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Water for the urban poor and Covid-19

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Question

What practical measures can be taken to improve the availability of water for the urban poor in light of COVID-19?

Contents

1. Summary

Water, sanitation and hygiene are vital for the suppression and treatment of Covid-19. To maintain and increase access to water for the urban poor and other groups during the crisis, eleven African governments have announced various forms of free water. This includes governments paying users bills in some contexts (e.g. Ghana) and provision of water for vulnerable communities and informal settlements in others (e.g. Kenya). Development partners are also supporting new water sources for poor communities, for example, the World Bank is supporting 20 new water points in DRC supplied by water from utility owned tankers.

Water utility companies, hereafter utilities, may be unable to recover costs through user tariffs during Covid-19, which could have implications for their financial sustainability. Decreasing revenues during emergency/crisis situations can increase utilities' reliance on government and donor funding. For example, low-cost recovery by utilities in the Middle East and North Africa during protracted crises since 2011 has increased dependence on international funding.

Poor service provision prior to and during a crisis can impact customers' willingness to pay for water, further reducing utilities revenues and creating a vicious cycle. In 2018, the City of Cape Town (CCT) tried to introduce a drought levy, which was rejected by the public, to cover some of the additional costs and fall in revenue as a result of the 2018 'Day Zero' crisis[1]. Instead the CCT have increased tariffs threefold and restricted 'free basic water' to certain households.

Appropriate tariff structures can support both poor people's access to water, through pro-poor policies and a focus on affordability, and the financial viability of utilities. Social or lifeline tariffs are a common feature of utilities service provision to the urban poor. However, they are usually cross-subsidised through higher tariffs for other users, including commercial users. Covid-19 may reduce the amount of water used by commercial customers and therefore decrease revenues.

Covid-19 may increase domestic water demand in contexts where cities are already suffering from water insecurity[2]. For example, in 2018, rainfall deficits shrank the Loka Reservoir, which supplies 70% of Bouake's (Ivory Coast) water (Niasse & Varis, 2020). Government responses including digging 44 new boreholes may not be effective in a context of a declining groundwater table. Covid-19 measures including quarantines and social isolation as well as the promotion of increased hand-washing could increase domestic water demand as people are at home more. Opening up new water supply solutions to meet demand during Chennai's (India) 2019 'Day Zero' crisis diverted water from poor, rural farming communities on the city's outskirts.

[1] Day Zero refers to the day the City of Cape Town estimated it would need to start active water rationing (turning off residential taps) as the storage levels in its six water supply dams would fall below 13.5%, leaving the city with just enough water to supply critical services. Since then the term has come to be used to refer to a city running out of water. For more information see https://theconversation.com/day-zero-is-meant-to-cut-cape-towns-water-use-what-is-it-and-is-it-working-92055

[2] This is just one possible scenario and it will be important to monitor how the Covid-19 pandemic unfolds in developing countries.

Free water, or waiving payment of social tariff amounts may not necessarily benefit the poorest. In Ghana, the lifeline tariff can benefit richer households which have their own meter, in comparison to poor households who live in compounds and share a meter, easily exceeding the 5,000 litre lifeline consumption (Mosello, 2017).

Utilities are vital for urban water service provision, but they do not necessarily reach the poorest. For example, in Nairobi, Kenya only 35.9% of informal settlement residents have access to in-house or plot connections. The poorest often rely on a range of water sources including private vendors, packaged water and storing water at home. However, the reality of utility water access is more complex than statistics suggests due to informal connections and vendors who resell utility water at higher prices. Estimating urban water access is also multifaceted as access and households having water security are not necessarily the same.

Direct provision of water to informal settlements and the poorest, as well as measures to extend access through the utility are likely to include a range of measures. Typically, emergency water responses in urban areas include water trucks, water storage tanks, digging additional boreholes, urgent water infrastructure repairs and community mobilisation to address utilities' embedded vulnerabilities. Utilities could open-up more standpipes and kiosks, reconnect customers who were disconnected due to non-payment of bills, and subside new household or plot connections.

Utility water is often cheaper than water accessed through informal water markets. For example, informal traders in Dhaka, Bangladesh charge 15-20 times the rate charged by the utility (GSMA, 2019). Utilities often have low-income customer units, which focus on the needs of poorer customers, and in some areas already work with community-based organisations and water user associations to provide water to the poorest. These efforts could be scaled-up.

Practical measures that could support water availability for the urban poor in light of Covid-19 could include:

- **Opening up additional pre-pay sources:** pre-pay solutions such as smart cards, vouchers and tokens can help poor households to manage water spending, and could also reduce human contact, supporting social distancing during Covid-19. In Dhaka, Drinkwell water ATMs have issued vendors with personal protective equipment (PPE), installed hand-washing stations and social distancing ground marks. These types of solutions could be paired with social safety net transfers.
- **Subsidising the price of utility water from communal access points:** In Kampala, the utility is opening up an additional 100 public waterpoints, with water charged at the public tap tariff. This tariff is cheaper than the household water tariff and cheaper than private vendors.
- **Working with private sector providers:** small-scale vendors and informal water markets often fill gaps in utility service provision. Utilities could work with these providers to supply water at regulated prices. There is growing interest from humanitarian actors in supporting market-based water responses in urban crises. This includes **social protection mechanisms such as vouchers** that can be exchanged for water or hygiene items.
- **Digitise payments:** Digital payments can reduce human contact, help poor customers to manage their water payments and use, and increase revenue collection for utilities**.** The Lilongwe Water Board in Malawi is emphasising digital payments in its social media

campaigns, and some mobile operators are waiving transaction fees or adopting other measures to facilitate mobile money use and adoption in light of Covid-19.

