

DPU MSc ESD/SLURC Learning Alliance

Understanding urban risk traps in Freetown

MSc Environment and Sustainable Development
Practice Module 2018-19

POLICY BRIEF N° 6

Water and Sanitation Related Diseases

Key points

- Diseases linked to water and sanitation are underpinned by limited quantity of water as much as inadequate quality of water. Yet, efforts to tackle these diseases focus mainly on increasing the amount of water and expanding water access.
- Water and sanitation issues are treated separately, with a strong bias towards the water sector as its institutional arrangement is more developed compared to that of sanitation. This has led to a subjugation of the importance of sanitation in preventing diseases linked to water and sanitation.
- International aid projects coordinated by various organisations focus on strengthening ministries, and providing post-crisis supplies and financial resources. There is room for improving coordination between international and local organisations.
- Women typically bear greater responsibilities for WASH-related activities but remain underrepresented in related decision-making processes. Vulnerability must be disaggregated based on gender to formulate interventions that address disproportionate risks to women.
- Current strategies to address WASH diseases are heavily prescriptive and unevenly distributed. Alternatively, pre-emptive strategies such as hygiene awareness and point chlorination are relatively low-cost and feasible for low-income communities.



Roman, J. (2018) DPU Photography

Summary

By examining the current state of water and sanitation infrastructure, practices, the nature and distribution of international aid and institutional mechanisms for planning and service provision, this policy brief explores the multivariate factors underlying the proliferation of water and sanitation diseases (WASD) in Freetown. It traces how these diseases disproportionately affect certain parts of the city such as coastal and hillside communities, and how entrenched social factors underlie vulnerability of particular groups, such as women and girls. This brief elaborates gaps within efforts to tackle WASD in three main areas: lack of attention to water quality, bias towards the water sector due to the underdevelopment of formal and systematic sanitation service mechanisms, and the distribution of aid that focuses largely on providing emergency responses rather than working with community-based initiatives to enhance locals' capacities to act. These initiatives can forward water and sanitation goals within informal spaces to address pressing community concerns in the absence of formal infrastructural development.

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Background

After its foundation in 1787, Freetown became part of a British protectorate in 1896 and remained under British control until 1961 (Fyfe, 2018). It was the capital of the British dependency in West Africa and thus the seat of the colonial government (Wyse, 1987). In 1901, the British colonies decided to racially segregate their tropical colonies to protect the areas where Europeans settled from malaria as "Africans were seen as the vectors" of the disease (Njoh, 2007). In 1904, this led to the building of Hill Station: an enclave exclusively for Europeans replicating modern living conditions with piped water and flush toilets, among other amenities (Njoh, 2011).

This segregation is manifested today in the water and sanitation infrastructure of the city supporting the west with piped water from the Guma valley and leaving the east with wells, sachet water and rainwater collectors.

This policy brief endeavors to look at this prevailing informality as a framework that offers its own solutions instead of advocating for formalising the water, sanitation and hygiene (WASH) infrastructure across the city.

Infrastructure and Practices

The specific manifestations of inequalities in infrastructure can be seen in the spatial variability of sanitation methods.

Areas such as Hill Station, Babadori, Juba, Lumley, Wilkinson Road, and Aberdeen located in the west are generally more affluent than the east and also have access to more costly sanitation methods i.e. fully established on-property sewage systems connected to a septic tank (Kansal and Amara, 2018). Whereas the east majorly relies on pit latrines (Atkins et al., 2008). Also, the uneven distribution of healthcare infrastructure including hospitals, pharmacies and ambulances has contributed to the prevalence of diseases in eastern areas. This situation has further worsened through the mass rural-urban

migration into Freetown two decades ago (Atkins et al., 2008).

