



## **Position paper. COVID-19: A turning point to further sanitation justice?**

Adriana Allen<sup>1</sup>, Pascale Hofmann<sup>1</sup>, Nelly Leblond<sup>1\*</sup>, Julian Walker<sup>1</sup>, Wilbard Kombe<sup>2</sup>, Claudy Vouhé<sup>3</sup>, Robin Bloch<sup>4</sup>, Braima Koroma<sup>5</sup>, Colin Marx<sup>1</sup>, Sulaiman Foday Kamara<sup>6</sup>, Georgina Montserrat Pagespetit<sup>4</sup>, Tim Ndezi<sup>7</sup>, Sandra de Castro Roque<sup>4</sup>, Catarina Simões Mavila<sup>4</sup>, Ibrahim Bakarr Bangura<sup>6</sup>, Festo Dominic Makoba<sup>7</sup>, Ilundi Polonia Cabral<sup>4</sup>, Richard Prosper<sup>2</sup>

<sup>1</sup>University College London, UK; <sup>2</sup>Ardhi University, Tanzania; <sup>3</sup>L'Être égale, France; <sup>4</sup>COWI; <sup>5</sup>Njala University and Sierra Leone Urban Research Center, Sierra Leone; <sup>6</sup>Sierra Leone Urban Research Center; <sup>7</sup>Centre for Community Initiatives, Tanzania.

### **Abstract**

Sanitation has received increased attention during the COVID-19 pandemic, but the heterogeneity of infrastructures, investments, practices and needs that exist on the ground, have often been overlooked. Consequently, the intersecting inequalities shaping how COVID-19 and sanitation interact remain unaddressed. This paper suggests it is possible to move beyond 'deficit narratives', and to support pathways towards just sanitation for all women and men, girls and boys during and beyond the pandemic. Tracking down past, ongoing and projected sanitary arrangements, exploring the political economy of both grid and off-grid investments and promises, and paying attention to the diversity of needs and practices from an intersectional perspective that considers, among other things, class, gender, age, ethnicity and ability, are three directions to do so. Together, these three directions can account for how illness or health, poverty or prosperity, suffering or well-being, stigma or respect are generated for different people who are dependent on, or who are providing, sanitation services. COVID-19 marks a turning point to critically reframe how we talk and act upon just sanitation and to challenge long-term inequalities.

Keywords: gendered sanitation trajectories, intersectionality, urban Africa, wastewater, epidemiology, COVID-19

Sanitation has received increased attention during the COVID-19 pandemic, as handwashing stations burgeon<sup>1</sup>, sanitation workers are handed out protective equipment<sup>2</sup> and wastewater is

---

\* [Overduesantiation@gmail.com](mailto:Overduesantiation@gmail.com) or [n.leblond@ucl.ac.uk](mailto:n.leblond@ucl.ac.uk)



investigated for viral residues<sup>3</sup>. Indeed, poor sanitation can contribute to viral dispersal and exacerbate health issues and is, by itself, lethal to around half a million people each year<sup>4</sup> - approximately one-quarter of the number of COVID-19-induced fatalities recorded globally by January 2021<sup>5</sup>. Yet, the current harnessing of sanitation, as an objective, a source of viral exposure or a means to monitor viral loads, often downplays the heterogeneity of infrastructures, investments, practices and needs that exist on the ground. Consequently, existing intersecting inequalities that shape how COVID-19 and sanitation interact, as elaborated below, remain largely unaddressed.