- **Fixing leaks to increase water supply:** Between 2012 and 2015, JIRAMA, Madagascar's state utility was able to increase the amount of water supplied by 12 million cubic metres through tackling both leaks and commercial losses.

Covid-19 government restrictions, such as quarantines, could affect access to water. During the 2014 Ebola outbreak in Sierra Leone, several maintenance routines were stopped and water trucks' access to informal settlements and other areas was limited as nearly 50% of Freetown was placed under quarantine (TKG, 2016).

There have been a number of calls to 'build back better' in light of Covid-19. Extending sustainable water access to the urban poor during Covid-19 could help cities to 'more equitably withstand the next crisis'[3]. In 2015, the Freetown and Liberia WASH Consortiums[4] argued that major investment was needed in safe water, sanitation and hygiene (WASH) to limit the spread of Ebola and ensure preparedness for any future outbreak (Oxfam, 2015). A lack of WASH, including in informal settlements, was also identified as a factor hindering recovery and development in the medium to long-term in Sierra Leone, Guinea and Liberia (ACAPS, 2015).

This rapid literature review focuses on literature from the last 10 years including both grey literature such as reports from the World Bank's Water and Sanitation Program, and academic literature from peer reviewed journals. As the response to Covid-19 is currently unfolding this paper draws on examples from urban water responses to crises in low and middle income countries, as well as work related to affordable water access for the poor.

2. Free water

Free water, in various forms has been announced by a number of African countries as part of their response to Covid-19. Publicly available information on how these commitments will be operationalised are scarce but announcements include[5]:

- **Burkina Faso**: subsidies for water bills and water points, removal of penalties on water bills and subsidies on water costs for market vendors.
- **Chad**: temporary suspension of payments for water bills for the lifeline consumption tariff.
- **DRC**: provision of free water for two months to households and hospitals.
- **Ethiopia**: the city of Adama providing water directly to those who need assistance.
- **Gabon**: the government will pay the water bills of the most vulnerable through a solidarity fund.

[3] See for example https://www.wri.org/blog/2020/04/coronavirus-inequality-cities

[4] Members included Oxfam, Wateraid, and other large non-governmental organisations.

5 Correct as of 24 April 2020. For more information on some of the countries see: https://www.herbertsmithfreehills.com/latest-thinking/covid-19-initial-responses-of-certain-african-countries-africa

- **Ghana**: the government will pay water bills for 3 months and supply water tanks to the vulnerable communities.
- **Kenya**: free water for informal settlements.
- **Mali**: government will pay the water bills of households on the social tariff in April and May.
- **Mauritania**: The state will pay water and electricity bills for poor families for two months. The state will also cover the costs of village water for the rest of the year for citizens of all villages.
- **Namibia**: the government will ensure that water points are kept open without a need for water cards during lockdowns, through NamWater and Local Authorities that will subsidise this service.
- **Senegal**: utility subsidy to 670,000 vulnerable households to pay water bills for two months.

Potential access modalities, such as opening up new water kiosks in underserved areas are considered in section 3 of this report.

Free water provision and urban utilities

Utilities are vital for urban water delivery. During the Covid-19 crisis response they are likely to be one of the key actors working to maintain and extend access to water in underserved areas, whilst potentially facing financial challenges due to failing revenues during the crisis. Water is provided through a system (from storage to treatment to delivery) and that system entails a number of costs (including operation and maintenance, servicing debt, staff, water treatment chemicals, energy etc.) and also need investment (WSUP, 2019; Pinto et al., 2018). Costs have to be recovered to sustain service provision (Pinto et al., 2018). Consequently, appropriate tariff structures are important for ensuring the long-term financial viability of utilities and can be designed to cover all users including the poorest (Yates et al., 2020).

Utilities may need financial support during the Covid-19 crisis if they are unable to recover costs through user tariffs. Water utilities are often funded from user tariffs, tax-payer subsidies, transfers and depreciation of existing assets (Gasson, 2017). Free water, with the government paying water bills or providing water is likely to mean that utilities cannot recover costs through tariffs in the short-term. An inability to recover costs could have knock on consequences including them being unable to pay for water treatment chemicals or water quality testing[6].

Development partners may support utilities during the crisis. Sanitation and Water for All (SWA, 2020) argue that where water and sanitation service providers are being asked to extend services beyond their usual remit, and where service providers are required to provide services at a lower rate or for free, this must be supported by financial packages to make up the shortfall to protect the provider from failing (SWA, 2020).

[6] https://www.devex.com/news/what-does-a-covid-19-response-look-like-with-limited-water-96834

The World Bank's menu of options for critical WASH interventions for effective Covid-19 pandemic response and building resilience to future risks includes providing financial support to water utilities to monitor and support cash reserves, availability of water supply and wastewater treatment chemicals, availability of electricity fuel for pumping and treating water, appropriate staffing levels, and routine or capital maintenance (World Bank, 2020). In April 2020, the European Bank for Reconstruction and Development announced the establishment of a Vital Infrastructure Support Programme to support utility finances in its 38 target countries, including MENA, Eastern Europe and Central Asia[7]. The programme will offer working capital lines to utilities and municipalities through local banks to help safeguard continuity of service and direct loans to compensate for Covid-19 related revenue losses.

