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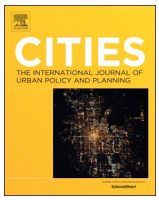

COVID-19 challenges and WASH in informal settlements: Integrated action supported by the sustainable development goals

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The spread and impacts of COVID-19 have exposed multiple and cascading vulnerabilities, which particularly affect urban informal settlements. In light of such threats, it is vital to understand how interventions in the Water, Sanitation and Hygiene (WASH) sector are required and how these can positively affect cities in multiple ways. The 2030 Sustainable Development Goals (SDGs) global agenda calls for integrated approaches to development in order to revisit the way societies are built and to more effectively include marginalised populations. Parikh et al. have identified positive linkages between sanitation and 130 of the SDG Targets of the 17 Goals (Parikh et al., 2020a). Their work demonstrates how investments in WASH (SDG6) "to ensure availability and sustainable management of water and sanitation for all" can lead to further achievement of multiple goals, including health (SDG3), gender (SDG5), education (SDG4) and cities (SDG11), and the value of such integrated interventions to tackle challenges facing humanity.

The COVID-19 pandemic has exposed long-lasting issues in WASH. An estimated 60% of people in the world, and only 38% in least developed countries have a basic handwashing facility with soap and water at home, leaving out about 3 billion people (United Nations, 2019). Between 2000 and 2014, the number of people living in informal settlements has increased from 807 million to 883 million where these facilities are commonly lacking (UNDESA, 2019). Urban settlements are often characterised by high population densities and narrow pathways reducing mobility. In addition, sub-optimal housing and infrastructural conditions do not allow for physical distancing, nor do WASH services enable people to follow hygiene rules. As such, maintaining positive health practices, alongside sustaining livelihoods represent considerable challenges specific to informal settlements.

The COVID-19 crisis must be approached as an opportunity to replace evidence of WASH service gaps into contexts of policies and practices to better build urban resilience for the future. In settlements worldwide, people frequently have to leave their homes to enable them to access handwashing facilities and for water collection leading to an increase in potential contact points for further transmission of COVID-19. The use of shared sanitation facilities also increases risks of transmission of the virus. This is an important consideration since it is common for people in informal settlements worldwide to rely on communal toilets where it is difficult to apply physical distancing and to follow strict hygiene procedures (Parikh et al., 2020b; Wasdani & Prasad, 2020). Self-isolation is nearly impossible for individuals carrying the virus who cannot access separate toilets and hygiene facilities. As the spread of the virus exacerbates these issues, it contributes to and worsens existing health conditions. These include respiratory infections, tuberculosis, typhoid and malaria, commonly diagnosed among low-income populations living in homes with poor infrastructure and limited access to basic services (Corburn et al., 2020; Hardoy, Mitlin, & Satterthwaite, 2001). Besides, with increasing evidence of traces of the virus in sewage, informal settlements with poor environmental sanitation conditions where wastewater is poorly contained could be highly exposed (Naddeo & Liu, 2020; Quilliam et al., 2020).

While mortality rates from COVID-19 are higher in men, women may be more likely to be affected in other ways, especially as gaps in WASH mirrors such pre-existing social inequalities. For example, where there is no running water at home, women often bear the burden of water collection, transport and disposal (Parikh, Fu, Parikh, McRobie, & George, 2015). They are required to organise their time to carry out such tasks while they juggle with multiple household chores. This contributes to an increase in mental stress and anxiety, and may expose them to violence, whether this being domestic or encountered during water collection. Trips to collect water and food also leaves them more exposed to infection pathways. Since SDG5 calls for ending all forms of discrimination against women and girls, periods of crises expose ways in which access to water and sanitation services can both be a causal agent and a perpetuator of vulnerabilities that need to be addressed for everyone.

COVID-19 has also exposed the multiple linkages between WASH and inclusive education as promoted by SDG4. Published evidence

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shows how handwashing with soap correlates to levels of education and literacy (Schmidt et al., 2009), thereby demonstrating the importance of and the need for reliable means of information-sharing in relation to hygiene behaviour to prevent virus transmission (Pandey et al., 2020). Access to accurate information in a format that is accessible by all, and in multiple languages has been a key challenge since the beginning of the outbreak. Contradictory messages regarding 'social distancing' and isolation coming from authorities and health experts have caused confusion in relation to what measures to take. Local myths and non-evidence based practices have also caused misunderstandings and affected the most vulnerable. In low-income areas where illiteracy rates are high, access to reliable information provided through a diverse array of communication tools, both visual and written, is crucial if there is to be an impact on hygiene behaviour and healthcare.

