

WASH in Guinea, Liberia, and Sierra Leone

The Impact of Ebola



This assessment of the known and probable impact of the Ebola outbreak on the WASH sector in **Liberia, Sierra Leone** and **Guinea** is based on a secondary data review and information collected by ACAPS analysts in the field.

	Not required	Low	Moderate	Significant	Urgent
Need for international assistance				X	
Expected impact	Insignificant	Minor X	Moderate	Significant	Major

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Crisis Overview

There have been 26,339 cumulative Ebola cases as of 4 May 2015, with 10,895 deaths (WHO, 05/2015). However, the outbreak shows signs of subsiding. At the end of April, Guinea reported under 30 cases a week, Sierra Leone under 20, and Liberia declared the outbreak over on 9 May 2015 (WHO, 05/2015). The crisis has highlighted the weaknesses of existing infrastructure and institutions, which have not been able to respond to the additional strain. Many, like the health system, have been weakened further.

The Ebola outbreak appears to have had a limited short-term impact on the WASH sector. Delivery of WASH services in Sierra Leone and Liberia were, for example, far more affected by civil war during the 1990s and 2000s. Despite WASH being addressed by the Ebola response (see Annex 1), it necessarily remained secondary to the health sector. Assessments have been planned to scrutinise the impact of Ebola as a whole, at least in Liberia, but there are almost none completed to date. This, coupled with the limitations of available information, has led to a sporadic and an incomplete picture of the exact impact of Ebola on the WASH sector in all three countries.

Yet its impact must not be ignored. Pervasive unhygienic conditions and use of unsafe water have been identified as a key underlying factor in thousands of deaths prior and during the Ebola outbreak. In the medium to long-term, lack of development in the WASH sector is a constant burden to the three countries' recovery and development. Addressing WASH development offers the opportunity to greatly increase the quality of life. In Liberia it has been estimated that improvements to the water supply could reduce diarrhoea morbidity by 21%, while improved sanitation facilities could reduce diarrhoea morbidity by 37.5% (Liberian Dialogue 2015/03).

This document summarises the baseline data on WASH available for each country. It then provides an overview and analysis of the known and probable impacts of the Ebola outbreak on the WASH sector at both the community and facility level. Relevant aggravating factors not linked to Ebola are described, and WASH-related areas that present a possible risk to the people of Liberia, Sierra Leone, and Guinea are highlighted. Information gaps and lessons learned are outlined at the end.

Key Findings

- Known impact**
- During the crisis people had to explore alternative water sources and sanitation facilities, particularly if in quarantine. However, it is believed the impact on access to water and sanitation facilities for was limited for the majority.
 - Uncollected waste has built up due to logistical and movement restrictions, increased by the need to safely manage the waste from the response.
 - Investment in and monitoring of WASH activities in health and education facilities has increased.

- Probable impact**
- The WASH response has focused on new structures rather than maintenance of existing ones. A focus on facilities has drawn resources away from communities. This has impeded development and could lead to an increase in non-functional facilities by halting the little ongoing maintenance activity.
 - Ebola facilities have added to the demand on weak WASH systems, causing environmental damage through waste and incineration.
 - Remote rural areas and urban slums are the most vulnerable and most affected by a weakened WASH sector.
 - Improved WASH in facilities and improved community hygiene may be positive consequences of the Ebola response.

- Aggravating factors**
- The rainy season brings a risk of flooding and increased waterborne disease. The dry season sees fewer functional facilities and decreased access to water.
 - Limited data available, or reliable monitoring systems, to measure the impact on WASH, especially at the community level. This has made planning the response problematic.
 - Lack of investment, limited implementing capacity, and a diversion of resources from WASH to the Ebola response.

- Risks**
- Cholera and other waterborne diseases are endemic in the region. Should an outbreak occur now, there could be a very high rate of infection and mortality.
 - Lack of physical access and movement constraints as a result of the rainy season might have an impact on the response to Ebola and other outbreaks.

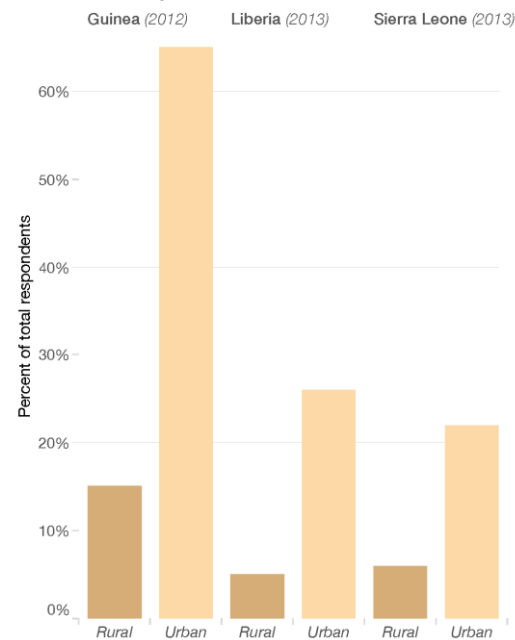
Pre-Crisis WASH Situation

Very little baseline data is available on WASH from before the Ebola outbreak in all three of the most-affected countries. Those development indicators relating to WASH that pre-date the Ebola crisis, were among the worst in the world.

	Liberia (2013)		Sierra Leone (2013)		Guinea (2012)	
	Urban	Rural	Urban	Rural	Urban	Rural
Access to improved water sources	86%	57%	88%	47%	95%	66%
Access to improved sanitation	26%	5%	22%	6%	65%	15%
Open defecation	25%	71%	7%	26%	1%	25%

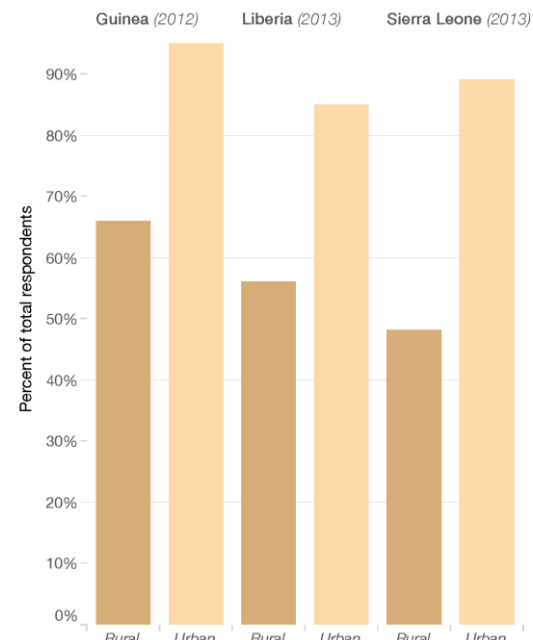
Sources: LDHS 2013; SLDHS 2013; GDHS 2012.

Access to improved sanitation services



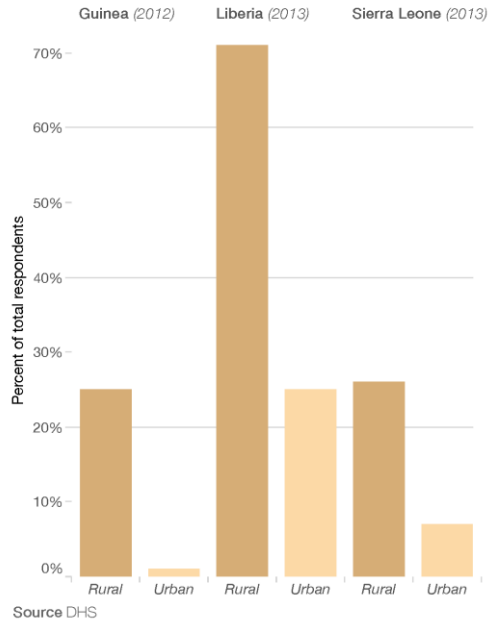
Source DHS

Access to an improved water source



Source DHS

Prevalence of open defecation practices



Liberia WASH Pre-Crisis

Water supply: Levels of access to improved water supply have fluctuated in recent years: from 56% in 2007 to 66% in 2011, and down again to 56% in 2013. These figures are drawn from the Liberia Demographic and Health Survey (LDHS) in 2007 and 2013 and the Malaria Indicator Survey (MIS, 2011). WASH indicator definitions differ slightly among the surveys, which makes comparison difficult (WASH SPR, 2013).

The situation in urban areas seems to have been more stable, with the same surveys reporting 81% in 2007, 80% in 2011, and 85% in 2013. With the increase in the urban population and migration from rural areas, this may actually indicate a higher rate of improvement. In comparison, rural communities have the same level of access in 2013 as they did in 2007, 56% (LDHS, 2013; 2007: MIS 2007).

Nationally, the proportion of people travelling for more than 30 minutes to collect drinking water increased from 7% to 18% between 2007 and 2011 (WASH SPR, 2013).