Emergency preparedness may vary by utility. Evidence from the MENA region shows that many utilities did not have contingency plans in place to safeguard infrastructure and did not have emergency stocks prior to 2011 (Diep et al., 2017). Aging infrastructure and lack of investment can make service provision systems more vulnerable to shocks (Diep et al., 2017). Donor or humanitarian agency support projects also need to be aware of emergency preparedness. For example, in 2015, Oxfam reported that over 40% of the water-supply systems it supports in Hajjah, Haiti as part of the response to a 2010 earthquake were not functioning due to fuel shortages (Diep et al., 2017).

Domestic water demand and consumption could increase in developing countries during the Covid-19 response, as populations stay home more and need more water to wash their hands. This scenario could increase water demand further in contexts where the utility is already not able to meet demand. In many African cities water demand outstrips water supply: for example, in Nairobi the widening gap means water crisis management has become a permanent challenge for the city (Niasse & Varis, 2020). In Kinhasa, DRC, only 60% of the city's estimated water demand of 900,000 m3 per day is covered (Niasse & Varis, 2020). However, as the Covid-19 pandemic is unfolding it is unclear how water demand will be impacted. Potential increases in domestic water demand could be offset by a potential decline in water use related to economic activity.

Many utility networks also provide intermittent piped water supply, with people storing water at home to meet demand. Evidence from protracted crises in the MENA region suggests this can increase the risk of contamination, particularly if there is insufficient chlorine residue (Diep et al., 2017). Measures to support safe water storage at home may be needed during the Covid-19 crisis, particularly if lockdown type restrictions are implemented.

Examples of the impact of crises on utilities

Decreasing revenues during emergency/crisis situations can lead to declining revenues for utilities and increase reliance on government or donor funding. For example, low-cost recovery by utilities in the MENA region during protracted crises has been supplemented by direct financial support from central governments, often supported by grants or loans from the international community (Diep et al., 2017). In Jordan, the central government has covered utility energy bills or paid staff salaries to retain employees (Diep et al., 2017). Measures such as these highlight utilities lack of financial autonomy, are economically unsustainable, increase utilities'

[7] https://www.globalwaterintel.com/news/2020/18/ebrd-offers-lifeline-for-covid-hit-utility-finances

dependence on international funding and run the risk of worsening utilities capacities to become financially viable (Diep et al., 2017).

As a result of Cape Town's 'Day Zero' crisis, by 2018, the City of Cape Town (CCT) had suffered a USD 125 million deficit due to the drop in water sales, whilst facing mounting costs. It tried to introduce a drought levy in 2018, but this was rejected by the public, who were angry at being asked to pay a large additional tax while still under severe water restrictions (Muller, 2019). The CCT faced a number of additional costs during the crisis including tapping local aquifers to increase supplied, introducing smaller zones into the distribution network to more effectively manage pressure and reduce losses (Muller, 2019). Plans to open up further water resources were fast-tracked but the scale required could not be completed in time to address the immediate crisis (Muller, 2019). To address the financial implications of lost revenue due to restricted supply, the CCT have introduced new tariff structures (tripling pre-crisis water and sanitation costs) and restricted 'free basic water' to formally registered 'indigent' households (Muller, 2019).

Urban utilities often face a number of inter-related pre-existing challenges which could hamper their ability to maintain water supply during Covid-19. For example, challenges for the GVWC, the largely state-owned utility in Freetown, Sierra Leone include financial losses due to non-revenue water (both through informal connections that are not paid for and poorly maintained pipes and other infrastructure), poor management and poor network maintenance. Tariffs are highly subsidised with residential customers paying a flat fee[8]. Before the advent of Covid-19 increasing revenue was needed to fund the utility's current operation and invest in expanding the network.

Poor service provision prior to and during crises can impact customers' willingness to pay. A vicious cycle can be created (Diep et al, 2017). A crisis can impact both a utility's financial resources and its operations and maintenance capacity, resulting in poor service provision. Customers are unwilling to pay for poor service and become more reluctant to pay, thereby further decreasing utilities' revenue base.

The quality of service provision and willingness to pay are linked generally, regardless of crisis. Evidence suggests that the poor are willing to pay for water under certain conditions, including affordability and reliability. For example, following extension of the public water network into ten marginalised communities in Maputo, 60% of new customers thought the new service was a reasonable price (WSUP, 2019). As part of the extension, the initial connection fee was reduced by half (WSUP, 2019). A 2017 ODI report on urban water in Ghana found that poor people would be willing to pay for water if they received it on time, regularly and of good quality (Mosello, 2017). Weak revenue management systems can also reduce customers' willingness to pay (Banda & Mwale, 2018).

Utilities and tariffs

Affordability is a key criteria for water pricing in order to extend access to the poorest. The costs involved in water delivery combined with water being a human right, means that governments and providers should focus on affordability (IRC, 2014). This has been

[8] https://www.state.gov/mapping-freetowns-water-pipes-to-improve-service-delivery/

operationalised in a number of ways. For example, municipalities in South Africa provide 'free basic water' to the poorest, whilst in Ghana the lifeline tariff supplies a certain amount of water at a minimum charge. Consumption beyond lifeline or social tariffs is charged at different rates (Hoque & Wichelns, 2013; Pinto &Marques, 2015).

In South Africa, 'free basic water' has increased access to safe drinking water from 80% in 1990 to 95% in 2012 (Pinto et al., 2018). The provision of 'free basic water' is partially supported by a national government unconditional grant indexed to local poverty levels, but this does not cover the full cost (Heymans et al., 2016). Water service providers in South Africa largely operate according to cost recovery with a block tariff structure whereby high-volume users pay more to subsidise low-volume users and infrastructure (Bischoff-Masttson et al., 2020). Revenues are typically insufficient to cover operational costs, particularly rehabilitation and repair of infrastructure (Bischoff-Masttson et al., 2020).

