetown, but both have had inconsistent focus. The DFID infrastructure adviser from 2005-8 was not followed into post by a replacement, resulting in a loss of initiative during the period immediately following significant DFID water systems planning work in 2007. The World Bank WSP also acknowledges a similar lack of consistent focus. In their 2017 report on progress in supporting water systems in FCAS, they compared their work in Sierra Leone with Liberia, noting greater progress in Libera and attributing this to a lack of a WSP in-country team in Sierra Leone, noting "earlier engagement may have headed off the possibility of alternative providers becoming a barrier to future utility service provision."[105]

[105] WSP 2017. Water Supply: the transition from emergency to Development Support: Evidence from Country Case Studies in Africa. Pages 37 and 21.

7 Short case studies – Liberia, Syria, Yemen

In the process of researching the three main case studies in this report, the research team became aware of additional published and unpublished work on the same topic by other researchers which was complementary to the themes and contexts being explored in the above sections. We have included short case studies on three further cities – based more heavily on previous source material – to illustrate some of the kinds of context not studied above. Due to their shorter length, findings and lessons have been consolidated into single sections rather than organised according to case study topic areas.

7.1 *Yemen: Ibb – how urban WASH services can weather conflict*

Information in this case study is summarised from 'Trust and Necessity' an unpublished case study on Ibb's water supply for the World Bank by Meta Meta Research (June 2018), with some additional information and observations from prior ICED research for DFID Yemen.

Yemen has a long history and reputation as a water stressed country. It is currently subject to a complex and protracted conflict which escalated sharply in 2015 and which has led to widespread famine, disease and death. Displacement and poor access to water and sanitation systems have led to 'the worst cholera outbreak in the world' UNICEF/WHO with over 1.3m cases and 2,500 deaths.

The conflict has significantly disrupted urban and rural water supplies. Infrastructure has been actively damaged as a war tactic, increased fuel prices and disruption to supply chains for equipment and spare parts has left utilities unable to handle O&M, and the inability of consumers to pay for water has led to the decline of facilities and management.[106]

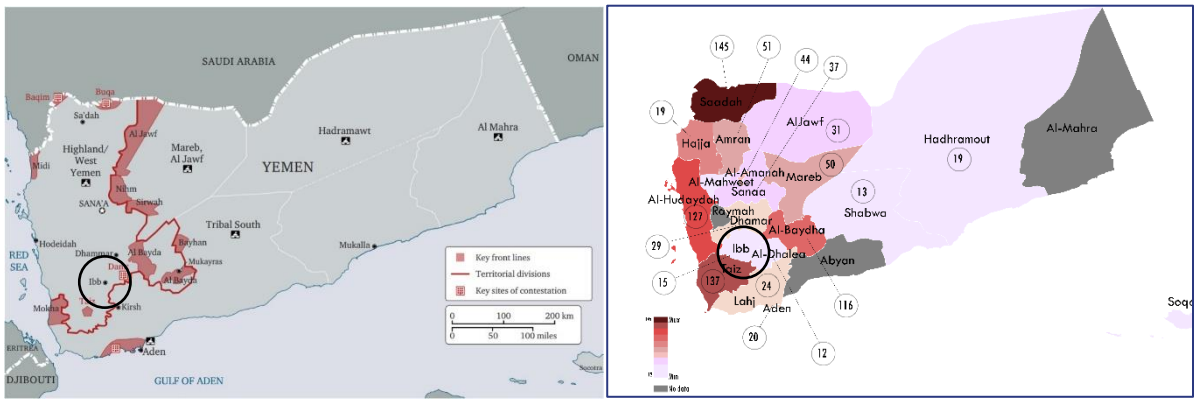


Figure 12: Maps of Yemen showing contested areas (Chatham House) and WASH infrastructure damage concentration (ICED)

Ibb city has a population of around 380,000, making it the 5th largest city in Yemen. It was captured by Houthi rebel forces without significant fighting in October 2014 and has been uncontested since then. The left map above[107] shows Ibb (circled) and the relative distance from major contested zones.[108] The border of control between the two largest conflicting groups is shown in red. The right map[109] shows the concentration of destruction of WASH facilities by the conflict as of November 2016. Both illustrate Ibb's relative good fortune in being less affected by direct fighting than some other major cities.

[106] ICED: 'Effects of war on water security in Yemen: Stocktaking study', June 2019
[107] Peter Salisbury/Chatham House: 'Yemen: National Chaos, Local Order', December 2017
[108] This was produced in December 2017 immediately prior to a major offensive which resulted in fighting not marked on this map, in areas along the west coast between Mocha and Hudeidah.
[109] ICED, based on Sana'a University data

Ibb's water supply and sanitation services are primarily[110] managed by the Ibb Water Supply and Sanitation Local Company (IWSLC), a type of parastatal organisation known as a 'local water corporation' overseen by a joint board of government officials and representatives from local residents, customers and businesses. IWSLC and its peer utilities in other Yemeni cities operate with considerable autonomy and are intended to be self-funding through tariff collection.