While the pandemic has disproportionally affected populations in informal settlements and exposed underlying conditions, the COVID-19 response has also largely overlooked the reality lived by slum dwellers. In many cities around the world, governments have called for rapid lockdown, leaving little time for residents to prepare their households with sufficient food stocks, water, medicine, health equipment and other priority items including cash. Due to the quarantine, 70% of families living in favelas in Brazil have experienced a fall in income since the beginning of the pandemic (Caetano, 2020). This would correspond to about 9.5 million people in the country affected by the interruption of work activities, thereby adding to the struggle of buying food and contributing to the risk of malnutrition and to the inability of paying pay for rent and essential services including that of water and hygiene equipment.

We argue that the current vulnerability of societies and even more that of informal settlements to the virus is not accidental, but a logical result of the type of cities that we have built. Snowden reported in the context of cholera that settlements of cities like Lima, Mexico City and Rio de Janeiro where millions live without sewers, drains, secured supplies of drinking water or appropriate waste management are places that were ready-made for diseases to expand (Snowden, 2008). As demonstrated for Mumbai, overcrowded conditions in settlements provide hotbeds for infectious agents to rapidly spread, thereby showing how COVID-19 disproportionately affects the urban poor (Patranabis, Gandhi, & Tandel, 2020). Similar trends have been noted in Brazil where favelas are becoming the hotbed of COVID-19 (De Pádua Cavalcanti Bastos et al., 2020; Klôh et al., 2020). This shows the importance of addressing SDG11, which requires adequate, safe, and affordable housing and basic services in cities and therefore calls for action in informal settlements.

The spread of the virus reflects human networks and societal interactions with their environment at different scales, including at city and community scales, with further impacts at national and international scales. The implementation of interventions must therefore consider scalar dynamics with different responses taken at different governance levels. As illustrated in Fig. 1, the identification of links across the SDGs will help create frameworks to develop an integrated COVID-19 response. This requires harmonised responses between different governance levels together with the civil society, and between sectors for approaches that generate knowledge that is transferable into governmental policy *and* social practice.

While the transmission pathways of COVID-19 bring a particular focus on water and sanitation infrastructure, and ways by which we distribute access to these services, integrated actions are needed for urban centres. The situation faced by informal settlements is a call for action that integrates WASH interventions with interventions in housing, health, livelihood, and education. Only partnerships that involve government stakeholders and different sectors working together with people living in informal settlements will enable such types of actions to achieve viable results. Partnerships are necessary to unlock synergies between WASH and health, gender and education, but also to help meet goals on cities and communities, as well as decent work (SDG8) and partnerships (SDG17). In the face of COVID-19, national and international funding agencies and utilities providing essential services need to work together with organised citizens, using community leaders as primary points of contact where possible (Mitlin, 2020; Wilkinson, 2020).

Short-and mid-term measures include efforts to support WASH utilities, including infrastructure repairs and implementation of handwashing points in accessible locations with access to soap. Furthermore, as earning instability and tenure are growing threats during crises, urban planners have called for evictions procedure to be reconsidered, or at least suspended (Rolnik, 2020). Immediate coordination between health authorities and sectors dealing with land, environment, water and sanitation will also provide both short and longer-term response to the epidemic (Wilkinson, 2020).

Investing in data management is crucial for developing a timely response. Besides the rapid changing dynamics that characterise them, data management on informal settlements is challenging due to informal service provision networks and the lack of records. Evidence from humanitarian crises worldwide have shown how utilities performance were impacted by lack of data in marginalised communities and demonstrated the need for closer collaboration with local actors (Cooper, 2020). Partnerships for better coherence of actions will therefore involve supporting the production of reliable local data collaboratively with communities to inform decision-making (SDG17). The data currently reported in the context of COVID-19 overlooks the way the virus spreads in informal settlements, and thereby impede adequate response from governments and the range of supporting actors (Wilkinson et al., 2020). Yet, community health workers can play an important bridging role given their position on the front line. In favelas of cities across Brazil, they have participated in preventing the risks of COVID-19, in providing essential caring services and in monitoring infected cases (de Mendonça, da Silva Junior, Cunha, & Latgé, 2020). Improving data for response in settlements requires efforts to operate across smaller, relational scales, and link these to larger governance scales.