Appropriate tariff structures can support both poor people's access to water and the financial viability of utilities. Social tariffs and cross-subsidisation are key mechanisms that can support full cost recovery and social inclusion (Yates et al., 2020). For example, in Uganda, the National Water and Sewerage Corporation (NWSC) has been able to cover its operational costs plus depreciation and also generate a surplus that is put back into the system (Yates et al., 2020). The NWSC has a social tariff that is cross subsidised by higher socio-economic groups (Yates et al., 2020). Water and Sanitation for the Urban Poor (WSUP) argue that building strong utilities that can provide services for the poorest is key to tackling the water crisis (WSUP, 2019). The Stockholm International Water Institute (2020) argue that financial governance and sustainability are essential if we are to meet policy objectives to provide water for all (Yates et al., 2020).

Cities in sub-Saharan Africa that have been able to provide good water services to the poor often include utilities that were able to improve financial performance, generate surpluses to support investment in infrastructure to serve the poor, and adopt pro-poor strategies to overcome financial and nonfinancial barriers to serve the poor (Heymans et al., 2016). The impetus for change often includes changes in the general or specific political economy, which enabled or allowed the turnaround of underperforming utilities (Heymans et al., 2016). (Heymans et al., 2016).

Covid-19 may impact the cross-subsidisation mechanisms utilities use to support social tariffs and full cost recovery. For example, in Manila, Philippines, the utility's social lifeline tariff for low income customers using below 10 cubic metres a month is subsided by business users (Hoque & Wichelns, 2013). Lockdowns or restrictions on businesses opening will reduce the amount paid by business customers.

Due to the unfolding nature of the current Covid-19 pandemic, its impact on urban utilities and water access for the poorest is unknown. Water prices are politically sensitive (Pinto et al,.2018). Yates et al. (2020) argue that historically political promises to lower or abolish water tariffs or over-promising on water delivery can led to a cycle of utility decline. This includes utilities are unable to cover their costs and look to other sources of funding, usually governmental (taxes or transfers); the utility's performance tends to decline due to lower revenues leaving the community with negative disconfirmation of service expectations; and, declining performance and financial unsustainability means the utility is an unattractive investment for other funders and financiers (Yates et al., 2020). During this cycle, water users use water inefficiently and become less willing to pay as service deteriorates (Yates et al., 2020) Introducing water tariffs after a

period of free water can be controversial, as the case of Ireland demonstrates (Pinto et al., 2018).

Tariffs and water conservation

Tariffs and water conservation are linked. Pinto & Marques (2015) argue that the use of free allowances has been criticised for leading to efficiency losses as customers do not have a marginal incentive to conserve water. Examples include:

- In the MENA region flat tariffs do not provide incentives to save water, and in urban areas in Jordan water conservation at the household level is low. Water authorities have suggested this is due to a lack of public awareness of the need to conserve water (Diep et al., 2017).
- A qualitative user survey of 326 users of Drinkwell's water ATMs in Dhaka, Bangladesh found that pre-payment for water had led users to be more accountable for water use and reduce waste. Survey respondents acknowledged a tendency to waste resources if they were received for free (GSMA, 2019).
- Tariff increases in Manaus, Brazil, where the majority of the 1.6 million residents are supplied through the municipal water network led to substantial consumption drops in metered households (Olivier, 2010).

Hoque & Wichelns (2013) examined the tariffs in 60 cities across 43 cities in Africa, Asia, Europe, North America and Australia. Findings include:

- Increasing block-rate tariffs are helpful in providing low-income consumers with essential water volumes at low prices while encouraging wealthier consumers to use water wisely.
- Metering is essential to promote conservation using price signals.
- Many utilities implement fixed water charges to ensure they generate a target level of revenue each year. Often, such tariffs include a relatively low volumetric price for delivered water, thus providing little financial incentive for households to use water wisely.

Stakeholder engagement and raising public awareness are important to increase both customers' support for water tariffs and water conservation (Pinto et al., 2018). Combining these with the use of smart technologies is also important (Pinto et al., 2018).

Free water and equity

Typically, across cities in Africa formal access to utility water is low. Utilities do not usually cover informal settlements (Niasse & Varis, 2020). Consequently, governments paying customers' water bills during the Covid-19 crisis may not reach the poorest. Estimates of the poor's access to utility water in cities in Africa includes:

- **Nigeria**: 15.7% of urban households had access to utility connections (piped water to the premises, public tap, or public standpipe) in 2013 (Abubaker, 2018).
- **Kinhasa, DRC**: one-third of residents are not connected to the city's drinking water network (Niasse & Varis, 2020). households with access to tap water suffer from water quality problems and frequent service disruptions, partly due to the ageing water infrastructure.

- **Freetown, Sierra Leone**: 60% of the population access water through the utility GVWC[9].
- **Nairobi, Kenya**: 35.9% of slum-area households have access to in-house or in-compound piped drinking water (Talukdar, 2018).
- **Lilongwe, Malawi:** In three informal settlements 90% of households are dependent on utility water, with on average 71% accessing water through kiosks and the remainder accessing water through a neighbour with a connection, their own connection or a shared yard connection (Banda & Mwale, 2018).
- **Sub-Saharan Africa**: Mitlin et al. (2019) compiled data for Kampala (Uganda), Lagos (Nigeria), Maputo (Mozambique), Muzu (Malawi) and Nairobi (Kenya) and found that 22% of households in the cities had access to piped water to the plot. Figures were lower for informal settlements. For example, in Makoko settlement in Lagos no households had access to utility water in any form and rely on surface, ground and rainwater, and bottled water.