The onset of war has negatively affected the IWSLC. Although it was fortunate to have suffered very little physical damage to infrastructure as a direct result of fighting (unlike other cities in Yemen),[111] the war eroded customers' ability to pay, severed supply chains for spare parts, suspended national power supplies, caused severe increases and fluctuations in the price of diesel and drove a heavy influx of internally displaced persons to the city. The IWSLC has fared far better than many other local water corporations in Yemen during the war – with for example the utilities in Aden and Sana'a described by the World Bank as 'almost collapsed'.[112]

The IWSLC's performance on water supply management during the war period has been strong. The population connected to piped water supply has risen from 70% in 2014 to 80% today (24,775 to 29,961 connections) and water production capacity has increased by 12% since 2015. The collection ratio for customer bills has averaged 87% and is only less than 100% due to the customary low collection rate for government bills. All connections are metered and meters are functional. NRW has remained low at around 28%. Operating expenses have consistently been covered by revenues.

IWSLC's tariffs rose by between 55% and 80% depending on user category between 2014 and 2017, but remain considerably cheaper than alternatives (20% of the price of tankered water and 74% of the cost of private sector piped supply). The utility also continues to provide life-line services (the first $5m^3$) at a price that is kept at affordable levels for the poor (YER 220 in 2017; about 40% of the maximum domestic tariff).

Performance on sanitation has not been as strong. This has been attributed to the low capacity of the infrastructure prior to the war. The only wastewater treatment plant was operating beyond capacity and has been overwhelmed by increased demand from the rising population of IDPs. IWSLC – without the capital to invest in a major expansion of the infrastructure – could decide to refuse new connections, resulting in uncontrolled disposal of sewage in the environment, or allow them and overwhelm the treatment plant. It chose to make the new connections, which has caused a build-up of untreated waste in the environs of the treatment plant. The cholera epidemic which has swept through Yemen has resulted in 9000 cases in Ibb (which at approximately 2.4% is about half the morbidity rate of the rest of the country), although the causes in Ibb are unclear and may not be related to problems at the treatment plant.

Some of the reasons for the high level of performance in water supply are:

- **The infrastructure that existed prior to the war was sufficiently robust** and in a good enough condition to cope with increased service demands in the absence of investment for significant rehabilitation or upgrading.
- **IWSCL had put in place crisis plans** following the 2011 political upheaval which eventually led to the present conflict. They retained stock of essential spare parts and had fuel reserves ready to respond to economic shocks and supply problems.
- **Decentralisation implemented prior to the war left IWSLC in a strong position to self-manage** and meant it could survive on a commercial basis entirely independently from external funding or expertise. The extent to which this has worked out with other water companies in Yemeni cities varies, suggesting legal autonomy may be necessary but not sufficient to ensure independence and resilience.
- **Critically, decentralisation of powers preceding the war enabled IWSLC to set its own tariffs**, which enabled it to weather input price increases – particularly fuel.
- **IWSLC had strong management performance and organisational efficiency going into the conflict and managed to retain both its staff and the confidence of its customers.** Transparency and customer trust have been essential in order to implement sharp tariff

[110] Water is also provided by private tankers and there is a small private piped network

[111] Most reports of war damage (for example, the World Bank's 'Dire Straits' report) draw on a GIZ study from 2016 which is not available online. Reference: GIZ Sana'a/Eschborn 'Damage Assessment Study 2016. The Republic of Yemen Water Sector: A Managerial, Financial, Human Resource, Operational Structures Assessment of Twelve Water Corporations, and their Affiliated Utilities', 2016.

[112] Mohammed et al. / World Bank 'Water Supply in a War Zone', July 2018.

increases necessitated by fuel price rises. The collection ratio has remained high. It is believed that customers have broadly remained supportive because they realise they have a strong vested interest in the survival of the water utility, which will always be the cheapest source of clean water.

- **Morale has remained strong during the conflict**, as staff are proud of the utility's strong performance and are aware they have few alternative employment avenues during a period of substantial economic decline and upheaval in Yemen. As IWSLC is not part of the civil service, it is able to pay salaries on time and with discretion over performance and retention incentives. By contrast, 10 or more months of delay is not unusual for civil servants to receive their salaries in Yemen during the current situation.
- **IWSLC's board has been unusually successful in protecting the organisation from political interference that has plagued other utilities in Yemen.** The board composition of all local water corporations includes representation from the relevant ministries (Water, Finance, Planning), augmented by members representing the local private sector, community and customers. Ibb's board has been able to take decisions that are politically unpopular (e.g. allowing tariffs to be raised) and has given IWSLC management a free hand to do whatever is necessary to sustain supply and a positive cashflow.