The majority of water points in central and eastern Freetown face seasonal water shortages and some water points are permanently dry as of 2016. In contrast, a majority of water points in the city's western areas, albeit some faced water shortages too, were recorded to be consistently operational (Sierra Leone WASH Data Portal, 2016). Furthermore, significantly more water points are broken down or not functional in the eastern and central areas than western areas in Freetown (ibid). Overall, piped water supply from Guma Dam and the Guma Water Treatment Plant, part of the Guma Valley Water Company (GVWC), is the most common source of water (55%) (PEMconsult et al., 2014). The remaining percentage receives water from groundwater (27%), rain water collectors on the roofs during the wet season (33%), or (untreated) surface water

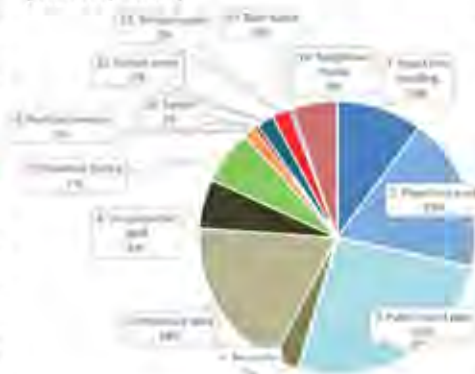
(2%) (ibid). Sachet water, in particular, has become increasingly important as a source of drinking water (ibid).

The importance of such alternative sources is not to be underestimated as water stand points are mostly operated during the day and with the abundance of faulty Guma pipelines packed water containers are often the only source of water during the night (Kansal and Amara, 2018).

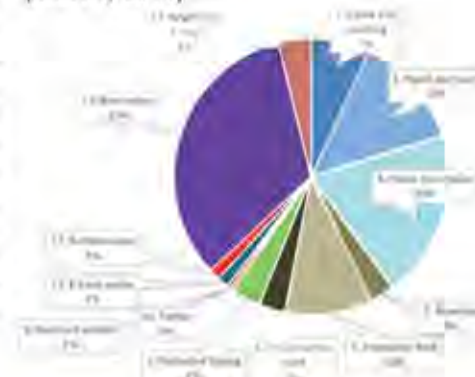
Higher areas of Freetown such as Wilberforce, Hill Station, Gloucester, Leicester Peak and the Fourah Bay College very often experience water shortages making geographic conditions a determining factor for water systems efficiency. These areas are mainly supplied by the Babadori Dam which is connected to the Guma treated water at Governor's lodge (Kansal and Amara, 2018).

Furthermore, the Guma Valley network has many leakages which directly affects the water pressure of pipelines and thus the flow rates of those areas. As a result, many areas that are technically covered by the network are not actually receiving any water for durations that can span over multiple months (Kansal and Amara, 2018). Such leakages have also led to the need to purify household water by filtration or chlorination (PEMconsult et al., 2014). Therefore, in order to avoid this, more affluent peri-urban areas have seen a rise in private water networks, which often work with household water tanks rather than pipelines (Harris, Kooy and Jalloh, 2012).

Water Sources in the Dry Season (MoWR, 2014)



Water Sources in the Rainy Season (MoWR, 2014)



Alternative Sub-Saharan Solutions

There are places in sub-Saharan Africa that are finding ways to deal with water supply problems. Durban in South Africa created a lower cost alternative to constant high pressure water supply by implementing a tank system. "The household itself pays for a feeder pipe" (Water Utility Partnership, 2003) which connects from a meter to a tank that gets installed near or on the house. This allows the city to provide water to an area without extending the system to each house individually. In Kibera, an informal settlement in Kenya, a project to create above ground pipelines for water has been expanding. The "overhead piping system... connects to various water kiosks" where vendors sell to those who live in the settlement (Wesangula, 2016). The project involves treating water from boreholes and distributing it, and it does not require digging. This shows that there are ways of solving these problems in informal settlements.