However, it is important to note that **the reality of how many poor people access utility water may be more complex** than the figures above suggest. A USAID funded project in Freetown, Sierra Leone is mapping the city's water system including the extent of piped water areas and informal connections[10]. Private water vendors may also access utility water and then sell it on to other customers at a higher price.

Estimating access to safe drinking water in urban areas is complex. Mitlin et al. (2019) argue that policymakers overestimate access due to limitations in global urban water data. For example, the universal categories used to measure and monitor access by the Joint Monitoring Programme do not identify the urban populations that are at risk (Mitlin et al., 2019). The proportion of the urban population with access to piped water has decreased since 1990 (Mitlin et al., 2019). HWISE (the Household Water Insecurity Experiences scale) goes beyond measures of water availability and quality to capture the unique experiences of water-secure individuals using a cross-culturally validated scale[11]. The HWISE scale provides data that can be used to assess the prevalence of water insecurity at the household level, identify vulnerable populations, monitor and evaluate interventions and determine cost-effectiveness.

Waiving payment of social tariff amounts may not necessarily benefit the poorest. For example, in Ghana, the lifeline tariff introduced in 2008 is more likely to benefit richer households than poor ones (Mosello, 2017). In low income urban areas, people generally live in compound housing, with multiple households sharing one water meter (Mosello, 2017). Consequently, consumption easily exceeds the lifeline threshold of 5,000 litres per month (Mosello, 2017). Wealthier households are more likely to benefit as they are more likely to live in a house with its own meter (Mosello, 2017). This incentivises private sellers to sustain an alternative market to the utility, GWCL, providing water at higher costs and lower quality (Mosello, 2017).

Poor households often rely on a mix of sources to meet their water needs. For example, in Dar es Salaam residents of informal settlements rely on a mix of boreholes supplying public

[9] https://www.state.gov/mapping-freetowns-water-pipes-to-improve-service-delivery/

10 https://www.state.gov/mapping-freetowns-water-pipes-to-improve-service-delivery/

11 For more information see https://sites.northwestern.edu/hwise/

standpipes, kiosks set up by the water utility, informal connections, drilling wells, installing water pumps and reserve tanks, and informal water vendors that rely on boreholes or utility taps amongst other sources (Niasse & Varis, 2020)[1]. Utility water supply to kiosks and standpipes is also intermittent. In Abuja, Nigeria, in-depth interviews with 60 household heads or their spouses found that coping strategies included: water storage (90%), bottled and sachet water (82%), water vendors (78%) and fetching water from neighbours (60%) were prefered for coping with inadequate water supply over water conservation and recycling (38%), boreholes (23%), home water treatment (15%), and surface water (10%) (Abubaker, 2018).

The provision of different forms of free water during Covid-19 also raises questions about the quantity of water people will be able to access. 25 litres per capita per day, seen as the minimum standard to sustain life, is insufficient to meet the requirements for consumption and basic hygiene (IRC, 2014). It may also not be enough to support households where someone is living with HIV/AIDS (Smith, 2012), or to facilitate increased handwashing. Residents of poor communities in eThekwini municipality, South Africa, successfully lobbied the municipality to increase 'free basic water' to meet their basic needs (Heymans et al., 2016).

3. New water sources

Opening up new water sources in underserved areas and informal settlements, including standpipes and kiosks[12], supported by utility water is a key measure for increasing water availability for the urban poor. For example, in DRC the World Bank is flexing its DRC Urban Water Supply Project to include financing for 20 new shared water points in densely populated areas that lack access to water: large water storage containers will be supplied by tanker trunks that the utility already owns[13].

In the context of Covid-19, new communal water sources will need personal protective equipment for vendors, and social distancing measures. In Dhaka, Drinkwell water ATMS have installed hand-washing stations and social distancing measures in response to Covid-19. Installing standpipes at frequent intervals could also reduce social contact and queueing times. For example, in Niamey, 78% of the poor access water through a public tap with an average roundtrip collection time of 12 minutes (Heymans et al., 2016).

Insights from previous emergency WASH responses in urban areas include a range of approaches and service delivery models during the relief and stabilisation phases. For example, in protracted conflict and humanitarian situations in Syria, Iraq, Libya, Yemen, Palestine, Jordan and Lebanon responses, **urban utilities** have typically relied on contingency stocks, repairs and replacements with spare parts as well as using generators during power disruptions (Diep et al., 2017). However, the ability of the utilities to continue regular supply has decreased over time (Diep et al., 2017).

[12] A kiosk is a water point owned by the water utility, a water user association, or any other private entity, where piped water supplied by the utility is sold to the surrounding community on a cash basis. In Lilongwe, a kiosk can serve up to 50 households. These are mostly used in low-income settlements where households may not afford a private water connection (Banda & Mwale, 2018).

[13] For more information see https://www.worldbank.org/en/news/feature/2020/04/20/tackling-covid-19-coronavirus-with-water-sanitation-and-hygiene-in-drc

Typically, humanitarian and development crisis responses in urban WASH include (Diep et al., 2017):

- Directly providing water through temporary solutions such as water trucks, urgent repairs and provision of generators where electricity may be a problem during the emergency/relief response phase.
- Rehabilitating infrastructure and drilling additional boreholes, and staff training and community mobilisation to address utilities' embedded vulnerabilities during the stabilisation and development phases.