Drawing on the ongoing work of a transdisciplinary network of researchers, practitioners and grassroots organisations focused on sanitation in urban Africa<sup>6</sup>, we seize this moment to explore and challenge the politics of maldistribution, misrecognition, and unequal power underpinning sanitation injustices. We suggest that investigating the legacies of promises and investments, documenting the trajectories of sanitary arrangements, and engaging with the practices and experiences of users and providers, is crucial to grasp how sanitation is impacting, being affected, and handled under the COVID-19 pandemic. This could supersede the deficit narratives which reduce sanitation to a technical and cultural gap, supporting solutions which too often achieve limited impact. The benefits of tackling sanitation injustices extend beyond the pandemic and sanitation per se and from illness to health, violence to safety and dignity, and burden to inclusion. Indeed sanitation is linked to 133 of the 169 targets (77%) set by the UN Sustainable Development Goals (Parikh et al. 2020).

## **Tackling intersecting inequalities beyond deficit narratives**

Sanitation injustices are often described as ‘infrastructural deficits’ and ‘access gaps’. WHO/ UNICEF (2017) estimates only 45% of the world’s population benefiting from safely managed water toilets or onsite facilities; 2.3 billion people lacking access to basic services, and over 890 million still defecating in the open<sup>7</sup>. However, framing sanitation simply as a technical and financial deficit obscures the importance of contextual arrangements and disparities within and across grid and off-grid sanitation infrastructure and services. These arrangements and disparities both shape contrasting situations and entail solutions for inclusive sanitation to work for women and girls, men and boys.

At the city scale, sanitation forms an assemblage of diverse infrastructure and practices. These include toilets connected by pipes to sewer networks that discharge into waste-water treatment plants (also known as grid sanitation), facilities with on-site pits or septic tanks serviced by mechanical or manual faecal sludge emptiers (considered as off-grid), as well as disconnected, or more accurately leaking, overflowing or uncontained sites of excretion and disposal. Residents



navigate across and along this sanitation landscape which gives rise to particularly unpleasant and inequitable situations. Some off-grid households simultaneously pay municipal taxes for a sewer system they do not access while funding their onsite sanitation facilities. The implications of unsafe sanitation are likely to be more pronounced in flood and landslide prone areas, co-occurring with limited services such as healthcare and insecure land tenure. These inequalities are ingrained in urban trajectories, produced by social, political, and economic choices as well as by unexpected and unplanned events ranging from environmental disasters to informal urbanization and conflicts.

Sanitation inequalities are distributed along lines of identity, such as: *class*, with a strong relationship between tenure and access to decent sanitation (McGranahan, 2015); *gender*, in relation to factors such as exposure to violence (Winter and Barchi 2016), struggles around menstrual hygiene (Chant and MacIlwaine, 2015), and pervasive gender norms about responsibility for dealing with the day to day management of household hygiene and related health issues (Sweetman and Medland, 2017), and; *disability*, with disabled people having poorer access to public sanitation facilities, due to stigma and design failures (Wasonga & Bukiana, 2015). However, experiences of inadequate sanitation are not experienced uniformly along lines of singular identities such as gender but are rather encountered at the intersection of identities such as gender, class, age, sexuality, and ability. These intersections mean that individuals have specific, embodied, experiences of sanitation, but those with intersecting subordinated identities are more likely to be disadvantaged in their experience of sanitation, and less well represented in decision-making about sanitation infrastructure (Walker and Butcher, 2016).

Understanding sanitation injustices and how they can be tackled from a gender and intersectional perspective is thus crucial for effective COVID-19 responses, yet this tends to be overlooked.

### **How COVID-19 and its responses combine with and magnify sanitation inequalities**

Governmental responses to COVID-19 reconfigure sanitation practices and access, by unwillingly affecting those deprived of well-maintained facilities at home. Lock down measures and the closure of places such as schools, markets, and public toilets, cut off users from accessing collective facilities. Residents depending on shared toilets must forgo health advice advocating isolation and physical distancing to satisfy their sanitary needs. Furthermore, the onus on individual protection increases the burden of those, often women and girls, who look after people and facilities, at a time of heightened pressure on water resources, time, and budgets. The inter-relations between viral exposure and vulnerability, socioeconomic inequalities, and the distribution of non-communicable diseases, are so important that some have argued COVID-19



should be considered a synergistic epidemic, or **syndemic** rather than a pandemic (Horton 2020). Indeed, syndemics are the aggregation of disease clusters emerging as multiple processes converge to create even deeper health disparities (Singer 2009). For example, unsafe sanitation not only increases exposure to pathogens but also coincides with contexts of heightened vulnerability (limited healthcare, economic precarity, lack of protective equipment).