IWSLC has received some external support which has contributed to its resilience, although this has not needed to be very large in cost, comprising an effective value of 5% of the utility's budget. GIZ, UNICEF and ICRC have assisted with fuel supplies in order to reduce exposure to large shifts in market prices and have provided some spares and equipment to help resolve system bottlenecks. There has been some accompanying training. The needs have been modest but important. Providing support to a viable and well operated utility has been far more efficient than the alternatives – i.e. allowing it to fail and then stepping in with humanitarian assistance, or treating the problems after the utility has entered a crisis situation. It has also enabled the expansion of services to cover IDP populations, which are a particular donor concern.

Broader lessons to learn from this are:

- **Customer dependence on water from utilities should not be undermined by provision of free water for humanitarian concerns**. A great deal of care is required when designing humanitarian support to ensure that utility customers who are able to pay will not be given free water if they already have access to a safe supply from the local utility. Buying water from the utility and then giving it away for free, instead of developing independent sources such as trucking in water from elsewhere or drilling boreholes, will continue to pump revenue into the utility in the short term. But in the longer term the provision of free water to those who could afford to pay will erode the utility's reliable customer base.
- **Donor planning should seek to understand the value of relationships of trust between utilities and customers** and the effects of donor intervention in these sectors where service delivery is substituted by unaccountable international organisations.
- **Stabilisation of *existing* utilities and service providers during conflict is at least as important as filling gaps in service delivery with humanitarian aid.** In some circumstances, humanitarian organisations can accomplish both at once, using utilities and existing distribution networks as tools for humanitarian effect.
- **Wars result in the substantial movement of people, generally from the countryside into cities**. Knowing this trend in advance, donors, utilities and governments should anticipate large capacity increases being required in the conflict and post-conflict stages at all urban utilities and take action to predict and mitigate the associated harms.
- **Building resilient infrastructure in chronically fragile states involves design considerations which take the risks associated with conflict into account.** In Ibb, the ability of the liquid waste treatment plant to receive considerably more than its design levels of waste and continue to function, albeit at degraded efficiency, was better than uncontrolled dispersal of waste into the environment across a much wider area. **Crisis planning** also resulted in a good stock of spare parts being kept ready and in the development of the ability to change energy source to generators during a protracted crisis affecting the national grid supply.

On a wider scale, there is an opportunity – indeed, an imperative – in Yemen to start work on rehabilitation and technical support packages and national water policies prior to the end of the war. GIZ has put together and intends to implement a comprehensive plan for technical support and

rehabilitation in Yemen's urban water sector, and intends to begin implementation in spite of the ongoing conflict.[113] It remains to be seen if donors including DFID can build up sufficient momentum to rapidly substitute emergency support with longer term development programming, and if wider sector governance issues can be tackled or even effectively analysed before a political solution is reached.

7.2 *Liberia – donor emergency actions undermined water institutions*

The World Bank Water Services Program (WSP) published a case study[114] in July 2015 examining the history of donor WASH interventions in Liberia following the end of the civil war in 2003, which we have reviewed and included quoted extracts from here.

The report reflects on the missteps made by donors in the immediate post-war period of 2003-2007 which made progress on WASH services (both urban and rural) much harder when emergency support started to wind down in 2006/7 and attention turned to the unsustainable state of the Liberian utilities. Emphasis has been added to the extracts below.

"The choice made early in the post-conflict transition by the international community to directly fund WASH service delivery through non-state actors rather than through the Liberian government **undermined both sector policy dialogue and the formation of robust government institutions** able to lead and orchestrate service delivery by non-state actors.

The lack of a substantive [higher level] policy dialogue – particularly in the 2003 to 2007 period – meant that a fragmented institutional setup emerged across a number of ministries with no clear locus of policy authority. An earlier move to funding WASH service delivery through country systems … would have been a point of leverage to influence institutional reforms and build a nucleus of capacity in the Government of Liberia institutions responsible for WASH on which future capacity building could have capitalized. […]

The focus in the early years was on meeting the short-term needs of people following the war. However, these initiatives did not provide a working service delivery model that could be sustainably scaled up ... **Projects focused on quick impact and did not seek to establish longer-term goals of cost recovery**. Similarly, sanitation interventions focused on building simple pit latrines but did not promote hygiene. As a result, up to a quarter of water points failed within the first year, with barely half still fully functional after five years due to poor management practices and a lack of supply chains for spare-parts (World Bank 2011).