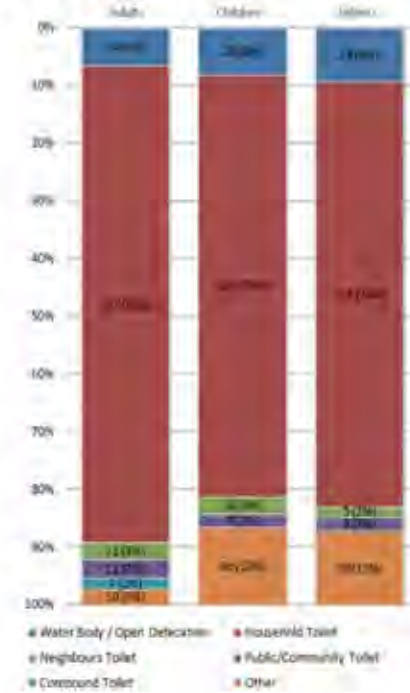
The GVWC, supported by the DFID and technical assistance with Adam Smith International, offers three tariff structures: monthly fix-rates, block-tariffs, and flat rates differentiating between commercial, residential, and institutional customers. However, as the WASH learning report states, this current tariff structure is "inadequate" to cover operation and maintenance" giving responsibility partly to the lack of meters or the lack of payment for water. About 42% of the western urban population of Freetown does not pay for the water, because they don't receive bills (PEMconsult et al., 2014).

Thus, low-income residents that are supposed to have free access to water standpoints do not always have it as they can pay from Le 500 to 1,500 per 5 L bucket to local mediators who control distribution (Rancourt, 2013). This can be gangs or other types of groups that take control of water standpoints, which pose a particular threat to women who are often more vulnerable to assault (ibid.). As a result, many low and middle-income residents have become reliant on informal vendors which sell water containers of 5 and 10 liters. They also sell small to medium sized water bottles or 'sachets' which are becoming increasingly common among day-to-day earners (Harris, Kooy and Jalloh, 2012).

According to the Freetown City Partnerships for Urban Sanitation Service Delivery (2014), "Over 90% of the population [is] served by on-site sanitation," which is predominantly managed by private providers, and "over 50% of households share facilities with four households (on average) per latrine."

Latrines are either emptied by vacuum tankers (49%) or manually by pit emptiers (48%) at least once in the past two years.

Defecation practices of household members (Mikhael, 2010)



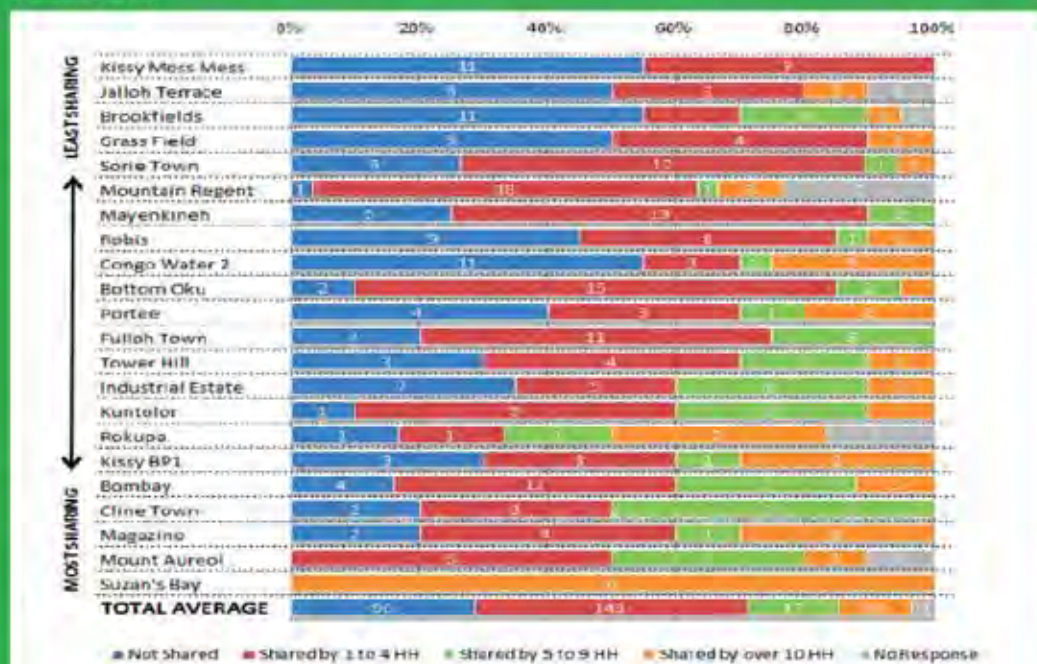
As a result of the lack of operational pit latrines there is a substantial amount of open defecation. This is especially common amongst children as they are also unaware of the direct dangers that come from open defecation and are unwilling to use malodorous pit latrines (Atkins et al., 2008). With an understanding of the current situation regarding the infrastructure of water and sanitation, it becomes possible to analyze how it contributes to health risk traps.