A 2017 IIED report focused on the resilience capacity of utilities in the MENA region recommends a number of measures throughout the preparedness-relief-stabilisation-development phases of crises related to building utilities' resilience through efficient resource management. These include (Diep et al., 2017):

- Emergency plans and contingency stocks should be in place to enable utilities to reduce risks of service disruptions. Have these elements in place can help utilities maintain services. In Gaza, constructing decentralised warehouses to hold emergency equipment in each governorate enables quick responses during any crisis.
- Human resources and internal capacity can be sustained during crises and enhanced over time when utility staff are well trained and able to multitask.
- Reducing non-revenue water (NRW) increases utilities' financial viability and autonomy while helping to serve more water to affected people.
- Efficient use of water and energy resources provides more sustainable solutions.
- Up-to-date data helps to inform decision-making in relation to actual needs.
- Partnerships with independent providers, both formal and informal provide multiple benefits to utilities but stronger/enforced regulatory frameworks to monitor independent water provision may be required.
- Community engagement and mobilisation to maintain relationships, improve accountability and trust and help to make services more efficient.

Donor support for urban WASH in crises should also help bolster utilities' capabilities (Diep et al., 2017). This can help utilities to become resilient to continuing pressures (Diep et al., 2017). Recommendations for humanitarian and development agencies include better analysis and understanding of the needs and capacity gaps of utilities by humanitarian and development agencies (Diep et al., 2017). Creating parallel water distribution systems to public ones can create high inefficiencies int the water sector (Diep et al., 2017). This can often result from discoordination between international agencies and local actors (Diep et al., 2017).

Water resources supply considerations

Many African cities are already suffering from water insecurity. Examples include (Niasse & Varis, 2020):

- In the first half of 2019, Harare and Bulawayo, Zimbabawe faced water shortages; in Maputo residents only had access to tap water on alternate days;
- In Dakar water tankers were used to supplement the failing utility-managed distribution network.

- In 2018, in Bouake, rainfall deficits shrank the Loka reservoir, which supplies 70% of the city's water supply: the government responded with tankers and digging 44 boreholes, however these will only be effective if the current trend in groundwater table dropping is decreased (Niasse & Varis, 2020).

Investment gaps in water storage and aging infrastructure have contributed to urban water crises (Niasse & Varis, 2020). **Covid-19 restrictions could pose challenges for construction of new large water infrastructure projects such as water storage and treatment plants.**

In light of existing water insecurity it is important to consider where the water to supply new water sources will come from. For example, in Chennai additional water tankers during the 2019 'Day Zero' crisis diverted water from poor, rural farming communities and had implications for groundwater levels as private vendors sank new boreholes in rural areas[14]. In water scare or arid areas drilling additional wells or increasing pumping rates could mean aquifers are depleted faster than they naturally replenish (Diep et al., 2017).

Whilst supporting efficiency during crises can be difficult, it can have medium to long-term benefits (Diep et al., 2017). External support to resource efficiency in the MENA region has included aquifer recharge in Egypt, reducing leaks, and using treated wastewater to minimise freshwater use in agriculture in Jordan (Diep et al., 2017).

4. Practical measures to increase availability

Lessons learned about increasing service provision to poor include tackling both financial and non-financial barriers. Measures include curbing water mafias and on-sellers who charge excessive mark ups; and, improvising new technical and institutional arrangements for informal settlements and areas with informal land tenure including working with small providers to deliver services where the utility cannot (Heymans et al., 2016).

Utility water is often cheaper than water accessed through informal water markets (WSUP, 2019). For example, in Dhaka, many urban poor have to rely on 'illegal' connections or buy expensive, low-quality water from informal traders, which often charge 15 to 20 times the rate charged by the utility (GSMA, 2019). Development partners have urged governments to consider measures such as subsiding connection costs and reconnected users who were disconnected for non-bill payments as measures to support access in response to Covid-19[15]. This could build on measures some utilities already have in place. For example, in Kampala, the utility operates an affordable connections policy, whilst in Dakar the utility subsides the connection cost for poor households through the water rates (Heymans et al., 2016).

Many utilities have low-income customer units, recognising that poor customers have different requirements to higher-income customers (WSUP, 2019). For example, Nairobi City Water and Sewerage Company elevated its Informal Settlements Department (established in 2008) to a business unit, the Informal Settlements Region increasing staff from 30 to 180

[14] https://www.wri.org/blog/2019/10/responding-day-zero-equitably-water-crisis-lessons-cape-town-and-chennai

[15] See for example https://www.devex.com/news/what-does-a-covid-19-response-look-like-with-limited-water-96834

(Wateraid, 2016). Working with low-income customer units could support extending access to water during Covid-19 as these units have pre-existing relationships with community-based organisations and knowledge of the customer base and the barriers they face in accessing safe water.

Opening up additional pre-pay sources

Pre-pay solutions allow the poor to control their spending and also help utilities collect revenue. In the context of Covid-19 pre-paid solutions such as smart cards, vouchers and tokens could reduce human contact. For example, Nairobi City Water & Sewerage Company operate water ATMs in Mathare informal settlement. Users swipe a smart care, topped up at a kiosk or via mobile phone, at the dispenser, select the amount of water they want to purchase and receive water via the tap[16]. The ATMs are operated by local women and youth groups and provide safe, affordable water. The utility has also worked with Water and Sanitation for the Urban Poor to install prepaid Token Dispensers in Korogocho & Kahawa Soweto settlement, which provide water 24/7 at a regulated price.

Community engagement in water kiosk decision-making increases use (Contzen & Marks, 2018). Evidence from an informal settlement in Nairobi with a community-owned kiosk, constructed by a non-profit foundation, suggests that the more survey participants felt a sense of ownership over the kiosk, the greater the share of water they consumed came from the kiosk, despite it being more expensive than other sources (Contzen & Marks, 2018). A sense of ownership was associated with high perceived water quality and low perceived effort of kiosk use (Contzen & Marks, 2018).