In urban areas, where at least half of Liberia's population is concentrated, the hand-pump driven model of service delivery deployed in the first few years of the post-conflict period has simply been inadequate both in technology and scale … **Yet, even the larger UN agencies and NGOs were unwilling to build the desperately needed piped water and sanitation infrastructure in urban areas and develop the related capacity.** At the same time, the national utility … remained mired in crisis, operating at a fraction of pre-war capacity and unable to absorb its first significant investment project (MWSSRP) which had disbursed barely 50 percent two years after its expected closure date. […]

Attracting at-scale WASH investment to fragile states emerging from crisis requires breaking the dead-lock that the capacity conundrum poses. **The capacity conundrum holds national institutions in their low-capacity post-war state as they are bypassed during the emergency response**. As emergency responders withdraw, however, enfeebled state institutions struggle to replace their implementation capacity, and are often incapable of providing the leadership in planning, monitoring and implementation required for a scale-up of support. […]

Providing intensive technical assistance can resolve the capacity conundrum but is more difficult the later it starts. Starting in 2011, WSP and other development partners supported evidence-based national planning, monitoring and review processes, which played a key role in transitioning the

[113] This plan is not publicly available at time of writing, but was provided to ICED for review.

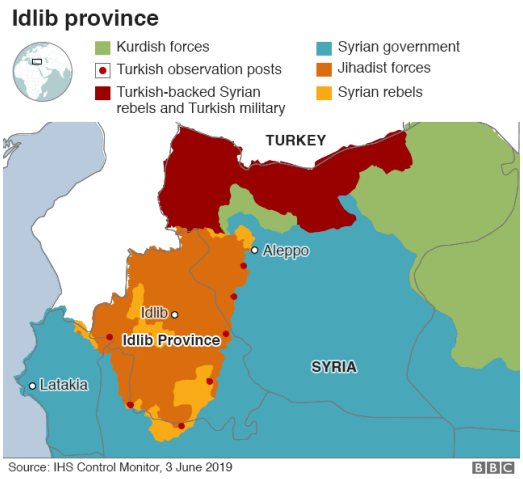
[114] Dominick de Waal and Max Hirn / World Bank: 'The Intricacies of Attracting and Sustaining Investment in WASH in Fragile States: Lessons from Liberia', July 2015. http://hdl.handle.net/10986/24787

sector from one dominated by a humanitarian response approach to one based on longer-term development."

7.3 *Syria: Idlib – attempts to build water utilities during active conflict*

7.3.1 Background and context

The war in Syria has now lasted 8 years at the cost of at least 370,000 lives (1.6% of the pre-war population) and extensive destruction of social and economic assets including the devastation of infrastructure in the most contested areas.[115]



Idlib province has been contested between forces siding with the Syrian regime and various rebel groups including the Western-aligned Free Syrian Army (FSA) and salafist jihadi groups including Hayat Tahrir al-Sham (HTS) which are hostile to Western interests.[116] Idlib City (the provincial capital) fell to a loose alliance of rebel groups in early 2015 and settled into an uneasy arrangement whereby governance was provided by civilian councils and the ideologically more extreme armed groups professed a policy of non-interference in civilian government. In reality, these groups did exert influence over civilian rebel authorities, which varied with time and the issues at stake. The situation destabilised from early 2016 with clashes between 'moderate' and 'extremist'[117] rebel factions. HTS announced the formation of a 'Salvation Government' in November 2017 and began to interfere more directly in governance in Idlib city and elsewhere in the province in 2018, causing escalating issues with aid and development actors operating with US and European funding, which were strictly prohibited by donors from interacting with or doing anything that might benefit extremist groups. The military fortunes of HTS in Idlib surged from January 2019, culminating in a broad capture of the province by HTS and associated forces from moderate rebel groups. An offensive by Syrian regime aligned forces is currently in progress and the future control of the province is unclear.

Throughout the period above, within this complex context, the Irish NGO GOAL has been implementing humanitarian projects in Idlib province with DFID, USAID and other funding. **This short section describes and draws lessons from the urban water supply initiatives that GOAL has implemented in Idlib**. These have involved water supplies in Idlib city as well as three nearby towns – Harim, Salqin and Darkosh – and commenced in late 2013.

The following text includes quoted sections from an earlier, in-depth case study by Boot et al.[118] published in July 2015. Additional information to update the state of knowledge has been drawn from ICED interviews with the GOAL implementing team in early 2019.

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[115] The best available information on war damage is not complete. The World Bank has conducted remote studies based largely on satellite imagery and humanitarian and other actors have some data gathered from the ground level within Syria.