Inequitable access to rural water points exists among clans. Access to services are particularly low in the southeastern counties, namely Grand Gedeh, Grand Kru, Maryland, River-Gee, Sinoe and Nimba.

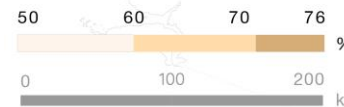
Infrastructure: The massive influx of people into Monrovia and other towns over the last decade puts pressure on an already failing and inadequate water and sanitation infrastructure in all urban areas (WASH SPR, 2013).

More than 60% of over 10,000 improved water points mapped nationally were fully functional in 2011 (WASH SPR, 2013). Only 50% are functional throughout the dry season. Montserrado (98%) and Bomi (95%) have the highest coverage, and Rivercess (47%) and Bong (54%) the lowest (Liberia Waterpoint Atlas, 2011). In urban areas, 64% of people get their water from a protected well, and 14.5% from a piped system (WASH SPR, 2013).

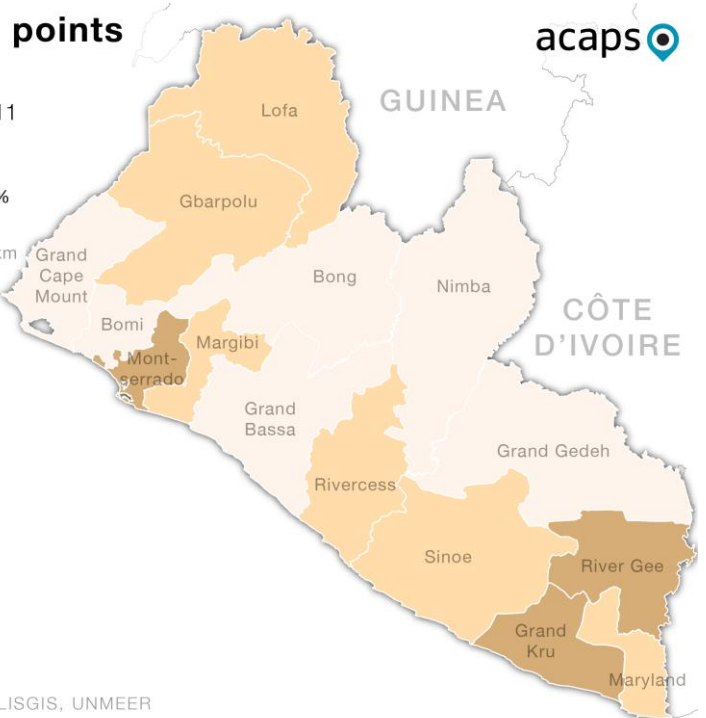
Functioning water points

Liberia

Functioning water points as of 2011
percent of total



0 100 200 km



Sources Liberia Water Atlas 2011, LISGIS, UNMEER

Sanitation: Like water supply, variations in definitions among sources make it impossible to conclusively measure the increase in access to sanitation. However, improvement is more evident in sanitation than water supply. Access to improved sanitation, with household-exclusive use of a facility, shifted from 11% in 2007, to 10% in 2011, and 17% in 2013 (LDHS, 2013; 2007: MIS 2011).

As of 2013, 25% of people in urban areas openly defecate, and 71% in rural areas. This is by far the highest of the three countries, demonstrating both the urban/rural disparity, and lack of infrastructure (DHS, 2013; 2007: MIS 2007). In urban areas, 19% of the population had access to an improved sanitation facility in 2011, increasing to 26% by 2013. This improvement is further supported by a reduction in the number of people without access

to shared or improved facilities, falling from 47% to 41% in the same years (LDHS, 2013; 2007: MIS 2007).

In rural areas, only 2.2% of the population had access to improved facilities in 2011, increasing to 5% in 2013. In the same year, 79% still had no access to shared or improved facilities (down from 85% in 2011) (LDHS, 2013; 2007: MIS 2011).

Waste management is largely restricted to Monrovia (GoL 2013). Still, the sewage system only covers around 14% of the city and has not yet been restored to pre-civil war capacity, which would be inadequate because of the expansion of the city's population since then (WASH SPR, 2013). The most recent data, from 2007, shows that 55% of the capital's solid waste was not being collected. The remainder was being discarded in waterways and empty land (Bill & Melinda Gates Foundation 2009, Innis 2015).

Hygiene: According to the 2013 LDHS, only 2% of households have hand-washing facilities. Of those, 47% had water and soap, 19% had only water, and 5% had soap but no water (LDHS, 2013).

Sierra Leone WASH Pre-Crisis

Water supply: The 2013 DHS reported that 89% of households in urban areas had access to improved sources of drinking water and only 48% of rural households. In urban areas, there is a large discrepancy in access to improved facilities between wealthy and poor households (Freetown WASH Consortium, 2013). For the majority of the population, water is rationed. Almost no households have a 24-hour water supply.

Infrastructure: According to a 2012 water point survey, 65.5% of water points were reported to be in use, but only 39% (11,212 points) were functional and in use year-round. In some districts, the percentage of protected/in-use water points fell below 45% (UNICEF, 2012).

The uneven distribution of water points within districts creates yet more discrepancies between individual communities' access to water. It was estimated that about 50% of the water supply in Freetown is unaccounted for, lost through leakages and illegal use (UNICEF, 2012).

Sanitation: Before the Ebola crisis, only 10% of households had an improved toilet facility not shared with other households. In urban areas, 22% had access to improved sanitation in 2013, which marked a decrease from 26% in the 2008 SLDHS. In rural areas, access decreased from 7% to 5% (SLDHS, 2008; 2013). 7% of people in urban areas and 26% in rural areas defecate openly (SLDHS, 2013; Wateraid, 2012). As with the other countries, the capital, Freetown, has the only significant a sewage system. However, it is antiquated and cannot meet current demand.

In 2009, UNDP estimated that about 1.7 million people would still be without access to water supply services and 2.2 million would be without proper sanitation facilities by

2015. The same report stated that the water supply is increasingly polluted as a result of contamination by human and industrial activity (UNDP, 2009).

Waste management: Even before the Ebola outbreak, Freetown suffered from increasing waste and decreasing waste management capacity. It was estimated in 2013 that Sierra Leone's cities produce about 0.3 million metric tons of solid waste per year, with Freetown contributing 800 metric tons a day in 2010 (local media, 21/06/2012). 40% of Freetown's waste is collected in formal disposal sites by private operators. The rest is burned at home or disposed outside in waterways, drainage channels, alongside roads and vacant lands (Freetown WASH Consortium, 2013). This results in flooding and an increased transmission of vector-borne diseases.

Hygiene: Prior to the Ebola crisis, 22% of households had a place to wash their hands. That number increased to 33% in urban areas and 17% in rural areas. However, of those that had a place to wash hands, only 33% had soap. This represents 55% in urban areas compared to 12% in rural areas (SLDHS, 2013).

Guinea WASH Pre-Crisis

It is worth noting that the WASH Cluster had been activated in Guinea prior the Ebola crisis, highlighting the concerns regarding the WASH sector before the outbreak. Guinea has the highest development indicators of the three countries for WASH.

Water supply: The GDHS reports that 75% of households have access to improved drinking water sources, 39% of them wells with pumps or boreholes. 95% of urban households use an improved drinking water source. According to the GDHS, only 66% of households in rural areas have access to an improved water source, 51% of which use boreholes. These are higher proportions than Liberia and Sierra Leone (GDHS, 2012).

In Conakry, almost all households are using safe water sources (99%). The lowest coverage is in the regions of Kindia (44%) and Mamou (43.3%). In rural households, only 10% have a water source on premises. 40% spend more than 30 minutes fetching water, compared to 18% of urban households (GDHS, 2012).

Infrastructure: Only 80% of draining pumps were seen to be in good condition in 2012. There is lack of capacity to provide the training or technical support necessary for maintenance. According to the national poverty reduction strategy, DSRP, this has resulted in a deterioration in access to improved water and latrines (DSRP, 2013).

Sanitation: The GDHS reports that 56% of households use non-improved toilet facilities. 29% of rural households do not have access to any kind of toilet facility. Faranah (77%) and Mamou (71%) regions had the highest proportion of unimproved toilet facilities, and Conakry the lowest (8.7%). Open defecation is most common in the regions of Labe (48%), Mamou (33%) and Nzerekore (33%). The DSRP states that 31% of the population live in households using improved sanitation facilities: 65% in urban

areas and 15% in rural areas. In urban areas, under 1% practice open defecation, while this figure is 25% in rural areas (GDHS 2012; DSRP 2013).

Waste management: There is no well-established system for solid waste management. 70% of households dispose of their waste in the environment. This proportion is lower in urban areas (47.1%) than in rural areas (80.2%). Conakry is the only region with a waste management system, either via private or public waste bins or truck collection. Incinerators are another common way of handling solid waste (INS, 2012). The management of household waste remains a challenge. In urban areas the percentage of households disposing of its waste hygienically declined by more than 10% between 2007 and 2012 (DSRP 2013).