Restrictive assessments of sanitation as a source of viral exposure run the risk of amplifying such health disparities. Sanitation has remained a peripheral object of investigation in the absence of documented cases of faecal-oral contamination. Rather, the bulk of the attention has been on the dispersal of the SARS-COV-2 virus causing COVID-19 through respiratory droplets and fomites in person-to-person and hand-mediated contacts<sup>8</sup>. However, there is evidence of live SARS-COV-2 virus in the stools of infected carriers and of potential dissemination of viral aerosol particles by flushing<sup>9</sup>. The absence of assessments in non-flush systems, highly shared facilities, or places where residents are in direct contact with untreated effluents is especially problematic in sub-Saharan Africa where an estimated one in five people depend on shared toilets, rising to 40% in urban areas (UNICEF and WHO 2017), and where dozens of households can rely on the same facility<sup>10</sup>.

A limited understanding of COVID-19 interactions with sanitation disparities is worsened by the exclusion of off-grid residents from sewer-based monitoring. Tracking viral fragments in wastewater might reach up to 2.1 billion sewer-connected users but overlooks the 5.7 billion who rely on pit latrines, septic tanks, and disconnected sites (Hart and Halden 2020). As a result, their health is ignored. Such distinction foregrounds urban, western, and colonial biases. Indeed, flush toilets, pipes, and sewers are largely based on a model piloted in London in the 19<sup>th</sup> century, exported to Europe, and implemented in colonial cities around the globe, as a form of superior civilizational hygienic practice (Black and Fawcett 2008; Barlow 2017). For example, in Beira, Mozambique, Portuguese colonial authorities only connected the industrial areas and the port to sewers, relegating Mozambican natives to peripheral areas and makeshift on-site sanitary solutions. The resulting infrastructure divide is long-lasting, and common to many sub-Saharan cities, such as Freetown, Sierra Leone, where the 4-km-long-sewer network only serves 61 properties in the historic colonial centre, bypassing 90% of the population, 75% of which rely on unimproved pit latrines. While there has been progress in wastewater monitoring, this should not be at the expense of analyzing off-grid sanitation chains, which often serve resource-constrained and vulnerable residents, particularly if we do not want to reinforce the syndemic nature of COVID-19<sup>11</sup>.

Paradoxically, while sanitation currently makes the headlines without acknowledging existing inequalities and asymmetries, these nonetheless come back to the forefront. As women constitute



70% of the global health workforce, menstruation - a particular taboo within the sanitation taboo - becomes an important matter in the COVID-19 crisis (UNICEF 2020). Public facilities, in places of supposedly privatized practices, are petitioned for, and forcefully reopened, making it clear that sanitation needs extend beyond domestic spaces. In some countries, school reopening is conditional on improved toilets, turning this neglected feature into a crucial one<sup>12</sup>. We therefore ask whether COVID-19 could be a lever to advance equitable sanitation. Below, we sketch the potential of engaging with sanitation **promises and investments**, of exploring how **sanitation trajectories** are shaped on the ground, and of including users and providers' **practices, experiences, and expectations**.

### **Pathways to further sanitation justice**

First, the fact that we struggle to fully grasp how access to sanitation interacts with the pandemic and its responses indicates that the costs and investments of grid and off-grid sanitation remain poorly understood. We know that large-scale investments typically bypass the urban poor who in return must incur considerable costs (in terms of time, money, ill-health, missed education, and so on) to compensate for infrastructure and service deficits. But surprisingly, we know little about how sanitation investments by governments, development partners, utilities, collectives of the poor, and individual households work as a whole and in relation to each other. This simultaneously masks sanitation inequalities and hinders the development and scaling-up of adequate alternatives. Tracing the junctures and disjunctures between sanitation promises and the flows of sanitation investments appears key to identify factors shaping sanitation cityscapes and their responses to crises.