[116] The context here is compiled from multiple news reports and the authors' own familiarity with the history. The conflict is complex and some simplifications have been made to convey a general picture.

[117] These are labels applied from the perspective of Western aligned countries which had been attempting to support the most moderate militant factions and civilian governance bodies. The Syrian regime and allied factions in the war have always referred to all rebel groups as 'terrorists' without publicly recognising ideological distinctions.

[118] Boot, Chen, Cohen, Khayat & Steele: 'Delivering sustainable water supply in fragile and conflict affected states: experiences from Syria', July 2015. From proceedings of 38th WEDC International Conference, Loughborough University.

7.3.2 GOAL water supply projects

According to Boot et al.: "Pre-conflict water management structures in Idlib province were controlled by central government with strategic oversight from the Water Establishment, located in Idlib City. The Water Units were technical organisations, responsible for daily operation. … **The key impact of the conflict on water supply in Idlib province was the interruption of central support and control.** The Water Units rapidly became independent entities without a revenue source or electricity supply necessary to operate, which led to a collapse of supply and a shift to reliance on private tankering operations. … [The disruption to] central control structures interrupted funding and terminated power supply essential for operating the abstraction and booster pumps."

Various humanitarian actors responded to the problem by providing assistance to the Water Units, primarily with generators and fuel to allow the operation of pumps to draw and distribute water through existing pipe networks. GOAL's programming was more ambitious, providing technical and financial support to the Water Units in addition to equipment and fuel. The GOAL programmes also rehabilitated networks suffering from war damage and theft, covering all aspects of the water distribution network other than household connections, which were largely in their pre-conflict state.

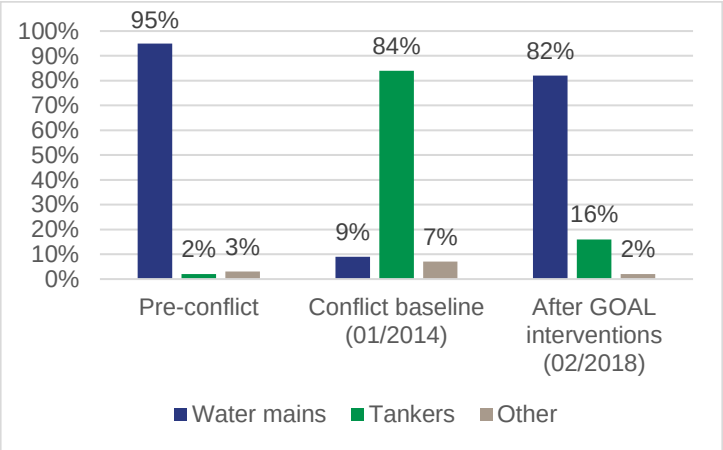

Figure 13: Primary water source indicated by HHs (GOAL data, adjusted)

Figure 13 – adapted from Boot et al – shows the impact the work had. There was a significant shift back to supply from water mains and away from trucked water. The financial impact was not stated, but GOAL noted that prior to the interventions the average cost of water per household in the supported service areas was SYP 5,016 per month, around 34% of household income, and 76% of these households reported outstanding debt. As water from the reactivated water mains was being provided for free at this stage, a significant positive effect on household economic resilience can be assumed.

7.3.3 Cost recovery strategy

While the immediate impact was positive and interventions had a high level of efficiency due to their lower cost compared to substitute water supply options, the programmes "**placed GOAL and external donors in the critical position of being responsible for ongoing support**".[119] Water was provided for free and would keep flowing only as long as GOAL could supply fuel to run the pumps and financial support to the Water Units to pay for salaries and other operating costs. This was not a sustainable situation for GOAL and its donors – particularly as the conflict continued with no end in sight and operational problems with operating in an unsecured war zone were numerous.

Prior to the war, water supply in Idlib was heavily subsidised by central government. Households were charged around $0.05 per cubic metre of piped water. Albeit operating less efficiently, in 2015 water networks in Idlib were costing $0.35 to $0.72 per cubic metre delivered to customers, and these costs fluctuated severely with the price and availability of diesel. Private tanker operations charged $1.5 to $5 per cubic metre.

[119] Boot et al, op. cit.

Encouraged by DFID to investigate more sustainable solutions, GOAL commissioned an international engineering consultancy to put together a plan for establishing a cost recovery system, with the goal of covering at least partly (50%) the O&M costs of the supported water networks.[120]

Some of the difficulties that would need to be tackled included:

- Security and uncertainty in developments in the conflict,
- Legitimisation of Local Councils and Armed Groups;
- Population size and the large scale of a cost-recovery operation;
- Weak economic environment;
- Behaviour change and consumer perception of value of water;
- Non-functioning household meters, illegal connections and identifying and registering consumers;
- Water Units may not have authority to demand fees and enforce punitive measures;
- Irregular and un-equal water supply distribution;
- Accountability for service provision obligations to consumers;
- Remote management and transparency in operation;
- Water Unit staff salaries are maintained at much higher than market rates;
- Cash management risks;
- Longer term planning for period after humanitarian withdrawal;
- Climate change and water resource scarcity.