The lack of urban planning, especially in Conakry, has given rise to a highly polluted environment. Domestic waste water, sewerage, solid waste and toxic medical waste from hospitals remain largely untreated and are a major concern for environmental health (DSRP, 2013).

Hygiene: Although there were efforts to improve practices in recent years, according to the GDHS, only 41% in urban areas and 31% in rural areas had hand washing facilities. However, only 37% and 9% of those households, respectively, use soap and water (GDHS, 2012). The DSRP reports that 48% of people washed their hands at all times after using the toilet (DSRP, 2013).

Limitations Measuring the Ebola Impact on WASH

Some areas have been monitored during the crisis. There is also significant evidence from which to draw conclusions regarding the likely, if not provable, impact of the Ebola outbreak on WASH in the three affected countries.

Nonetheless, there are several issues with measuring the impact of the Ebola outbreak and the response on the WASH sector in the three most affected countries.

- The lack of data for many aspects of the WASH sector that were potentially impacted, such as maintenance of facilities and services.
- The limited geographical scope of assessments conducted during the Ebola outbreak, which often were not representative at the national level.
- Variations in definitions and methodology of assessments, making collation or comparison of data difficult. This is especially true for comparing assessment over years, organisations, and countries.
- Humanitarian actors' bias towards data collection during the outbreak, which has focused on those WASH priorities already identified in the recovery and response strategy, rather than attempting to get a holistic view of Ebola's impact on WASH more generally.

- The lack of baseline data from prior the outbreak for aspects of the WASH sectors priorities in the response, such as WASH in facilities.

ACAPS must also note that there was a general lack of information available on Guinea. This is partly due to ACAPS' relatively limited time in-country, but also due to a clear gap in national and institutional data on the Ebola impact.

Where information is lacking – most frequently in Guinea – we triangulate other sources of information to deduce if an impact can be generalised to the whole region, and define the limitations of such generalisations.

Known Impact of Ebola on WASH

The following breakdown of the known impacts of Ebola on the WASH sector during the crisis is based on WASH data available, baseline statistics, interviews conducted by ACAPS analysts in the field, and trends evident before the crisis. The impact of Ebola is defined as 'known' if there is substantial evidence to support the conclusion. This could be in the form of uniformed consensus from sources, but preferably from the findings of formal assessment; these have most frequently been conducted for facilities rather than at community level.

For a background on the main focus of the WASH response during the Ebola outbreak, please see Annex 1.

Community

Restricted movement/Quarantine: With Ebola, movement restrictions aggravated lack of access to water across the three countries. At different times during the outbreak, most often in Sierra Leone, whole areas were quarantined. At other times, most frequently in Liberia, individual households were in quarantine. In addition, there were broader restrictions on movement and nationwide curfews. These restrictions have largely been removed in the current phase of the response, or only impact a small number of people. Nevertheless, at the outbreak's height they severely affected people's access to WASH facilities.

In Sierra Leone, 17% of the population surveyed in October 2014 stated that Ebola had affected the provision of water services (UNDP, 01/2015). Several maintenance routines were stopped and water trucks' access was limited (IRIN, 14/10/2014). People were forced to look for alternative, unprotected sources of water, and the risk of water-borne disease increased (PI, 01/2015).

The restrictions and closure of borders hampered imports of essential products, such as chlorine for water treatment, and the movement of skilled personnel, such as maintenance teams and Infection Prevention Control (IPC) professionals (Early Recovery Strategy, May 2015).

Ebola waste: Concerns have been raised about the medical waste created by facilities in an already grossly undercapacity national waste management system, as well as the environmental impact of incineration and the large quantities of chlorine used.

Every visitor and healthcare professional working in an Ebola facility was required to wear personal protective equipment (PPE), which was removed and disposed of after duties in the facility which presented a risk of infection. This means over four PPE kits per patient per day. Currently, the medical waste management practices in health facilities in each of the countries is based on burning all waste within the same compound, and segregation of sharps waste, such as needles, into a hole that is covered with concrete (PI Sierra Leone, 03/2015).

This same practice is used in Ebola facilities. PPEs and other contaminated materials have caused a spike in the amount of medical waste that must be burned at very high temperatures. Some Ebola treatment units (ETUs) have had to burn this waste in piles in the open air, raising concern in neighbouring communities and causing environmental damage (WHO 02/2015).

Liquid waste is also a challenge, as 300 litres are generated per bed per day in an Ebola treatment unit, including sewage and the chlorinated water used for IPC activities. In Liberia, only the Fiamah sewage plant in Monrovia was able to receive this waste (WHO, ICRC 2015/02).

Several actors have emphasised the need to monitor the cemeteries where people who died from Ebola have been buried, as well as the burial sites for ETUs' medical waste and their septic tanks. The community may consider these areas to be sources of infection and they may present a challenge to the reuse of nearby latrines and wells (PI, 04/2015; PI, 03/2015). However, the exact scale of the issue is yet to be assessed.

Non-Ebola centres' waste: The considerable accumulation of waste during the outbreak has not solely come from Ebola treatment facilities. It has been reported that a large amount of waste has accumulated in towns in Sierra Leone (PI, 04/2015). A major factor contributing to this build-up has been the lack of collection during lockdowns and quarantines.

Nearly 50% of Freetown was placed under quarantine during the outbreak. The large volume of accumulated waste cannot be incinerated without causing major environmental damage. Given the low baseline indicators for waste management in all three countries, similar build-ups can be expected in Liberia and Guinea. Guinea, where case numbers and movement restrictions were less severe, is likely to be less affected than the other two countries. However, the recent series of stay-at-home periods in

Guinea, beginning on 12 April and targeting 500,000 households may result in a greater waste build-up in Guinea (USAID, 04/2015).

Development programmes impeded: Following the outbreak, many stakeholders working on WASH have had to redirect resources and activities towards supporting the Ebola response.

In Sierra Leone, the Guma Valley and Sierra Leone Water Company SAWALCO have put investments to expand water provision services on hold, and some INGOs have reduced their WASH development activities (UNDP, 01/01/2015; PI Sierra Leone 04/2015; ACF 04/2015).

Furthermore, it is estimated that 800,000 consumers in the Sierra Leone districts of Bo, Kenema, and Makeni will not benefit from the Three Towns Water Supply Project, intended to improve water supply and sanitation capacity and service delivery. This project will be delayed for at least one year as a result of the need to shift national and international focus to the Ebola response. UNICEF rural WASH projects, aiming to drill additional boreholes, re-establish community-based water management, and promote hygienic behaviour, have also been disrupted, affecting more than 5,000 communities (Early Recovery Strategy group, 02/2015).

In Guinea, the goals of the few existing projects have been similarly severely undermined. The Poverty Reduction Strategy for Guinea, begun in 2007 and updated in 2012, intended to construct thousands of new water points and latrines, and extend the Conakry sewage system. Development funds for WASH have been redirected for EVD response (Early Recovery Strategy 2015).

Health and Education Facilities

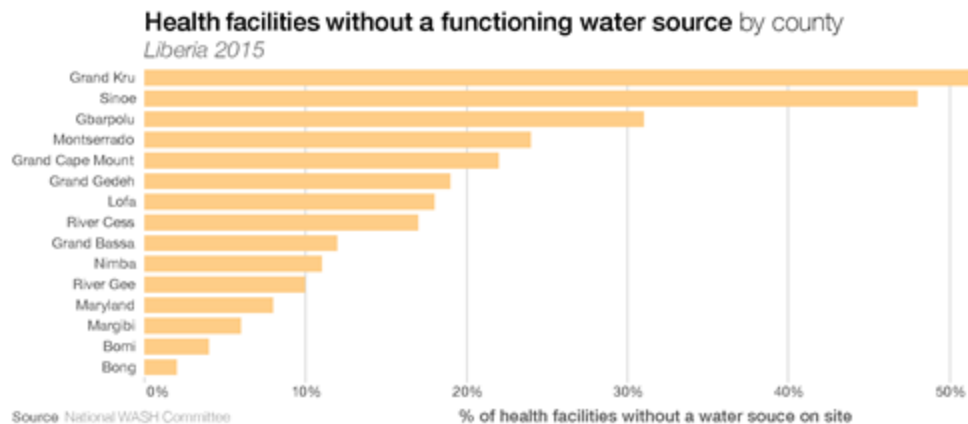
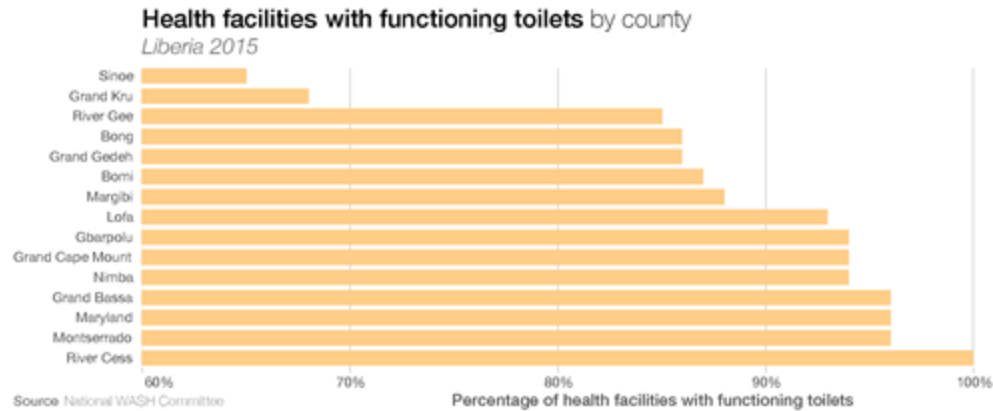
Though information is limited, it is uniformly recognised that WASH conditions in both health and education facilities were of a very low standard prior to the outbreak. As such, it was a major concern as a means to slow infection rates, especially for health facilities.