Second, beyond the political economy of infrastructure, the biases inherent to wastewater-based epidemiology call for an investigation of the multiple sanitation chains that coexist to channel human excreta in potentially diverging directions. A myriad of residents and workers engage with the construction, maintenance, and repair of sanitation facilities, from administrators and technicians to users, janitors, toilet block operators, truck drivers and pit emptiers. Their knowledge and experience can support a more inclusive and relational understanding of sanitation. At stake is the production of a comprehensive picture linking sanitation and health beyond sewer-connected residents. Accounting for power relations and the structural elements shaping people's options is one way to move beyond the individualizing ontologies, which lay the responsibility, and blame, on users and their cultural behaviours.

Third, as the COVID-19 pandemic is likely to trigger renewed support for sanitation projects and investments, it is essential to ground these in the experiences and expectations of users and providers. International funders often overlay their own "project laws" and conditionalities on



top of existing legal pluralism overlooking local preferences and creating illegible infrastructure palimpsests (Allen et al. 2019). Yet, several methods have been successfully applied to make marginalised voices heard and support diversified sanitation needs and capacities. Social audits, bringing people to assess sanitation services and hold authorities accountable (SJC 2014), participatory filmmaking putting sanitation-related violence on the spot (Sharma 2015; Thompson, Gaskin, and Agbor 2017), intersectional reconstructions of sanitation trajectories (Hofmann 2017), supporting women leaders in sanitation (Ink@Wash 2020), and discussion groups about menstruation (Ahmed and Yesmin 2008), have all proven highly productive. Taking stock of these approaches is crucial to make the most of the renewed interest in sanitation, further inclusion, and to challenge long-term inequalities.

Sanitation intrinsically depends on the interactions and flows of users, labourers, material, and investments, as people negotiate access, menstruate, clean and care for others, fetch water, or remove excreta across neighbourhoods. These flows both shape the pandemic and are reconfigured by responses to it. By emphasising sanitation as a key sector in its entirety, a means to track contamination levels, and a potential source of exposure, the COVID-19 pandemic has unexpectedly shed light on a very uneven landscape of infrastructures, performances, and experiences. Overlooking sanitation injustices might lead to their reproduction, but there is no reason to let this happen. As we embark on co-producing an intersectional examination of how sanitation (in)justice works across urban Africa, we hope to be joined by researchers, practitioners, and grassroots organisations to explore how identified challenges can be addressed and tackled for sanitation to become a right for all women and men, girls and boys during and beyond the COVID-19 pandemic.

## References

- Ahmed, Rokeya and Kabita Yesmin. 2008. 'Menstrual Hygiene : Breaking the Silence | Beyond Construction: Use by All |A Collection of Case Studies from Sanitation and Hygiene Promotion Practitioners in South Asia'. In *Beyond Construction: Use by All. A Collection of Case Studies from Sanitation and Hygiene Promotion Practitioners in South Asia*, 283–87. IRC. <https://asksource.info/resources/menstrual-hygiene-breaking-silence-beyond-construction-use-alla-collection-case-studies>.
- Allen, Adriana, Braima Koroma, Mtafu Manda, Emmanuel Osuteye and Rita Lambert. 2019. 'Urban Risk Readdressed: Bridging Resilience-Seeking Practices in African Cities.' In *The Routledge Handbook of Urban Resilience*, edited by Michael A. Buraryidi, Adriana Allen, John Twigg, and Christine Wamsler. London: Routledge.