Pre-payment solutions may not be appropriate in all contexts. Evidence from Karoi in Zimbabwe suggests that residents object to the installation of prepaid water meters (Reniko & Kolawole, 2019). Reasons include water is an indispensable commodity and a human right, consequently, prepaid water meters run counter to the constitution as they derive low-income citizens of water if they cannot afford to pay (Reniko & Kolawole, 2019).

Reduce/subsidise the price of utility water from communal access points

In Kampala, the utility relies on standpipes to serve the poor, and ensures that standpipe tariffs are kept lower than the tariff for water piped to the premise (Heymans et al., 2016). The cost of a 20-litre jerry can is 55% of the cost from a household water connection and substantially less than water vendors and resellers charge (Heymans et al., 2016).

Uganda's National Water and Sewerage Company is partnering with MTN-Uganda, the country's largest telecommunications company to provide **100 public waterpoints in water stressed areas of Kampala that currently receive intermittent or no water**[17]. Each water point will be supplied by a 10,000 litre capacity tank, with water charged at the public tap tariff. Currently,

[16] For more information see https://www.thesourcemagazine.org/ncwsc-bets-big-on-technology-to-provide-water-and-sanitation-services-to-nairobis-urban-poor/

17 For more information see https://www.nwsc.co.ug/notices/news/98-nwsc-and-mtn-ug-in-water-relief-partnership-amidst-covid-19-trials

peak water demand in Kampala is 300 million litres per day, but utility production is 240 million litres. The utility is constructing a new water treatment plant to bridge the shortfall.

Work with community-based organisations

Community-based organisations (CBOs) and water user associations (WUAs) manage and oversee service delivery on behalf of the utility in some informal settlements, helping to extend access to the poor. Working with CBOs or WUAs can increase community-buy and overcome challenges related to the community not trusting the utility or being unwilling to engage or pay for services (WSUP, 2019). Arrangements whereby CBOs or WUAs run services on behalf of the community means that communities have a say in how the service is delivered, where facilities are built, and boosts local employment (WSUP, 2019). Examples include (WSUP, 2019; Wateraid, 2016):

- In **Madagascar**, the utility JIRAMA allows the WUAs to retain some of the profits so that they can be invested in improvements to the community.
- In **Lilongwe, Malawi** WUAs manage a system of pre-paid water kiosks following utility concerns about extensive non-payments and threats of wide-scale disconnections.
- In **Nairobi, Kenya** WUAs manage pre-paid kiosks.

Many informal settlements have a range of local groups and community structures that provide and advocate for services as well as collecting data on residential populations and facilities (SSHAP, 2020). These groups could be particularly well-placed to mount Covid-19 responses (SSHAP, 2020).

Work with private sector providers

In cities across developing countries water supply gaps are usually filled by the private sector, especially small-scale operators (e.g. water trucks and vendors). There are some examples of utilities working with private providers to extend access at more affordable prices. For example, in Ouagadougou the utility works with small entrepreneurs to resell water at controlled prices to residents of informal settlements (Heymans et al., 2016).

Building the capacity of service providers and working with market-based solutions can improve service provision (Mercy Corps, 2017). In DRC, Mercy Corps has worked with the government to rehabilitate and expand the Goma Water Network to reach 150,000 unserved residents, as well as delivering hygiene promotion through mass campaigns and radio messaging (Mercy Corps, 2017). Concurrently, Mercy Corps is focusing on increasing the capacities of water systems managers and empowering communities to participate in water systems management (Mercy Corps, 2017).

Humanitarian agencies are also beginning to work with WASH market systems to improve the efficiency and effectiveness of the crisis response in urban areas (Parkinson et al., 2018). This involves using market supply chains to provide goods and emergency services via existing market actors (Parkinson et al., 2018). In WASH responses this can involve contracting water truckers, small grants to repair water supply systems, or issuing vouchers that recipients can exchange for water, hygiene items or use of privately operated toilets or washrooms (Parkinson et al,.2018). In 2019, the Global WASH Cluster Technical Working Group for WASH

and Market Based Programming issued a *Guidance on Market Based Programming for Humanitarian WASH Practitioners* [18]

Oxfam, funded by USAID, undertook a two year project focusing on market based programming, In Gumbo, one of the poorest parts of Juba, South Sudan, Oxfam supported the construction of a solar powered water treatment plant, owned by the community: this will help to overcome dependency on fuel for treating water, which has increased the price of water in Juba[19]. Oxfam is working with the operator to understand market demands, function more commercially and be better equipped to deal with a crisis (Parkinson et al., 2018). The aim to supply water to household via existing bicycle water vendors and water tankers (Parkinson et al., 2018).

Explore social protection mechanisms

Working with WASH market systems can be part of social protection responses to a crisis in urban areas. The majority of cash transfers programming for WASH uses vouchers due to concerns that cash would not be used for WASH commodities (e.g. soap, menstrual hygiene products and containers for storing water (Parkinson et al., 2018).

In 2011, Oxfam undertook a 4 month project supporting vulnerable households in three communities in Gaza with water vouchers that were used to purchase water from vendors (trucks) to test whether vouchers could be effective. Programme activities included water tank distribution, awareness sessions on chlorination and safe water chain, water quality monitoring, distribution of water vouchers and reinforcing chlorination at the water vendors' points (Oxfam, 2013). Whilst 98% of Gaza residents are connected to the water network, 97% of the population purchase water from private vendors who own medium scale desalination units (Oxfam, 2013). The programme provided safe drinking water to more than 90% of targeted beneficiaries (Oxfam, 2013). It also resulted in behaviour change in terms of more people drinking chlorinated water, although a 2013 evaluation argues that sustained follow-up would be needed (Oxfam, 2013).