Most WASH-related aid efforts were focused on facilities rather than communities. Actors saw the immediate improvement of WASH standards in facilities as the most achievable goal. This was expected to have a more significant impact than improvements at the community level.

Schools were closed for several months in the three countries as part of government efforts to curtail the spread of the outbreak. During the closure, many schools' resources were taken by the community and school's WASH facilities were often used by communities, resulting in deterioration of latrines and other existing WASH infrastructure. The current level of WASH in schools is unclear. Coupled with the lack of baseline data, this makes it difficult to ascertain the exact impact of Ebola.

Liberia Health Facilities

Liberia is the only country where substantial baseline data for health facilities is available. According to data from the 2013 MOHSW Facility Accreditation, 84% of the 659 health facilities reviewed had running water for hand washing and 98% had available drinking water. No comprehensive sanitation or waste management data is available. However, 76% reportedly had sanitation facilities for patients, 82% burial pits, and 72% incinerators (MoH, 2013).



The WASH Cluster conducted another assessment of WASH in 647 health facilities in March 2015. 50% did not have a protected year-round source of water, and 20% did not have any protected source on site. 74% of available water sources were functional (WASH Cluster, 04/2015).

96% of health facilities had toilets, but only 91% of those facilities had functional toilets. 43% of health facilities did not have an incinerator or other waste management system and only 23% had a drainage system. 61% of facilities reported hand washing facilities at the toilet (WASH Cluster, 04/2015).

The factors behind a particular county's performance are unclear: there does not appear to be a particular correlation between facilities that have functioning water sources and those that have functioning toilets. For example, Grand Kru and Sinoe had the highest number of functioning water sources, but also the fewest functioning toilets.

Sierra Leone Health Facilities

In Sierra Leone, according to a recent UNICEF health facilities survey in April 2015, 71% of primary health units have access to water throughout the year, whilst 14% have no access at all. Tonkolili (35%), Pujehun (27%) and Kambia (26%) have the worst levels compared to the national average. All facilities reported hand-washing facilities are available on site, but only 39% have a functional incinerator. The main means of waste management seems to be burning pits: 88% have access (UNICEF, 04/2015).

By February 2015, 43 of 50 (86%) assessed Ebola health facilities in Sierra Leone met minimum standards for IPC (WHO, 11/02/2015).

Guinea Health Facilities

A 2014 government WASH inventory of 398 health facilities in 32 of Guinea prefectures found that only 61% had access to a functional water point. 8% had water points that did not function, and 31% had no water point at all. 90% had access to functional latrines, with 7% having access to non-functioning latrine and 3% without any access. Only 10% had access to incinerators (Guinea WASH Cluster, 02/2014).

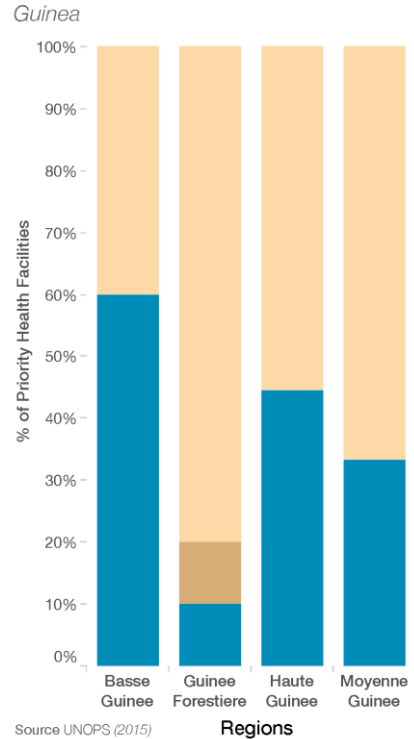
Assessments conducted during the Ebola outbreak are not as nationally representative as the government WASH inventory. However, they do provide an indication of the current state of WASH in health facilities. UNOPS conducted an assessment of 42 priority health facilities from all four geographic regions of Guinea in April 2015. They found that most priority facilities, apart from Guinée Forestière, have access to a latrine. However, over half were non-functional. Far more priority facilities lack any water points, with no priority facilities in Moyenne Guinée reporting access to a water point – although only three priority facilities were assessed in the region and so the severity of the situation is likely exaggerated by these findings. Seven out of ten priority facilities in Guinée Forestière have no access to a water point, which is far more likely to indicate the general level of access given the low development indicators in the region. Only one facility in Guinée Forestière had a functional water point. In Basse Guinée and Haute Guinée, 20% and 40% of priority facilities had functional water points, respectively (UNOPS, 04/2015).

A pilot survey in 2015 led by the National Society for Sanitation and Water Points Project and Dutch NGO AKVO assessed 41 health centres in Boké and Kindia prefectures. Results show that only 49% had access to functional water points, 22% had access to a water point that was non-functional, and 29% had no access. This assessment also

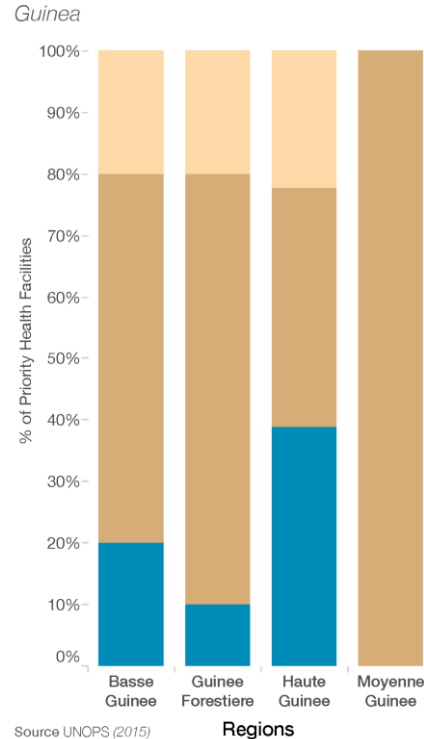
found only 46% of health centres could access a functional latrine, with 36% of latrines non-functional (Guinea WASH Cluster, 04/2015).

Both surveys suggest that health facilities are more likely to have access to latrines that water points.

Priority health facilities with functioning latrines



Priority health facilities with functioning water points



Schools in Liberia

As with health facilities, Liberia is the only country with available baseline data for schools prior the Ebola crisis. A 2013 Ministry of Education report on the WASH sector is the best pre-crisis data available. It found that access to water in primary school was particularly low, with a national average of 45%. Only five counties had 50% or more of primary schools with access to water. Nationally only 67% had access to a latrine. This is compared to secondary schools, where 67% could access water and 89% had access to a latrine. Overall, according to this assessment, the highest indicators were found in

Margibi, Monteserrado and Grand Bassa counties, while the poorest performers were Sinoe, Grand Kru and Gbarpolu (WASH SPR, 2013).

The baseline survey has limitations, as it was completed by school head teachers instead of WASH technicians. Therefore there might be issues of reliability. Disparities between primary and secondary school results might be the result of the larger size of the secondary schools that often have more space for WASH facilities.

The only nationally representative assessment for WASH in schools conducted during the crisis was carried out by the Education Cluster in March 2015. It found that 60% of the assessed schools have safe drinking water within 500 meters. 31% did not have a functional latrine (Education Cluster, 02/2015). Schools with functional latrines have an average of 1 latrine for every 123 students. However, an Oxfam report found that even when facilities are available, they often cannot be used due to damage or unhygienic conditions, causing children not to feel safe using them (Oxfam, 03/2015).

40% of the schools have soap and water for hand washing, and 39% of the schools have functional hand washing facilities. This is an increase from the around 18% who had hand washing facilities before the outbreak, according to Oxfam. If accurate, this could be due to the focus of responders to improve IPC in schools. (Education Cluster, 02/2015).