Health Risk Traps

Despite the fact that about 83% (Mikhael, 2010) of Freetown's residents have access to improved water sources, significant challenges still remain to ensure that water sources are microbiologically safe. Pathogens enter water systems via informal connections and pipe leakages, during transport stages, or during household storage. These same factors weaken the impact of source chlorination at downstream water retrieval points. Of the households surveyed during a 2012 study in Eastern Freetown, 40% of water samples taken show the presence of free chlorine residue (Von Nguyen et al., 2014). Point-of-use chlorination or distribution of chlorine tablets coupled with awareness of water treatment methods may prove effective in ensuring greater water safety. While most respondents reported being aware of boiling as a treatment measure, awareness still does not sufficiently catalyze action. Many households reported straining the water or letting it stand as coping measures, which are inadequate strategies that must be dispelled in favor of boiling and chlorination.

When it comes to obtaining drinking water, "[l]ow-income residents in Freetown rely on unprotected wells... or stand posts," and often have to pay for access to those ostensibly free stand posts (Harris et al., 2012). This means the poorest pay "almost 100% more for their water than the lowest bracket" of consumers that pay the GVWC for water (Harris et al., 2012). It is also important to note that the water quality they have access to is poor. A study that looked at water collected by households, mainly from municipal supplies, wells, and springs,

Comparing numbers of households sharing sanitation facility among the different Freetown sections (Mikhael, 2010)



found that "E. coli were detected in 52%" of samples tested (Fisher et al., 2015). Despite the extra expense, often the best option available from a water quality perspective is packaged sachet water (PSW). "PSW products manufactured in Freetown conformed with national and international guidelines for E. coli at the time that they were produced" (Fisher et al., 2015). Buying from street vendors seemed to be the least reliable option regarding PSW water quality (Fisher et al., 2015). There is evidence that vendors could have contributed to a cholera outbreak in 2012 (Von Nguyen et al., 2014). Still, PSW seems to be the safest option.

E. Coli and *V. Cholerae* (the cause of cholera) are examples of bacteria that cause diarrheal disease by producing toxins while inside the body (Das et al.,

2018). These diseases can be caused by ingesting something that has been contaminated by human faecal matter. Cholera, in particular, has historically been a serious problem in Sierra Leone. These health risks brought about by water related diseases increase the burden on the city to provide healthcare (ex. hospitals) to those in at risk communities. However, instead of looking solely at how to treat the diseases, it makes more sense to see them as problems with solutions linked closely to sanitation.

Indiscriminate faecal sludge burial and dumping is the primary threat to water safety. Of the 80,000 m³ raw sewage produced in Freetown every year, an estimated 17% is emptied at the King Tom dumpsite where the treatment facility remains non-functional and

space is limited by Ebola victim burials (Parikh et al., 2016). Without adequate liners, leachate leaks into the shallow aquifers on which over 24% of the population rely as their drinking source. An estimated 85% of citywide sludge is buried on-site or discharged into local waterways (Mikhael, 2011). In low-income areas near waterways and drainage paths, nearly a third of latrine pits are less than 5m³ in size and thus require manual emptiers, who habitually disposed of sludge in water bodies or on vacant land.

In a 2016 survey of coastal slum areas, the majority of households cited overwhelming odour as the primary reason for households to hire emptying services while only a few respondents connected desludging with health. Over 80% of households surveyed in Sorie

Spatial distribution of risks related to water and sanitation



Town, Tower Hill, Susan's Bay, Magazine, Cline

Town and Kissy Bye Pass reported emptying faecal sludge less than once per year (Mikhael, 2010). In the case of Susan's Bay, services are only required for the few public toilets available while those without access use hanging toilets or defecate openly. As all waterways eventually drain off into the sea, coastal seawater represents a reservoir for *V. cholerae* which can survive up to six months in high-saline environments. As such, coastal communities should be prioritized for point-of-use chlorination and hygiene awareness initiatives.