The cost recovery plan is intended overall to "establish an efficient water supply service that is accountable to its consumers and where the cost for operation and maintenance are sustainable and can be recovered by the Water Service Providers from the consumer population". Importantly, **the plan acknowledges that full recovery of costs is not possible prior to the end of the war**, for many reasons including the fact that while humanitarian support is still needed and many households are struggling to cope with costs, introducing water charges will both absorb money that will need to be substituted through some other mechanism and very likely lead to an increase in health risks as less water is used for sanitation functions by families unable to meet the costs any other way.

The plan has the following main elements, each laid out in step-by-step detail in the full planning documents:

1. Improving the efficiency and management of the water networks:
   - 1.1. Develop an asset management system
   - 1.2. Optimise water supply by enhancing operational management and capital works to improve efficiency
   - 1.3. Develop standard operating plans (SOPs) enabling forecasting of CAPEX and OPEX
2. Developing a financial management system for the cost-recovery system
   - 2.1. Develop a tariff structure based on real operational costs and consumer affordability, differentiated between domestic and commercial consumers and proportional to consumption
   - 2.2. Develop a billing and fee collection management system
   - 2.3. Create a consumer database linking consumption, billing and payment, ensuring fair and equitable fee collection based on ability to pay and maintaining consumer protection
3. Capacity building of Water Unit and GOAL Syria staff
   - 3.1. Train Water Service Provider staff in technical and managerial skills required to operate the optimised water supply networks
   - 3.2. Train Water Service Provider staff in skills required to operate, manage and plan for works associated with the cost-recovery system
   - 3.3. Train GOAL project staff in Turkey and Syria in skills required to support and backstop the Water Service Provider staff

Significantly, the plan cautioned: "It should be noted that the process of achieving cost-recovery for service provision within the Syrian conflict environment is highly complex and relies on a fragile state

[120] Elements of plan listed below are quoted or paraphrased from two reports headed 'Cost Recovery and Water Network Analysis Consultancy': a 'Cost-Recovery Narrative Report' and a 'Cost Recovery Strategy Matrix'. Dated April 2015, provided by GOAL. As ICED was unable to seek views from the consultancy which developed the plan, it has not been identified by name.

of stability. There remains a significant amount of preparation work that needs to be undertaken for GOAL to be in a position to introduce cost-recovery."

7.3.4 Roadblocks in implementation

As of March 2019 there has not been a single user fee collected by Water Units supported by GOAL, following the delivery of the plan in April 2015 to the GOAL team in Turkey (the closure of the border prevented the consulting team from presenting their plans to staff of the Water Units).

GOAL found the cost recovery plan extremely challenging to implement. It was a highly ambitious document which assumed a level of influence, access and capacity much greater than existed in practice. The plan was effectively to create a basic but functionally complete water utility out of the Water Units, substituting for the functions that used to be handled by central government authorities. This seems highly optimistic in the circumstances, particularly as GOAL lacks the expertise to implement a technical capacity building project in urban utility reform. The external and time-limited nature of the support also led to many unanswered questions which the GOAL team needed to solve. For example, the plan mentioned that the activities would be likely to attract the attention of armed groups, but did not provide advice on how to resolve this problem. It also noted problems with the requirement for cash handling procedures in an unpoliced environment where unaccountable armed groups are in control. Reviewing these and other difficulties which were listed unsolved in the plan, it is clear that it would have been unrealistic to expect them to be solved in a single prior planning step and the plan will require substantial creativity and flexibility in implementation.[121]

In the first months of implementation in 2015-16, rapid conflict developments led to stop-start engagement with the Water Units and limited progress. In April 2016, GOAL's Syria funding was mostly frozen by donors after USAID discovered irregularities in GOAL's procurement practices in Turkey relating to Syria programmes. Although the irregularities did not involve the Idlib programming, all funding was affected, including the DFID funding for the cost recovery programme. Only essential funding for ongoing operation of the water supply was permitted to continue. The freeze lasted until the end of 2017.

At around that time, HTS (a formerly Al Qaeda linked extremist group; see above context section) began to exert more influence over governance in Idlib. The 'Salvation Government' announced by HTS in late 2017 had a 'water ministry' and ambitions to control water management across its areas of influence. GOAL restarted the cost recovery preparations in late 2018, preparing to conduct surveys to build a customer database for revenue collection. First contact with HTS on these issues was a demand to be included in the data collection exercise, which GOAL initially fended off with the support of the partner Local Councils and WUs. However, ultimately HTS declared that they planned to take a copy of the customer database once it was built, to support their revenue raising activities, and DFID and GOAL halted the work in early 2019 pending an improvement in the conflict situation.