44% of the assessed schools reported that their WASH facilities were used while the school was closed, especially the latrines. Therefore the deterioration of WASH facilities in schools during the Ebola outbreak can partly be attributed to the use of school latrines and water points by the community and a lack of regular maintenance.

Schools in Sierra Leone

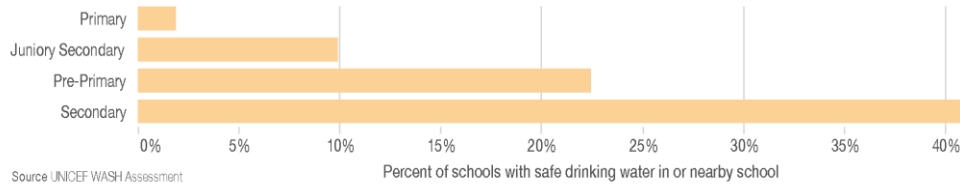
UNICEF reported in 2012 that only 20% of schools in rural areas of Sierra Leone had access to improved water (UNICEF, 2013). A national assessment carried out in March 2015 indicates variance between districts. The highest use of unimproved water sources was in Tonkolili at 83.4%, followed by Kailahun at 80.2%. Western Urban Area reported the lowest use of unimproved water sources, at 41.2%. The other districts ranged between 43% and 61% (UNICEF, MEST, 02/2015; Education Cluster, 02/2015).

Most schools assessed in the same report used soap and water, with the highest proportion found in Bonthe (64.4%) and Kailahun (64.2%), and the lowest in Koinadugu (10.7%). The majority of other districts ranged from 40% to 60% (UNICEF, MEST, 02/2015). 50.9% of schools used an open pit as the method of waste management, the second most common method being dustbins (UNICEF, MEST, 02/2015).

There is a strong correlation between the type of school, the availability of functional latrines, and available safe drinking water. The disparity between primary and secondary school results, as with Liberia, might be the result of the larger size of the secondary schools providing more space for WASH facilities, but institutional size does not explain the disparity between pre-primary and primary schools.

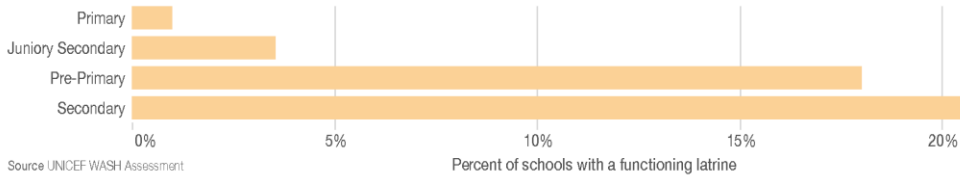
Schools with safe drinking water

Sierra Leone 2015



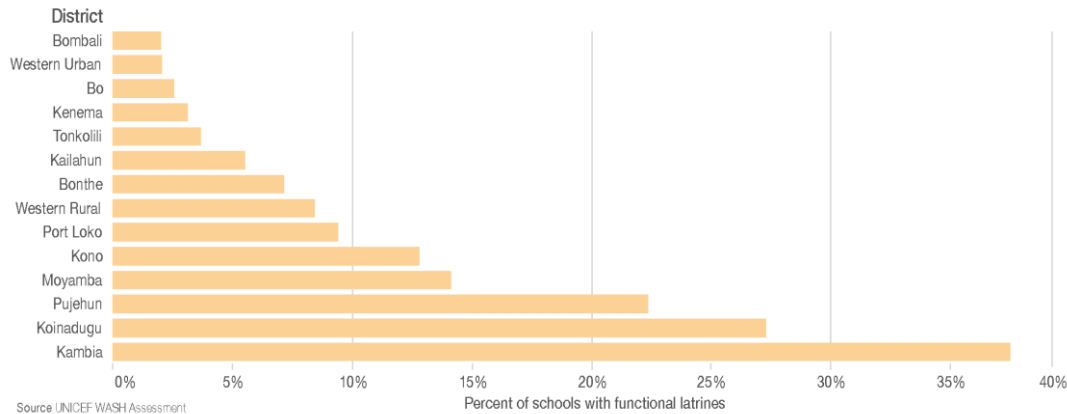
Schools with functioning latrines

Sierra Leone 2015



Schools with functioning latrines

Sierra Leone 2015

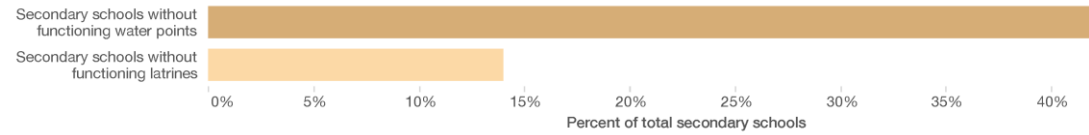


Schools in Guinea

Source: Education Cluster

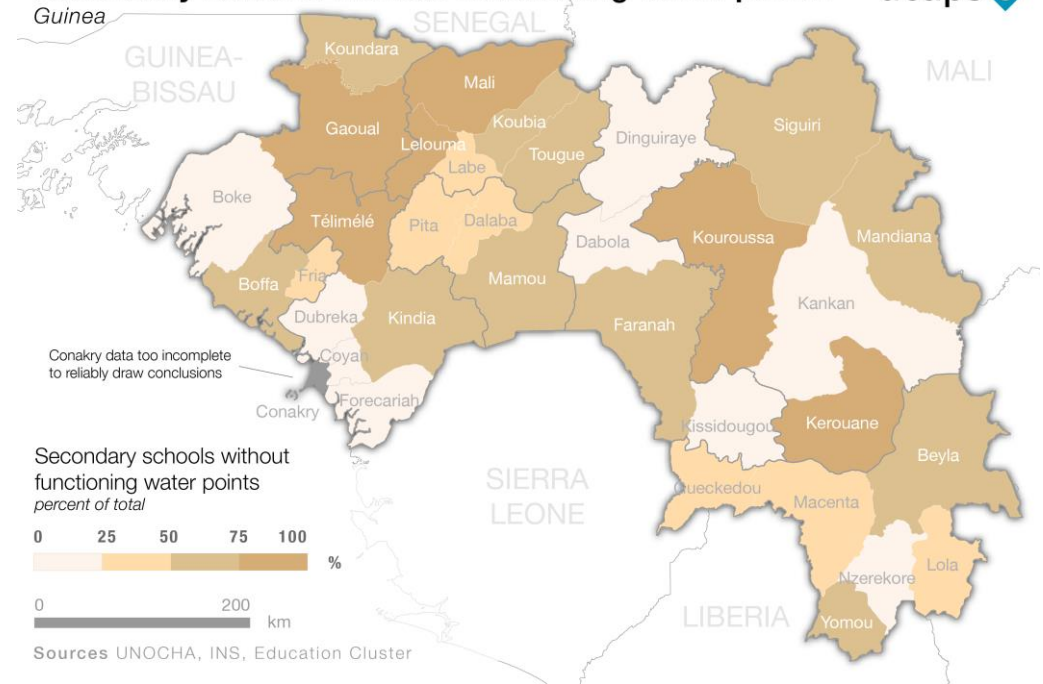
Sanitation facilities in secondary schools