At present, the cost of emptying a containment system varies from Le 10,000 (US\$3) to Le 1,000,000 (US\$ 256) (Mikhael, 2011). Generally, lower costs for manual emptiers, who command an average of US\$40 per operation, make

them the preferred option for lower-income households. However, in certain hilly neighbourhoods, topography and the narrowness of roads obstructing the passage of FSM vehicles may render the manual option necessary. Manual operators are exposed to various health risks in the emptying process as well as persistent social stigma and frequent physical assaults (Mikhael, 2011), which may be addressed by increasing oversight and fostering community acceptance of the importance of sludge management.

Within the current system of FSM, a reduction of indiscriminate dumping and increased community oversight into the location of sludge burial may strengthen spatial planning initiatives and awareness of water supply contamination hotspots. Alternatively, on-site solutions may prioritize upgrading unsafe latrines, which are those located

within 30 meters of a water point. In cases where the area is too crowded to dig at safer distances, retrofitting structures with waterproof material may reduce the risk of leakage (Action Contre La Faim, 2008) Special attention should be paid to hillside communities, since the first rains flush faecal matter downwards into the town and waterways, putting communities at the foot of the hill at increased contamination risk. Planning for latrine construction on the hillsides can incorporate sensitisation of individuals or companies aiming to construct latrines to carefully choose the location and make use of waterproof material to plaster pits.

There is considerable scope for reducing exposure to WASH diseases through community-level and government investment in the sanitation sector. According to a study by the Bill &

Melinda Gates Foundation, every \$1 USD investment in WASH services translates into approximately \$8 USD from increased productivity, increased time savings, reduction of medical costs and reduction of time lost from work and school (WASH Consortium et al., 2014).

Potential Options for Transfer and Transport of Faecal Sludge (Mikhael, 2011)



International Aid

International aid in Freetown is strongly supported by the Freetown INGO WASH consortium. It is led by Oxfam alongside Save the Children, Concern Worldwide, Action Contre la Faim and GOAL Ireland since January 2010. In order to bolster the government's post-Ebola recovery strategy the Consortium has supported pro-poor interventions which focus on increasing community participation from all wards since March 2017 (Oxfam, 2017).

One main financial supporter of the consortium is the UK's Department for International Development (DfID). The British governmental aid agency has scheduled a budget of £88.4 million for projects in Sierra Leone for the year 2018/19 (DfID, 2018b). Among these, the Rehabilitation of Freetown's Water Supply System amounts for £15.5m and focuses on WASH advancements in the capital (DfID, 2018a). The project started in 2016 and the work includes improvements at the Guma reservoir system and treatments plants (£5.2m), upgrading the old pipes and valves (£19.3m) and designing the construction of key elements of the system which impact up to 600,000 consumers (ibid).

Underinvestment, lack of maintenance, and illegal connections were the main causes that led to the need for the mentioned groups of investment.

Key cost drivers are administration, plant and materials, and labour costs for engineers (DevTracker, 2019). The implementation itself is managed by the British engineers and construction firms. There is a plan to involve the local authorities such as "the GVWC staff and Clerk of Works (CoW) in design work, costings and site supervision" (DfID, 2018a), but this still fails to address the exclusion of locals from the design process. On top of this, there is no evidence of planned maintenance work after the project is finished.

An already completed project is "Resilient Zero". It strengthens the public health system in Sierra Leone by putting a focus on prevention, detection and response to further outbreaks of Ebola and other diseases. It was supported by DfID with a sum of £38.5m, which was split up mainly into surveillance teams (£8m), fleet management (£8m), household decontamination and quarantine support (£5m) and the national lab network (£4m) (DfID, 2017). The purpose of the spending was to strengthen the Ministry of Health and Sanitation (MoHS) and the lead agency, and the Office of National Security (ONS), for coordination, and is partially providing support for district-level capabilities (ibid). Concrete actions are the safeguard against sexual transmission of Ebola survivors, support for laboratory testing, and treatment of infectious disease cases and psycho-social care for survivors. Significant risk was detected in the collaboration between actors (DfID, 2017).