Cities represent a strategic scale to build local community resilience against future crises to come. There is a clear opportunity to adopt a systems approach to tackle interlinked challenges at a city-level (Gupte, 2020). The present requirement is on understanding how the built environment and social dynamics of people moving into, out of, and within cities are shaped by governance systems. Times of crises highlight the way these intersect and the need for stronger understanding of complex patterns of mobility and fixity. Integrated approaches supported by partnerships will improve our understanding of and responses to the relationships between ecosystems, land, labour and property, and what this implies for urban governance (Brenner, 2014). Partnerships that break down traditional silos and integrate knowledge from a multitude of disciplines will be required in the production of locally grounded research that connects concerns at the site level with multiple other scales, in order to join up decision making at the municipal and national levels.

As the COVID-19 pandemic is exposing inequalities, it reminds us that the cure will reside in the political will to ameliorate the underlying conditions that have made societies vulnerable to pandemics and other disasters. This will fundamentally depend on socio-economic factors that influence the way we shape our cities with long-term strategies for which the 2030 Agenda and the SDGs provide guidance. Policy-makers need to consider that public health interventions should not emerge only because of crises, but should be tools for inclusive long-term planning and effective, integrated implementation. The key path to prepare for future pandemics require water, sanitation and hygiene gaps to be adequately addressed for populations living in informal settlements, and be actively tackled together with other development goals to build more resilient cities.

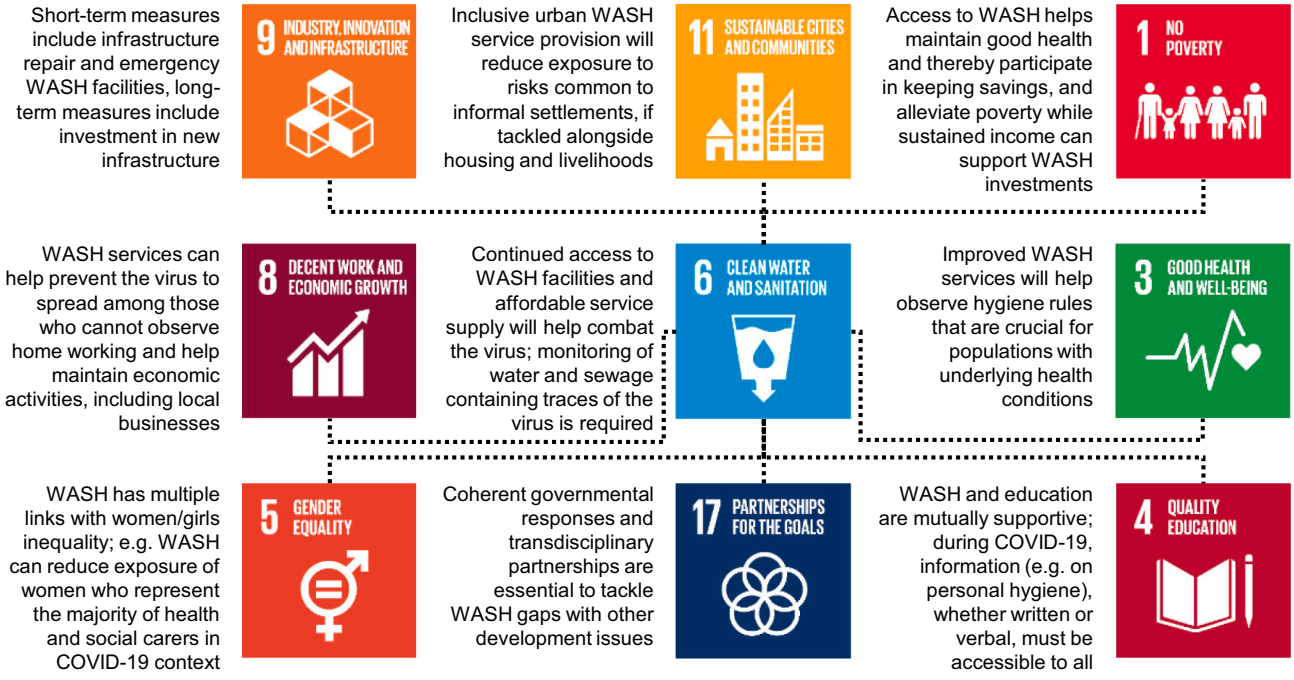

Fig. 1. Examples of interlinked Sustainable Development Goals illustrating how WASH action can support other goals during the COVID-19 pandemic affecting informal settlements in cities.

Transparency document

The Transparency document associated with this article can be found, in online version.

Author statement

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Loan Diep - Conceptualization, Methodology, Validation, Resources, Writing - Original Draft.

Dr. Jaideep Gupte - Validation, Resource, Writing - Review & Editing.

Professor Monica Lakhanpaul - Validation, Resources, Writing – Review and Editing.

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