Guinea 2015

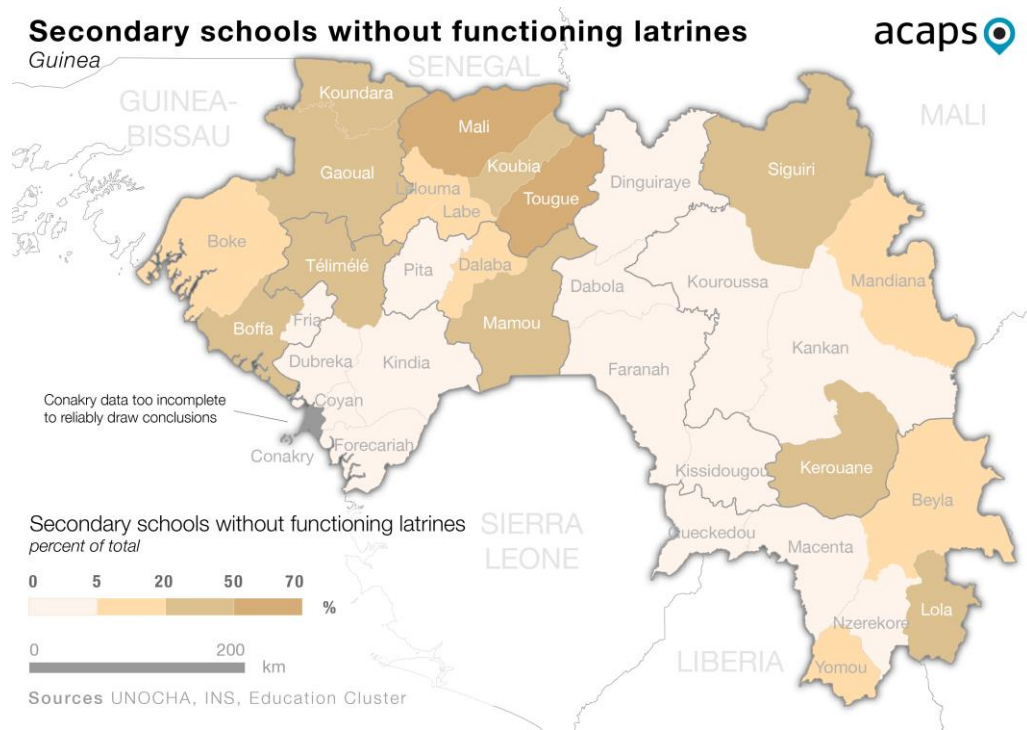


Secondary schools without functioning water points

Guinea



According to data collected by the Education Cluster in Guinea, 84% of secondary schools have access to latrines, while only 53% have access to water – either on the premises or nearby. Similar WASH data for primary schools is not available (Education Cluster, 03/04/2015). The situation of secondary schools appears to be better than that of health facilities. Access to a latrine is more likely than access to a water point in both places. The conditions and functionality of latrines have not been reported, and results are not conclusive. The sample sizeable but not complete, and the data available for Conakry was too incomplete to draw a reliable conclusion. The findings should be considered only an indication of the current situation.



Probable Impact of Ebola

The impact of Ebola is defined as probable when there is sufficient evidence to indicate strongly that the Ebola crisis has impacted the WASH sector, but there is insufficient baseline or current data available to state that it is known.

Community

Improved hygiene practices: One of the few likely positive impacts of the Ebola response is community engagement's effect on attitudes towards hygiene and sanitation. Knowledge, Attitudes and Perception (KAP) surveys in Liberia and Sierra Leone indicate that there has been an improvement in hygiene and sanitation practices.

In Sierra Leone, where the SLDHS provides evidence for hand-washing practices prior to the outbreak, some districts have seen a significant increase in hand-washing. Compared with the 2013 SLDHS, the January 2015 IFRC KAP survey, the proportion of people in Koinadugu reporting regular hand-washing with soap and water has increased from 5% to above 90%. Numbers in Kono and Port Loko have grown from 22% and 26%, respectively, to above 70% (IFRC, 01/2015, SLDHS, 02/013). This positive outcome could possibly have resulted in improved hygiene conditions and lower transmission of diseases like diarrhea.

Actors have used this probable improvement in attitudes to emphasise the critical role of community engagement and behaviour change, and as a warning to not solely focus on infrastructure rehabilitation projects.

It is not possible to say for certain whether these positive shifts will be restricted to the duration of the Ebola outbreak, or to specific districts. There are also very few KAPs which were repeated over time, therefore it is not possible to record how community engagement impacted hygiene practices over time.

In the case of Guinea, lack of available information makes it more difficult to predict impact. Given the higher level of resistance to the response in Guinea, it is reasonable to suspect that the impact has been less significant (ACAPS, 04/2015).

Poor build quality and lack of maintenance: Lack of maintenance and the disruption of development programmes together present arguably the biggest consequences of the Ebola outbreak upon the three countries' WASH sector. The Ebola outbreak reduced what little maintenance that was being carried out in the community to nearly zero. The redirection of resources towards health, education and Ebola facilities for a year may well lead further deterioration of WASH facilities and monitoring systems, especially in communities as they were not the focus of Ebola WASH response.

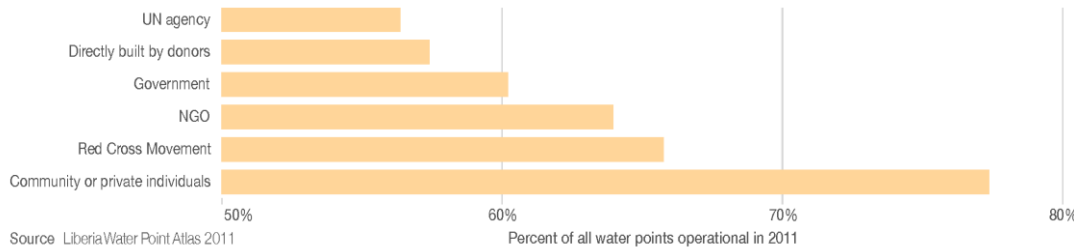
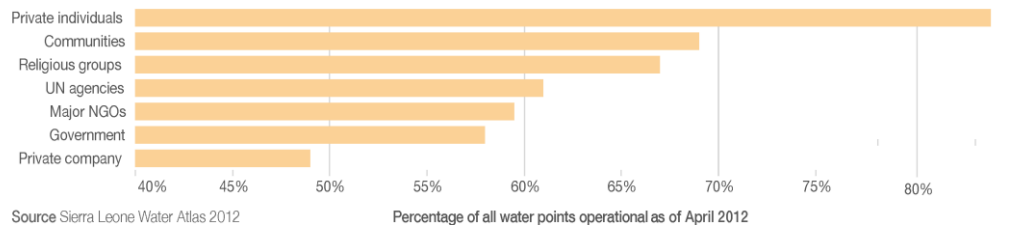
Chronic lack of maintenance was a long-term and severe obstacle to development in Guinea, Sierra Leone and Liberia long before the Ebola crisis. Pre-Ebola WASH

programmes placed too much emphasis on coverage, and not enough on sustainable service delivery. In general, the construction of new infrastructure projects has superseded the capacity to maintain these structures, and has not considered the burden of the cost of maintenance (PI Sierra Leone, 04/2015).

The DSRP states that lack of maintenance is the reason access to improved sanitation facilities in Guinea declined by 1.1% between 2007 and 2012. More significantly, access to water points fell from 74.1% to 68.6% in the same period. In rural areas the decrease was from 67.8% in 2007 to 57.1% in 2012, while urban areas saw an improvement from 90% in 2007 to 92.9% in 2012 (DSRP, 2013).

Poor maintenance means that gains achieved by investment are quickly lost. For example, between 2009 and 2010 the number of new water points in use increased from 0.24% to 1.4% due new constructions in rural areas. In 2011, this number had decreased to 0.7%, as a very large number of wells were no longer functioning. This could also be due to poor construction (DSRP, 2013).

Functioning water points by constructing group
Sierra Leone 2012



In Liberia, a third of water points built since 2004 were non-functional in 2011 (Liberia Waterpoint Atlas, 2011). In Sierra Leone, post-war emergency interventions reportedly did not prepare the communities for their maintenance. This, and a lack of minimum quality standards for construction, is blamed for the low water point functionality of approximately 62% in 2012 (AfDB, 09/2013). It is significant to note, however, that in the case of both Sierra Leone and Liberia, the water points that were most likely to be functional were those constructed by the community or private individuals. UN agencies performed worst in Liberia and private companies in Sierra Leone (Liberia Waterpoint Atlas, 2011; Sierra Leone Waterpoint Report, 2012). Given the evidence of deterioration of WASH

facilities in Guinea, it is possible that communities and private individuals are the best performing group in that context as well.

Without the support and training of the community and private individuals, the short-term boost of the large presence of international actors to WASH sector capacity is very likely to diminish. This is aggravated by people's reluctance to use WASH facilities that have been associated with Ebola infections, as well as the poor build quality and lack of maintenance of WASH infrastructure leading to an increase in non-functionality.

Water supply to Ebola treatment facilities: Each Ebola facility requires between 200L and 400L per day per patient. This likely meant a huge diversion of water from the local population to Ebola centres, particularly in big urban areas. The exact number of people affected by the diversion is unknown. In Freetown, it was estimated that between 1.3% and 15% of water was diverted (PI 04/2015; PI 02/2015; WHO 02/2015).

As the majority of Ebola facilities have now been decommissioned, and those that remain have minimal patients, this impact has probably subsided. However, the strain on infrastructure may have longer-lasting effects.

Urban Areas: Slums

According to responders in the field, the Ebola emergency has exposed the deterioration of capacity and quality of WASH services in urban centres. It has highlighted the gap in service provision to vulnerable communities, especially to the residents of the three countries slums.

In all three countries, WASH standards in slum areas are among the lowest, while the high population density makes the population most susceptible to waterborne diseases. Slum areas are often also more likely to flood due to their topography. Poor or non-existent safe water and sanitation facilities are also linked to high malaria and diarrhoea rates (Cities Alliance, 2008).

During the Ebola response, the lack of safety protocols and trained sanitation technicians were highlighted as major gaps in sanitation infrastructure and services (PI, 27/03/2015).

The density of urban slums also meant their populations were more adversely affected by the direct impact of burning and burial of waste in their vicinity.