Collaboration between money sources and actors in the ground is crucial to design strategies of the most effective and efficient allocation of funds. However, this collaboration is often lacking. Healthcare workers during the Ebola crisis found themselves in need of WHO funding, but were neglected. Misplaces spending such as the financing of Kerry Town, a hospital designed by London architects, did not receive patients until fully finished which other hospitals had to turn away patients. As stated by Johnson, a healthcare worker during the Ebola crisis, the most essential task for international agencies is to "work with communities – not do something to them" (O'Carroll, 2017).

Alternative Aid and Timing of investment

Concern is a well-established NGO in Freetown with over 150 staff in the country and collaborations with the government (Myers, 2017). After the 2014 mudslides and heavy rainfalls in Culvert in the east of Freetown, the NGO distributed clean drinking water via trucks to the settlement (ibid). However, Concern noted that this form of water supply is not sustainable in the long term. Eight planned water towers are supposed to improve the situation. The close collaboration with the community also allowed for the distribution of hygiene kits to decrease the risk of disease after the houses were filled with mud and drainage systems were clogged. It required frictionless communication between the suppliers and the population to determine the location of where the hygiene kits should be delivered to and how the distribution was strategically most efficient and effective.

Critiques of International Aid

1. Lack of recognition of local actors was highlighted by Macarthy et al (2017). "Humanitarian agencies prefer to work separately" due to their uncertainty of the legality of community-based organisations. "Efforts of many CBOs which had hitherto intervened in the community are easily overwhelmed by the emergent humanitarian agencies, especially when they do not have a reliable source of funding." (ibid). This way of operating can also be seen in the example of the funding of the GVWC. The funding went mainly to the ministries and the design of a new system carried out by non-local actors instead of training locals on how to sustain the quality of the pipes and how to renew them. That way, GVWC would have a well-trained group of local engineers that can continue the upgrading of the GVWC system without the need for external funding.

2. Aid is often put in place after a disaster has happened to remedy the outcomes. Examples are hygiene kits and emergency resources. Education and theatre play raise awareness for WASH among the population in a sensible way especially by emphasizing the importance of including the population in fighting the issue. This is closely linked to the aforementioned example of the GVWC. Supporting prescriptive measures and thereby decreasing the local community's vulnerability and decreasing the likelihood of another outbreak would make the community more resilient and avoid the need for international aid after the disaster. This would also increase the timescale of the impact that the initiative has on the local community from short-term help to long-term improvements.

Oxfam in cooperation with Unilever's Lifebuoy soap and Unilever's chief Sustainability Office designed the initiative "Mom's magic hands". It focusses on education about hygiene in the form of storytelling and making handwashing a fixed part of the daily routines of kids. According to Oxfam "[h]andwashing with soap can reduce the risk of diarrheal disease by up to 48%" (Oxfam, 2019). Helping the population understand and more importantly, follow the organisation's advice will be crucial as many inhabitants are still using bag hygiene practices.

Towards a Pro-Poor Initiative

A pro-poor approach should disaggregate differential concerns of specific groups -- adult men, adult women, young boys, and young girls -- to tailor interventions. Some of the ways in which community voices can be continually engaged include the City Council hotline, which ensures that those who could not participate in community focus groups could also voice their concerns. With nearly 60% of hotline users being women, continued operation of the hotline is crucial to understanding gender-specific concerns, especially since there is currently no gender-sensitive programming across the Consortium. Agency-level gender-related activities remain largely informal (Welle, 2013).

Youth groups have been shown to be effective in conducting door-to-door surveys to register concerns and collect feedback while spreading awareness of the importance of providing input to Consortium activities. Gathering more refined ward-specific information is also integral to the ongoing development of community maps, which has been prioritized by the Consortium (Oxfam, 2017).

Knowledge of the impacts of WASH intervention on different age and gender groups is central to assessing progress. In terms of water supply, the provision of

water closer to home has by far the biggest impact across all groups: it is shown to increase the physical safety of women and girls who fetch water; it frees up children's time to study, rest and arrive to school on time; it eases household tensions over water use and retrieval. Raising the total amount of water available and the timeliness of availability tends to translate into better hygiene practices at home; men report having better working schedules and enjoying cleaner working spaces. When water fees are reduced, women can save more money for food, household items and necessities for children. Concurrently, access to higher-quality water enables small businesses such as vendors to sell safer and better food and drink (Welle, 2013).