- Barlow, Matt. 2017. 'Finally Facing Our Water-Loo: It's Time to Decolonise Sewerage Systems'. *The Conversation*. 2017. <http://theconversation.com/finally-facing-our-water-loo-its-time-to-decolonise-sewerage-systems-78095>.
- BBC. 2020. 'Coronavirus: Kenyan Boy Who Made Hand-Washing Machine Awarded'. *BBC News*, 2 June 2020, sec. Africa. <https://www.bbc.com/news/world-africa-52898797>.
- Black, Maggie and Ben Fawcett. 2008. *The Last Taboo: Opening the Door on the Global Sanitation Crisis*. Earthscan.
- Chakravorty, Abhimanyu. 2020. 'Fighting from the Bottom, India's Sanitation Workers Are Also Frontline Workers Battling Covid'. *The Indian Express*. 27 May 2020. <https://indianexpress.com/article/india/india-sanitation-workers-waste-pickers-coronavirus-pandemic-6414446/>.
- Chant, Sylvia and Cathy McIlwaine. 2015. *Cities, slums and gender in the global south: Towards a feminised urban future*. Routledge.
- Duarte, Fernando. 2021. 'The Burundian Refugee Soap Maker Who Is Fighting Coronavirus in Kenya'. *BBC News*, 9 January 2021, sec. Africa. <https://www.bbc.com/news/world-africa-55545845>.
- Duti, Vida. 2020. 'Opinion: A Complex WASH Sector Could Hamper Ghana's Fight against COVID-19'. *Devex*. 12 June 2020. <https://www.devex.com/news/sponsored/opinion-a-complex-wash-sector-could-hamper-ghana-s-fight-against-covid-19-97396>.
- Farkas, Kata, Luke S. Hillary, Shelagh K. Malham, James E. McDonald and David L. Jones. 2020. 'Wastewater and Public Health: The Potential of Wastewater Surveillance for Monitoring COVID-19'. *Current Opinion in Environmental Science & Health, Environmental Health: COVID-19*, 17 (October): 14–20 <https://doi.org/10.1016/j.coesh.2020.06.001>.
- Gormley, Michael, Thomas J. Aspray and David A. Kelly. 2020. 'COVID-19: Mitigating Transmission via Wastewater Plumbing Systems'. *The Lancet Global Health* 8 (5): e643. [https://doi.org/10.1016/S2214-109X\(20\)30112-1](https://doi.org/10.1016/S2214-109X(20)30112-1).
- Gunther, Isabel, Alexandra Horst, Christoph Lüthi, Hans-Joachim Mosler, Charles Niwagaba and Innocent Tumwebaze. 2012. 'When Is Shared Sanitation Improved Sanitation? The Correlation between Number of Users and Toilet Hygiene.' *MPRA Paper*, no. No. 45830 (January). <https://doi.org/10.13140/RG.2.2.10422.09288>.
- Hanlon, Joseph. 2020. 'Covid-19: Looking Nervously over the Border'. 494. *Mozambique News Reports & Clippings*.