In summary, slum areas have borne the brunt of the Ebola impact among urban populations, and have been made them more vulnerable to WASH-related dangers as a result. These concerns are particularly true for Freetown and Monrovia, where baseline statistics have been lower and restrictions of movement have been more frequent, and where Ebola case numbers have been higher than Conakry.

Rural Areas

Declining infrastructure due to weak maintenance is expected to have had a particularly detrimental impact in rural areas affected by Ebola. The rural/urban disparity in access to improved drinking water sources is already very wide. Remote communities have to travel further and have more logistical challenges finding alternative improved facilities and safe drinking water. They are also the least likely to benefit from any international response (Stratégie de relance, 2015).

Facilities

Like hygiene practices, facilities are likely to improve in the short-to-medium term. This is due to the attention they have received from humanitarian responders. Some NGOs have already planned or started implementing projects to improve WASH facilities beyond the scope of the Ebola response.

Based on previous records of WASH facilities maintenance, it is unclear how long these improvements will continue beyond international actors' withdrawal. In Liberia, there is a risk that the new water points, latrines and other WASH infrastructure constructed in schools, health posts, and local markets will not be provided with water, hand-washing facilities, or latrines, which might defeat the purpose of the infection and disease control measures which have previously been put in place as part of the Ebola response and by the national authorities (PI, 27/04/2015).

Furthermore, actors have warned that interventions by international actors often bypass governmental structures and systems. They provide urgently needed services to communities, but risk further erosion of local capacity (World Bank, 04/2015).

Aggravating Factors

Lack of investment and disbursement bottleneck: There has been a long-term lack of investment in national WASH programmes in all three countries.

In Liberia in 2012/13, only 1.2% of the Liberian government budget was allocated to WASH. The planned 2013/14 budget was even lower, at 0.4% (WASH SPR 2013).

In Sierra Leone, the sanitation budget has been especially underfunded. There is usually a delay in the disbursement of funds to ministries, departments, and agencies, despite the Government having timelines for planning and budgeting (Budget Advocacy Working Group, 2013). This has led to underfunded and inefficient implementation of government WASH programmes (PI Sierra Leone, 04/2015). This point can be generalisable to an extent to Guinea and Liberia.

Lack of data and monitoring systems: Population projections based on census data do not reflect variations in average population growth in urban areas, or at national level. Since the data does not accurately reflect the number of people in need of WASH support, the scope and funding of programmes are routinely underestimated.

An effective and sustainable monitoring system for the functionality of water points and latrines remains lacking (Adam Smith International, 04/2015). Monitoring systems were abandoned during the civil wars in Sierra Leone and Liberia, and have not been adequately resurrected.

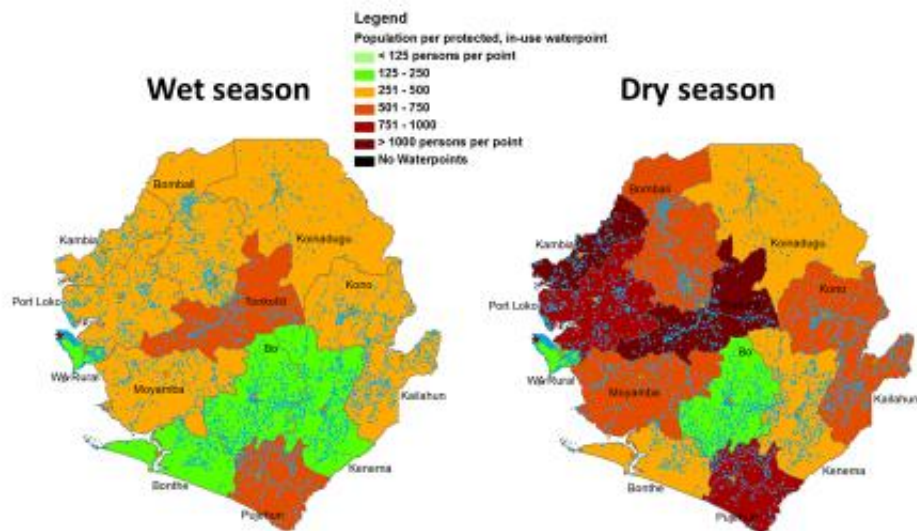
The rainy season: All three countries experience floods almost yearly during the May–October rainy season. Along with posing a threat to the lives of the most vulnerable, flooding also damages property and infrastructure. Low-lying slums, common in West Africa's urban areas, are particularly vulnerable to flooding due to poor drainage, with contaminated water contributing to the spread of waterborne diseases, including cholera (Overseas Development Institute, 01/2014).

In Guinea, the last floods which causes significant damaged happened in August 2011, and mainly affected the prefectures of Labe and Siguiro and areas of Conakry. At least 1,920 houses were damaged or destroyed, as well as 542 latrines and 212 wells, which had become unusable (IFRC, 29/11). At the time of publication, May 2015, there are reports that people living in flood-prone, low-lying parts of Conakry are moving to other locations in preparation for the wet season (PI, 05/2015).

In Sierra Leone it has been reported that flooding overwhelms existing systems. Contamination of drinking water and sewage overflows are common during the rainy season (Wateraid, 2012).

The dry season: The water table drops across the three affected countries during the annual dry season. It has already affected the Ebola response, with 35% of 121 Ebola facilities in Sierra Leone found to have inadequate water supply during the dry season (UNICEF 29/01/2015). Up to 40% of the protected in-use water points provide insufficient water in dry season in Sierra Leone. This is generally due to insufficiently deep wells or an inappropriate choice of water point location. The limited availability of safe water in the dry season means more people share the same water supply, which results in increased per capita water contamination, especially in densely populated areas (Ministry of Energy and Water resources, 2012).

Map of Seasonal Variations in Access to Water points in Sierra Leone



Source: Sierra Leone Waterpoint Report, 2012

The map above indicates the level of access to a functioning improved water point in the dry and wet seasons for Sierra Leone. Guidelines from the Ministry of Energy and Water resources (2012) state that access should not go above 250 people per water point. It demonstrates how far this number is exceeded across Sierra Leone.

The 0.1°C average increase in temperature each year, which may extend the dry season as well as making the rains heavier during the rainy season. This will cause more flooding and potentially extend the periods where the water table's depth affects water access (PI Sierra Leone, 04/2015).

Risks

Flooding during the rainy season dramatically increases incidence of cholera and other waterborne diseases throughout the three countries. Cholera is endemic in all three countries. According to WHO, the risk of an outbreak of another disease before Ebola is eradicated could have an increased impact on morbidity and mortality than would have been expected by an outbreak prior Ebola. This is because health service delivery has been weakened and use has decreased (ACAPS, 02/2015). This would present a particular risk if an outbreak occurred after or during the withdrawal of international

actors, as their presence is providing vital support to what remains of both the national WASH and health sector.

Cholera

Liberia

The Ebola outbreak in Liberia is over, and so the impact of overlapping outbreaks of cholera and Ebola is no longer a threat, unlike in the other two countries. In Liberia, WHO reported 207 cholera cases in 2012 and 102 in 2013. In previous cholera outbreaks, most cases were reported in Montserrado. Although no cholera cases have been reported so far in 2015, this does not exclude the risk of an outbreak following the rainy season, particularly in the face of a health system weakened by Ebola and a near non-existent WASH monitoring and maintenance system.

Sierra Leone

Although having fewer Ebola cases than Guinea, Sierra Leone should also be monitored for a new cholera outbreak. The last major outbreak was in 2012, affecting around 23,000 people and caused 300 deaths (GoSL MoH, 2012). Cholera outbreaks in 2007 and 2008 were less severe, with 84 deaths and 62 deaths, respectively (WHO, 2013). Cholera outbreaks in Sierra Leone have tended in the past to start in a coastal fishing community in Kambia to the north of the country, spreads down the coast by boat and by road to Freetown, where coastal slums are particularly vulnerable (GoSL MoH, 2012).

A consortium of different NGOs with WASH programmes in Freetown have identified 28 hotspots as particularly vulnerable to poor WASH related diseases. A hotspot was defined as an area which has had two of the three following criteria: previously recorded cholera cases, at risk of flooding, and reported Ebola cases. 15 are at risk of flooding and all 28 have had Ebola cases reported. All of the identified hotspots reported cholera cases in 2012, apart from Kissy Mental which is still considered at high risk of cholera due to its dire WASH conditions. According to the same consortium of NGOs, at least half of the urban population potentially exposed live in the Western Area, including in the urban and peri-urban slums of Freetown (Freetown WASH Consortium, 04/2015). (See map of hotspots on page 15).

12 of 21 cholera outbreaks in Guinea between 1970 and 2012 have been cross-border outbreaks between Guinea and Sierra Leone. Prior to the Ebola outbreak, there were 15 sentinel stations in Forécariah, Boffa, Coyah, Dubréka, Boké and Kindia monitoring the prefectures for signs of an outbreak (MoH, 2013). These are being reactivated through the WASH coordination in Conakry.