In terms of sanitation, the provision of private latrine facilities have far more positive impacts than communal latrines. Private latrines improve women and girls' safety and relieve their concerns over privacy issues and their embarrassment from sharing with males from outside the family. Many women also view private facilities as important status symbols. However, communal latrines do not alleviate the aforementioned concerns if they are not located at a safe and easily accessible location for women and girls. Across all groups, communal latrines charging fees may foreclose entry for the poorest groups, who must resort to flying toilets or open defecation without viable alternatives. Lastly, hygiene promotion interventions give both women and men more confidence and feelings of control over their health and the majority of respondents also feel more prepared to address diarrhoeal diseases. Many families are still unaware of the importance of handwashing while soap is often unavailable. Handwashing with soap can reduce the prevalence of diarrhoeal diseases by up to 35% (Hill et al., 2017), suggesting ample space for hygiene promotion, which is relatively low-cost, to produce lasting health benefits.

Unequal Government efforts in WASH Development

Despite international agencies' proactiveness, national and local governments still struggle to develop WASH infrastructures holistically and independently. At present, the local and national governments remain focused on upgrading infrastructure for better water provision. The top five projects: seawater desalination, network upgrades, new boreholes, Hasting plan and the backup plan listed on the Ministry of Water Resources' (MWR) webpage prove the case. Unfortunately, there is no mention of projects or initiatives to improve water quality as there are very few solid projects or plans aimed at improving infrastructure and services pivotal to WASH issues in Freetown. This is in part due to the governmental structures (or lack thereof) that have hindered both local and national governments in their pursuit of more ambitious plans for WASH infrastructures beyond just improving water provision. Infrastructural and operational deficiencies and inefficiencies further exacerbate an already lagging progress both in developing proper water and sanitation infrastructures and services. This has resulted in the majority of external funds and aid being channeled to more defined projects that mostly revolve around improving water provision.

Unsurprisingly, water resource management in Freetown is more defined than health and sanitation regulation. There are clearer boundaries and responsibilities for different actors. Guma Valley Water Company is the main water provider for most of Freetown. It is jointly operated by the national government and Freetown City Council (FCC). The MWR represents the national government in Freetown's water governance. It is noteworthy that the MWR is still in its infancy stage after its formation in 2013 (African Water Facility, 2017). The transformation in water resource mana-

NGO initiatives for water and sanitation programs

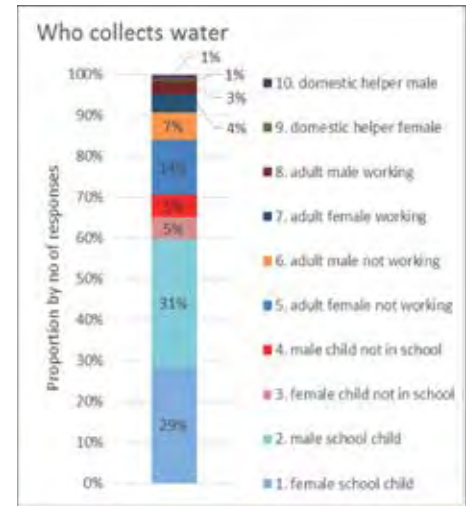


Photo Credit: Oxfam (2014)

gement provided Freetown and national government more clarity in responsibilities. The ministry is the overall authority and lead government institution on all water issues. It is responsible for the formulation, implementation, monitoring and evaluation of water policies, sector and cross-sectoral planning and coordination, fund sourcing, etc. On the other hand, FCC is responsible for local level planning, preparation of strategic local plans and land use plans. However, there also exist other actors, such as the Ministry of Agriculture, Forestry and Food Security (MAFFS) (agriculture regulation), Energy and Water Regulatory Commission (economic regulation) and even the National Planning Committee under the Ministry of Lands, Country Planning and Environment, performing as the project steering committee of the latest Greater Freetown Water Supply and Sanitation Master Plan. The diversity of actors coupled with the skyrocketing population and dwindling water resources resulted in governments focusing primarily on improving water provision.