So although some progress has been made on the preparatory stages of cost recovery, 2018 and 2019 have been characterised by a steadily worsening security and political climate. There is currently a broad offensive being mounted by Syrian regime forces with the apparent intention of retaking the province and progress on the cost recovery work remains highly uncertain.

7.3.5 Lessons

There are some practical lessons from the experience of working in water supply in Idlib. These are around the difficulties of developing a sustainable approach to water supply when significant parts of the pre-war management system are missing and consumer behaviour has been shaped by many years of heavy subsidies, as well as the necessary infrastructure to improve measurement and management not existing.

However, difficulties are not the whole story. **It is clear that as an emergency intervention the water supply work has been highly successful and far more efficient than any of the alternatives**. This has depended on the reasonably good condition of the infrastructure prior to the war and the low amount of war damage to the network. Idlib's proximity to the Turkish border for supply of fuel and spare parts has also been essential. This factor has been due to good fortune in this case, but in other forms of conflict and post-conflict environments it is potentially manipulable by the prioritisation of key import routes by military forces. It is not a factor that humanitarian and development actors can reasonably

[121] Views from discussions between GOAL and the research team, including review of the cost recovery plan documents.

manipulate without compromising themselves (e.g. by striking protection deals in exchange for fund transfers to militant groups).

There is a purpose to supporting water supply through the Water Units (and – by extension – their institutional equivalents in other active conflicts) above and beyond the economic case. This is that working through existing water management bodies, giving them the resources required to continue to work on technical solutions will retain expertise in these agencies and keep the water supply networks in a better condition, prepared for whatever future management structures are put in place after the conflict ends. This presumed outcome has not yet taken place and evidence will not be available until after a transition to peace in Syria. The test of this will depend on whether donors are able to continue to provide open-ended support until this time.

It is as yet unclear whether the attempts to pursue revenue generation capabilities will generate any sustainable improvements in the viability of water supply in Idlib. It is highly unlikely that donors will have an 'exit strategy' in the foreseeable future, allowing them to withdraw funding without negative impact on the supply of water to consumers in Idlib. The goal of collecting revenue to cover O&M and investment costs is not impossible in theory, but the circumstances in Idlib have not been conducive to making progress on such a plan. Security problems, the freezing of project activities due to irregularities elsewhere in Syria and cessations in activity that have been necessary to resist the influence of and legitimisation of hostile militant groups have delayed implementation of cost recovery plans, and such interruptions may continue indefinitely until there is a major shift in the conflict and political situation.

There are significant differences between the situation in Syria and that in other countries in a state of civil war. The main contextual factors that exist in Syria that may differ in other conflicts are:

- There was a very well developed urban water supply system, with the large majority of households served by piped water prior to the conflict.
- Centralised billing and management prior to the conflict has resulted in a major gap in the management framework in parts of the country not under government control, with the effect of cutting off all operating budget to the infrastructure management units.
- Heavy subsidies on water prior to the war have affected consumer behaviour and expectations around what is a reasonable fee level for a water supply.

These do not imply that experiences in Syria are irrelevant elsewhere, rather that understanding the implications of the above contextual factors will assist in diagnosing other situations and designing better programmes.

Finally, there has been very little consideration in Idlib province of the sustainable management of the basic water resource. As with many other concerns, the war has pushed it to one side for consideration some other time. It is observed by GOAL and others that water is drawn from aquifers which are likely to be non-renewable. It is unclear what effect the war has had on the exploitation of non-renewable groundwater. The GOAL projects utilise existing boreholes and – due to the reliance on generators and fuel scarcity – pump considerably less water than before the conflict when grid electricity was available. Worryingly, however, the war has seen an acceleration in drilling of private boreholes in the absence of regulatory oversight by people and organisations trying to safeguard their supply. As no groundwater monitoring is done, it is impossible to say what impact the war is having on the longer-term sustainability of water resources in this part of Syria. If there is an impact, it seems likely that private drilling will be the larger factor, but NGOs have also drilled new boreholes, for example to supply IDP camps.

8 Annexes

8.1 *World Bank (2017) outcome framework for post-emergency transition*

Table 5.2 from pages 23-24 in *Water Supply: the transition from emergency to Development Support Evidence from Country Case Studies in Africa*, de Waal et al. / World Bank, 2017.