Guinea

The risk of a new cholera outbreak is perhaps of the greatest concern in Guinea, where Ebola case numbers are still high. The last cholera outbreaks were in 2012 and 2013. The coastal areas are generally those most affected by cholera. The 2012 outbreak saw 7,351 cases and 138 deaths. 2013 was less severe, with 319 cases and 32 deaths, with Conakry, Mamou, and Dubréka recording the highest case numbers. Of concern is the spread of cholera in 2013 to locations in the interior of the country, such as Mamou, where access to improved water and improved latrines is among of the lowest (see GDHS data above).

No cholera cases were reported in Guinea during 2014. This is likely due to improvements in hygiene conditions resulting from measures to contain the spread of Ebola (ACAPS, 02/2015).

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Other Water-borne Diseases

Liberia

In Liberia, reported cases of diarrhoea fell from an average of 146 cases per week to 76 cases per week between 2012 and 2013. But there are substantial gaps in data, meaning the decrease is not certain. 90% of child deaths linked to diarrhoea in Liberia were directly attributed to poor water, sanitation and hygiene in 2013 (UNICEF, 2013). In 2012, E. coli was present in 58% of Monrovia's water due to open defecation (Local Media 24/08/2013).

Sierra Leone

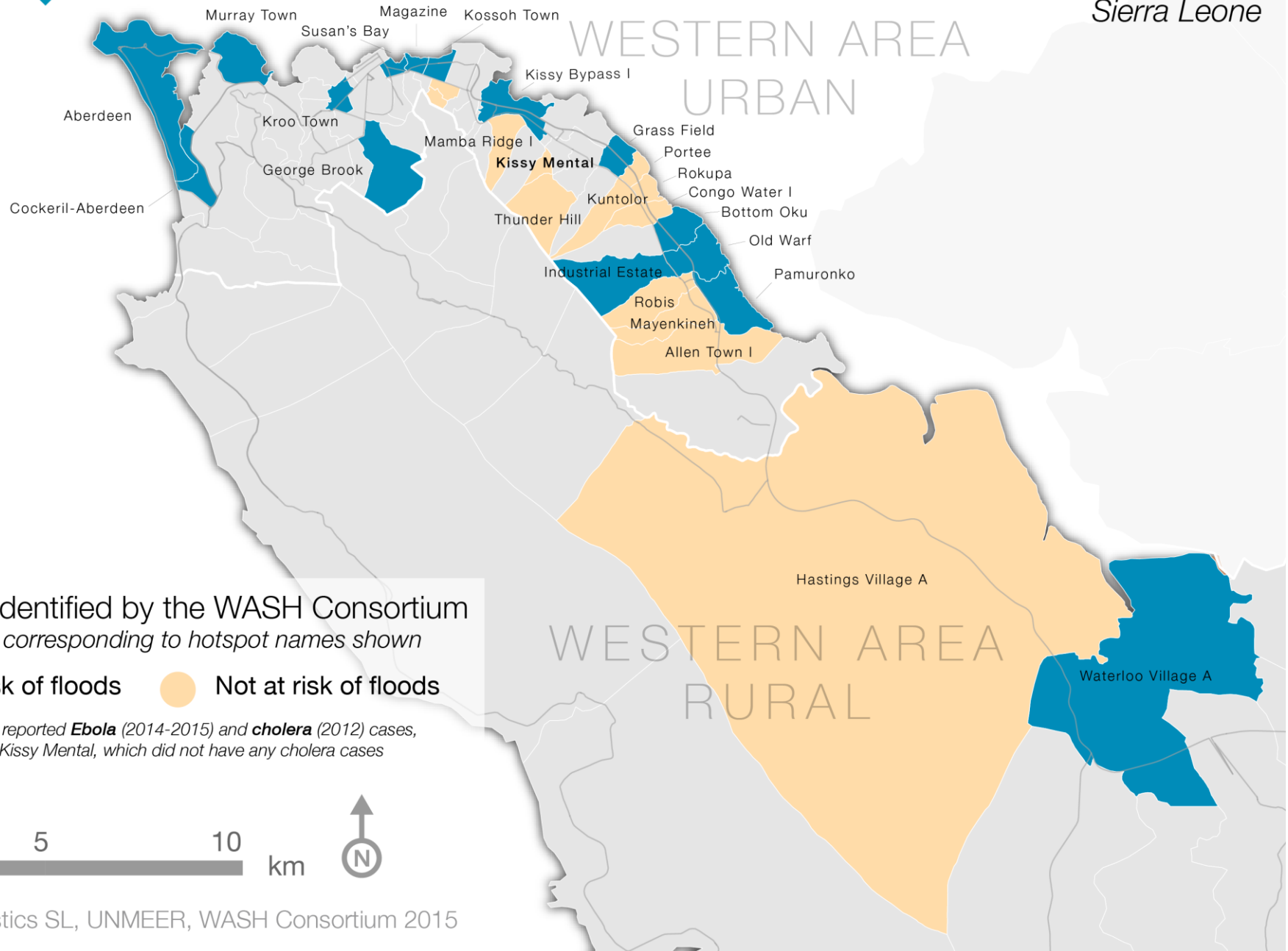
14% of the 217 children under five dying per 1,000 live births a year in Sierra Leone are due to diarrhoea. It is the third cause of infant mortality in the country (Freetown WASH Consortium, 04/2015). This is partly due to the poor WASH situation for most Sierra Leoneans.

Guinea

The incidence of diarrhoea in children under five in Guinea is 16% according to the GDHS 2012. This increases to 25% in children aged 12–23 months. Incidence is higher among children with reduced access to improved water sources and improved latrines (GMICS, 2012).

WASH Hotspots in Greater Freetown

Sierra Leone



Sources Statistics SL, UNMEER, WASH Consortium 2015

Information Gaps

The following information gaps should be filled in order to gain a more accurate understanding of the impact of the Ebola outbreak on the WASH sector in the three affected countries.

- WASH indicators at a community level, particularly communities most affected by Ebola.
- The impact of Ebola treatment facilities on the local environment, including liquid waste disposal, incineration, and general waste disposal.
- The impact of Ebola treatment facilities on the local WASH infrastructure.
- Nationally representative KAP surveys on hygiene practices in the community beyond the perspective of the Ebola response.
- Data on the impact of Ebola on WASH in Guinea, including information on facilities, as well as nationally.

Lessons Learned

Maintenance and community ownership are the keys to long-term WASH sector improvement. It has led to the minimal improvements seen over the last few years, as well as in some decreasing functionality of infrastructure. Whatever the benefit of the international Ebola response has been to WASH on the three affected countries, it will only ever be a short-term improvement without this shift in its approach.

Anticipating the impact of seasonality is crucial to mitigate the worst impact of the rainy and dry seasons. Their respective effects on water tables, flooding, and the risk of waterborne disease are well understood across the region. By taking account of their impact on WASH (including logistical restrictions), their negative influence could be reduced.

The disparity in WASH indicators between rural/slum areas, versus more relatively prosperous urban areas has been an outstanding problem for years and is not being adequately addressed. These issues will only slightly be diminished by short-term construction projects. WASH project design should emphasise any element that can provide longer-term solutions to this disparity.

Annex 1 - Background on the Ebola Response

The main WASH focuses of the Ebola response has been the following:

- **WASH in Ebola treatment facilities:** The primary focus of responders has been ensuring WASH standards within Ebola treatment facilities, for the safety of patients and staff. This has included carrying out IPC protocols, as well as the provision of water supply and sanitation to patients, and the safe, if not environmentally friendly, disposal of waste, medical and otherwise.
- **Social mobilisation:** At a community level, one of the major focuses of the response was to promote better hygiene and sanitation practices. However, actors trying to promote these changes have been affected by resistance from the communities. This is particularly true in Guinea (see ACAPS report on Resistance in Guinea).
- **Distribution of WASH supplies:** In the immediate response, actors focused on distributing household WASH kits, including chlorine, soap, and other supplies intended to alleviate and improve WASH standards in affected communities (UNICEF, 14/01/2015).
- **Strengthening non-Ebola health facilities:** Providing WASH facilities and services in non-Ebola health facilities, and schools. This has generally included improving access to water, sanitation, and proper waste management. It has been in addition to providing technical support and construction of facilities such as water points and latrines. As the crisis developed, support included preparing schools for reopening and the return of pupils: in January in Guinea, February in Liberia, and April in Sierra Leone.
- **Safe and dignified burials:** Responders have conducted burials of confirmed and suspect cases during the response. Protocols have changed over the course of the outbreak, sometimes dramatically, to reflect country and locality-specific custom and concern. Incineration has, at times, been used over burial.