This is not to say sanitation infrastructure is avoided altogether but initiatives to improve sanitation infrastructure seem to be secondary to efforts in improving water provision. This shortcoming is worsened by the current WASH institutional framework. Health and sanitation governance are often divided between the Ministry of Health and Sanitation, Environmental Protection Agency and Ministry for Local Government and Rural Development. On an operational level, maintenance of Freetown's sewerage system is managed by MWR's Water Supply Division while liquid waste

management (including FSM) is managed by FCC. Thus, confusions over responsibilities frequently occurs as the institutional and operational frameworks are dispersed and not well defined (ibid). The lack of clear and solid governance discourages these investors from investing in the sector through the government which explains why most agencies bypassed the government to work directly with communities. Therefore, macro level governance still requires improvements in its structures to ensure equal investments and capital flow into all WASH related sectors in Freetown.



Gender and WASH

The WATP Survey developed by the Ministry of Water Resource in Freetown showed that 63% of adults who collect water are women (MOWR, 2014). They are primarily responsible for water and sanitation related tasks such as washing, bathing, etc., which means that their role models and the application of health habits are essential to prevent waterborne diseases.

Women and children spend a great deal of time collecting water every day, which reduces the amount of hours they have for other things such as economic activities and education (Chant, 2007). Specifically, in Sierra Leone, "having to walk far distances to fetch water or to visit the toilet also exposes women and girls to violence and rape" (Welle, 2013).

While women bear a very large burden in collecting water and carrying out almost all water and sanitation-related tasks at home, they are often unable to express their choices or participate in decision-making about water and may be discouraged from freely expressing their concerns at committee meetings if the opinions are at odds with those held by men. As a result, gender-specific issues are often inadequately integrated into planning.

Women play a key role in preventing water-borne diseases among children because of they are often the primary caretakers. In addition, access to water and sanitation plays a critical role for healthy pregnancies and maternal health and decreases infant mortality from waterborne illnesses (Bartram and Cairncross, 2010).



Photo Credit: World Changing Center (2011)

Conclusion

It has been elaborated above how unequal distribution of access to water and sanitation in Freetown has produced an environmental injustice, in that it exposes certain areas and communities to the risk of water and sanitation related diseases (WASD). With the help of risk-mapping, it becomes clear that the most vulnerable areas shared the common characteristics of not only having inadequate water and sanitation infrastructure, but also overcrowded informal settlements occupied by lower income household, and situated in flood prone area. The majority of lower income households that live in this area engage with informal sources to support their water and sanitation needs which are often not adequate to prevent the spread of disease.

In responding to this issue, government, with assistance from the international community has been tackling the problem for years. Especially after the Ebola outbreak in 2015, international aid has been flowing consistently to relieve Freetown of the burden of water and sanitation disease. Nevertheless, having looked at the distribution of international aid and government initiatives, there are three main gaps that should be highlighted. First, the actions taken were mostly targeted towards increasing the amount of water supply without paying close attention to the quality of water consumed by the people or whether or not the vulnerable group could access the newly expanded water system. This leads to the second gap which is the lack of priority toward the importance of sanitation and how water and sanitation issues are often treated in a separate manner. The third gap is the strategies used to tackle water and sanitation disease were mostly carried out in a prescriptive, rather than preemptive, manner. This is evident because of how aid was distributed and the lack of recognition of the importance of local capacity to act.

Thus, to conclude, in order to solve the issue of WASD the three gaps that have been highlighted above should necessarily be addressed. It needs to be acknowledged that improving water access is not solely about increasing the amount of water, but also about the quality of water which depends on sanitation practices. How water and sanitation should not and could not be separated within the context of solving WASD has been explained. Additionally, the role of local actors should not be neglected in dealing with WASD because the locals also possess their own capacity to act. It is only by supporting and facilitating the locals that aid can build a preemptive response that is more effective and efficient in solving the issue and building a resilient society.

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