Legend:	No WSP intervention	No progress	Slight progress	Moderate progress	Good progress	Substantial progress

Intermediate Outcomes	1. Reestablish country leadership in sector coordination and policy development	2. Institutionalize rigorous sector monitoring and joint sector review processes	3. Restore cost recovery in urban utilities, small-towns, and large rural piped water schemes	4. Establish an inclusive sector investment plan (SIP) and process that mobilizes infrastructure investment	5. Increase domestic investment in the sector	6. Increase use of country systems by development partners
DRC	Water law ratified and promulgated by the President in early 2016	Survey and evaluation of autonomous piped water schemes initiated dialogue on management and regulation	REGIDESO is testing delegated management of standposts but no conclusive results on impact on cost recovery	Investment plan for autonomous piped water schemes developed but not for sector as a whole	Funding to WASH has not been prioritized by the government	No sector budget support mechanism. WB investment managed by PIU led by Secretary General for REGIDESO
Liberia	WASH Compact signed by the President in 2011, established and a series of guiding documents and events	A regular JSR process supported by an SPR in place led by NWSHPC	Updating of the billing system and customer databases helped increase revenue collection at LWSC	Detailed SIP exists for 2012–17 mobilized (circa US$30 million as of 2016) with greater attention since the EVD epidemic	Raised level of domestic funding thwarted in FY14 by lack of absorption capacity of ministry responsible for rural water supply	WB investment ($10 million) in Monrovia's urban water supply will be managed by PIU embedded in LWSC
Nigeria (Rivers State)	Dynamic Commissioner responsible for water in Rivers State drove reform agenda (2011–2015)	Water quality monitoring institutionalized at PHWC	Assessment of systems led to installation of basic accounting and billing system	Urban water supply investment attracted for Port Harcourt from AfDB ($170 million) and WB ($80 million)	Domestic investment as counterpart funds to WB and AfDB investment	AfDB and WB investment for PHWC to be managed by external PIU
ROC	GoC has initiated sectorwide dialogue on a new policy	Water point mapping initiated policy dialogue but monitoring not institutionalized and no JSRs	No progress on delegated management of standposts in urban areas	No SIP established	GoC has reduced investment in the sector due to lower than expected oil revenues in 2015	GoC financing 80% of WB project managed through a PIU in the Ministry of Equipment and Public Works

Continued…

Intermediate Outcomes	1. Reestablish country leadership in sector coordination and policy development	2. Institutionalize rigorous sector monitoring and joint sector review processes	3. Restore cost recovery in urban utilities, small-towns, and large rural piped water schemes	4. Establish an inclusive sector investment plan (SIP) and process that mobilizes infrastructure investment	5. Increase domestic investment in the sector	6. Increase use of country systems by development partners
Sierra Leone	A sector policy was approved in 2010 but provides weak guidance on cost recovery or tariff setting and review	Ministry of Water created civil service posts for sector monitoring but did not retain staff recruited	Replacing billing system and updating customer databases has increased billing and stabilized utility revenues	No SIP has been developed	No increase in GoSL investment in WASH infrastructure	WB Decentralized Service Delivery Program used country systems but link with sector institutions not made
Somalia	Where it exists, sector leadership from regional state level but implementation by non-state actors very fragmented	Multiple data sources integrated into *wadi* evaluation tool used by regional governments to guide investment	Strengthened corporate governance improved cost recovery at HWA	No SIP but analysis of potential scope for, and impacts of, rural water supply used to design WB-financed project	HWA reinvesting surplus utility revenues in strategic improvements to its infrastructure such as additional pumps	WB investment using embedded PIUs led by civil servants complemented by WB support to MoF for PFM systems strengthening
South Sudan	Leadership from ministry responsible for water has not translated into country-led program as external response fragmented	JSRs with representation from states in 2011/12 have not been repeated due both to capacity and security issues	Main utility SSUWC agreed on a corporate plan which enshrined a commitment to cost recovery but restoring only a low level achieved	Juba sanitation SIP included investment planning processes but neither have mobilized infrastructure investment	Significant drop in GoSS investment due to dispute over revenue sharing from oil pipeline followed by escalation in conflict since 2014	A decrease in donor appetite for use of country systems compounded with sanctions against GoSS by some donors
Zimbabwe	GoZ led dialogue and approved National Water Policy (2013). Coordination strengthened	Service-level benchmarking (SLB) process in place for 32 urban municipalities with peer to peer review process and JSRs	SLB process has led to gains in efficiency across some of the 32 municipalities	SIP established and detailed small town investment planning led to $20 million ZIMREF investment administered by the WB	Some municipalities using water revenues for system improvements	WB investments in Beitbridge ($2.6 million) and ZINWA ($20 million) use(d) embedded PIU led by civil servants or utility staff