- Hart, Olga E. and Rolf U. Halden. 2020. 'Computational Analysis of SARS-CoV-2/COVID-19 Surveillance by Wastewater-Based Epidemiology Locally and Globally: Feasibility, Economy, Opportunities and Challenges'. *Science of The Total Environment* 730 (August): 138875. <https://doi.org/10.1016/j.scitotenv.2020.138875>.
- Hofmann, Pascale. 2017. 'Multi-Layered Trajectories of Water and Sanitation Poverty in Dar Es Salaam'. In *Urban Water Trajectories*, edited by Sarah Bell, Adriana Allen, Pascale Hofmann, and Tse-Hui Teh, 103–18. Future City. Cham: Springer International Publishing. [https://doi.org/10.1007/978-3-319-42686-0\\_7](https://doi.org/10.1007/978-3-319-42686-0_7).
- Horton, Richard. 2020. 'Offline: COVID-19 Is Not a Pandemic'. *The Lancet* 396 (10255): 874. [https://doi.org/10.1016/S0140-6736\(20\)32000-6](https://doi.org/10.1016/S0140-6736(20)32000-6).
- Ink@Wash. 2020. *Women Leaders Water & Environmental Sanitation*. Vol. 1. Administrative Staff College of India. <https://inkwash.in/women-leaders-water-environmental-sanitation-vol-1/>.
- Kumbhare, Sagar. 2020. 'Sanitation Workers: At the Bottom of the Frontline Against COVID-19?' *The Wire*. 6 May 2020. <https://thewire.in/urban/sanitation-workers-covid-19>.
- Li, Yun-yun, Ji-Xiang Wang, and Xi Chen. 2020. 'Can a Toilet Promote Virus Transmission? From a Fluid Dynamics Perspective'. *Physics of Fluids* 32 (6). <https://doi.org/10.1063/5.0013318>.
- McGranahan, Gordon. (2015). Realizing the right to sanitation in deprived urban communities: meeting the challenges of collective action, coproduction, affordability, and housing tenure. *World Development*, 68, 242-253.
- Mitlin, Diana. 2015. 'Will Urban Sanitation "Leave No One Behind"?' *Environment and Urbanization* 27 (2): 365–70. <https://doi.org/10.1177/0956247815604527>.
- Parikh, Priti, Loan Diep, Pascale Hofmann, Julia Tomei, Luiza Cintra Campos, Tse-Hui Teh, Yacob Mulugetta, Ben Milligan and Monica Lakharpaul. 2020. 'Synergies and Trade-Offs between Sanitation and the Sustainable Development Goals'. *UCL Open: Environment Preprint*, August. <https://doi.org/10.14324/111.444/000054.v1>.
- Quilliam, Richard S., Manfred Weidmann, Vanessa Moresco, Heather Purshouse, Zoe O'Hara and David M. Oliver. 2020. 'COVID-19: The Environmental Implications of Shedding SARS-CoV-2 in Human Faeces'. *Environment International* 140 (July): 105790. <https://doi.org/10.1016/j.envint.2020.105790>.
- Sharma, Manish. 2015. *Indefensible Space*. <https://www.ucl.ac.uk/bartlett/development/indefensible-space>.





- Singer, Merrill. 2009. *Introduction to Syndemics: A Critical Systems Approach to Public and Community Health*. John Wiley & Sons.
- SJC. 2014. 'Our Toilets Are Dirty. Report of the Social Audit into the Janitorial Service for Communal Flush Toilets in Khayelitsha, Cape Town.' Social Justice Coalition report. <https://sjc.org.za/resources/publications>.
- Street, Renée, Shirley Malema, Nomfundo Mahlangeni and Angela Mathee. 2020. 'Wastewater Surveillance for Covid-19: An African Perspective'. *The Science of the Total Environment* 743 (November): 140719. <https://doi.org/10.1016/j.scitotenv.2020.140719>.
- Sweetman, Caroline and Louise Medland. 2017. Introduction: gender and water, sanitation and hygiene, *Gender & Development*, 25:2, 153-166, DOI: 10.1080/13552074.2017.1349867
- Thompson, Jennifer A., Susan J. Gaskin and Magdaline Agbor. 2017. 'Embodied Intersections: Gender, Water and Sanitation in Cameroon'. *Agenda* 31 (1): 140–55. <https://doi.org/10.1080/10130950.2017.1341158>.
- Trottier, Julie, Regis Darques, Nassim Ait Mouheb, Emma Partiot, William Bakhache, Maika S. Deffieu and Raphael Gaudin. 2020. 'Post-Lockdown Detection of SARS-CoV-2 RNA in the Wastewater of Montpellier, France'. *One Health* 10 (December): 100157. <https://doi.org/10.1016/j.onehlt.2020.100157>.
- UNICEF. 2020. 'Mitigating the Impacts of COVID-19 on Menstrual Health and Hygiene'. UNICEF Brief. UNICEF. <https://www.unicef.org/documents/mitigating-impacts-covid-19-menstrual-health-and-hygiene>.
- UNICEF, and WHO. 2017. *Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines*. Geneva. [https://www.unicef.org/publications/index\\_96611.html](https://www.unicef.org/publications/index_96611.html).
- Walker, Julian and Butcher, Stephanie. 2016. Beyond one-dimensional representation: challenges for neighbourhood planning in socially diverse urban settlements in Kisumu, Kenya. *International Development Planning Review*, 38(3), 275-296.
- Wasonga, Job, and Bukiania, F. 2015. Sanitation and physical disability: challenges to latrine access in Kakuma refugee camp, Kenya. *Waterlines*, 174-185.
- Winter, Samantha C. and Francis Barchi. 2016. Access to sanitation and violence against women: evidence from Demographic Health Survey (DHS) data in Kenya, *International Journal of Environmental Health Research*, 26:3, 291-305
- WHO. 2019. 'Sanitation - Key Facts'. 2019. <https://www.who.int/news-room/fact-sheets/detail/sanitation>.