Digitise payments

Digital payments can reduce human contact, help poor customers to manage their water payments and use, and increase revenue collection for utilities. The Lilongwe Water Board in Malawi is emphasising digital payments in its social media campaigns in light of Covid-19. Some mobile operators are waiving transaction fees or adopting other measures to facilitate mobile money use and adoption in light of Covid-19[20] and Kenyan President has publicly urged people to shift to cashless transactions to avoid spreading the virus when paying for goods[21].

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[18] The Guidance can be accessed here: https://resourcecentre.savethechildren.net/node/15664/pdf/gwc_mbp_wash_guidance_190725.pdf

[19] For more information see https://views-voices.oxfam.org.uk/2017/08/water-tankers-bicycles-lifeline-south-sudan/

[20] For more information see https://www.gsma.com/newsroom/blog/keeping-the-world-connected-development-challenges-in-times-of-covid-19/

21 For more information see: https://www.weforum.org/agenda/2020/04/africa-technology-coronavirus-covid19-innovation-mobile-tech-pandemic

Digital payments can also overcome barriers for poor customers. A 2018 case study of the Lilongwe Water Board and service provision in urban areas found that 16% of surveyed customers identified inconvenient billing paying options and 16% not receiving bills as key factors affecting willingness to pay (Banda & Mwale, 2018). A study of 25 water and sanitation providers (including utilities, small water enterprises and others) across Africa, Asia and Latin America also found that digital payments can improve customers' willingness to pay (Waldron et al., 2019). Similarly, a World Bank Water and Sanitation Program case study of Uganda found that with the introduction of the E-water billing system the utility was able to collect payments from 98% of its customers and customers are more willing to use the system to pay for services as their accounts are credited in real time (Ndaw & Mutono, 2015).

Digital payments can significantly reduce collection costs and increase revenue for utilities and can extend customer reach. For example, Safe Water Network in Ghana went from a 30 percent net loss to 1 percent net surplus by introducing digital payments tied to a prepaid service (Waldron et al., 2019). Uganda's National Water and Sewerage Company implemented an E-water billing system in 2011, which along with payment points at participating banks, has reduced bill collection costs, and increased revenue by 15% (Ndaw & Mutono, 2015).

Issues to be aware of when promoting digitalising payments include are there enough mobile money users, will the transaction fees deter customers, and the difficulty integrating mobile money providers (Waldron et al., 2019). To be effective, utilities should partner with as many mobile money payment providers as possible, including the biggest in a particular market (GSMA, 2019). This should be accompanied by customer education to help uptake (GSMA, 2019).

Digital billing systems could also support the Covid-19 response more generally. Mobile payment platforms improve communications between utilities and their customers which is an important part of customer engagement (Gasson, 2017). During Covid-19, utilities could send hygiene messages to customers mobile phones as well as water conservation messages, and mobile systems could offer a quick, easy payment mechanism for social protection safety nets.

Reduce non-revenue water: fix leaks and increase supply

Fixing leaks can increase the amount of water available in the system. Strategies to reduce consumption during Cape Town's 'Day Zero' crisis largely relied on reducing consumption amongst middle class users, but concurrent strategies included reducing water losses in low-income users' distribution networks (Muller, 2019).

Aging infrastructure is a problem in many African cities. For example, in Dar es Salaam, 20% of supply is lost due to aging infrastructure and illegal water abstractions in a context where the utility is only able to meet just over 50% of water demand (Niasse & Varis, 2020). Approximately, 20% of water supplies to Dakar from Lac de Guiers, 250km away (which supplies approximately 50% of Dakar's water), are lost along the water pipe (Niasse & Varis, 2020). A 2018 case study of the Lilongwe Water Board's performance in supplying water to informal settlements found that repair costs for the pipe network are extremely high in those areas (Banda & Mwale, 2018).

Combining technical and institutional solutions to tackle non-revenue water, **JIRAMA, Madagascar's state water and electricity utility, supported by WSUP was able to increase the amount of water supplied by 12 million cubic metres between 2012 and 2015** and the

continuity of water supply from 3 hours per day to 6-34 hours per day (WSUP, 2017). These benefits were translated into better services: new water kiosks were built in underserved areas, and 710,000 low-income customers have benefited from the NRW reduction programme since 2010 (WSUP, 2017). Financial projections suggest a net gain of USD 1.4 million (including operation and maintenance costs) in 10 years from 2017 (WSUP, 2017).

Analysis by JIRAMA, estimated that the utility was losing 19-20 million cubic metres of water per year in Antananarivo due to infrastructure and commercial losses (WSUP, 2017). This contributed to JIRAMA being unable to provide an adequate service to existing customers and unable to extend services into new areas (WSUP, 2017). Customers can be reluctant to pay for a bad service, which further reduces the revenue available for network improvements (WSUP, 2017).

Technical solutions included setting up District Metered Areas in peri-urban areas and part of central Antananarivo to measure and isolate the amounts of water piped to these zones so leaks could be identified and active leak management undertaken; and, introducing pressure reducing values to deal with pressure management including reducing nightly leakage rates and improving water delivery (WSUP, 2017). Institutional solutions included establishing a NRW unit, a leakage and repair detection service and a low-income customer unit (WSUP, 2017).

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