———. 2020. ‘Transmission of SARS-CoV-2: Implications for Infection Prevention Precautions - Scientific Brief Upadted 9 July 2020’. WHO. <https://www.who.int/news-room/commentaries/detail/transmission-of-sars-cov-2-implications-for-infection-prevention-precautions>.

WHO, and UNICEF. 2017. ‘Sanitation Facts’. [https://www.who.int/water\\_sanitation\\_health/monitoring/coverage/sanitation2017-930px.jpg?ua=1](https://www.who.int/water_sanitation_health/monitoring/coverage/sanitation2017-930px.jpg?ua=1).

Xu, Yi, Xufang Li, Bing Zhu, Huiying Liang, Chunxiao Fang, Yu Gong, Qiaozhi Guo, et al. 2020. ‘Characteristics of Pediatric SARS-CoV-2 Infection and Potential Evidence for Persistent Fecal Viral Shedding’. *Nature Medicine* 26 (4). <https://doi.org/10.1038/s41591-020-0817-4>.

---

<sup>1</sup> See for example coronavirus related funds to improve water access in Ghana (Duti 2020), Kenyan DIY handwashing machine (BBC 2020) or a Burundian soap maker lowering its prices to make his products accessible in Kenya (Duarte 2021).

<sup>2</sup> See for example (Kumbhare 2020; Chakravorty 2020)

<sup>3</sup> Viral excretions through the gastrointestinal tract were first identified in China (Xu et al. 2020). Teams in several countries then tracked viral RNA in wastewater (Trottier et al. 2020; Farkas et al. 2020).

<sup>4</sup> Inadequate sanitation is estimated to cause 432 000 diarrhoeal deaths annually, and to be a major factor in several diseases including intestinal worms, schistosomiasis, and trachoma (WHO 2019).

<sup>5</sup> The worldwide covid-19 death toll was 2.19 million in January 2021 according to the John Hopkins University Coronavirus Resource Center, <https://coronavirus.jhu.edu/>, consulted on 29 March 2021.

<sup>6</sup> This network comes together under an action-research project titled “OVERDUE: Tackling the sanitation taboo across urban Africa” funded by UKRI GCRF (2020-2023).

<sup>7</sup> According to the JMP, “basic sanitation” corresponds to improved sanitation facilities that are not shared between households while safely managed sanitation further includes the safe disposal of excreta in situ or transported and treated offsite. Unfortunately, data for safely managed sanitation is limited, with no data for pit emptying and excreta management of on-site systems even though this is a crucial component of safety for those living in dense residential settlements unserved by piped sewerage systems (Mitlin 2015; WHO and UNICEF 2017). Shared facilities are systematically disregarded in basic sanitation regardless of the number of households sharing.

<sup>8</sup> Faecal-oral transmissions, reviewed by (Quilliam et al. 2020), have not been considered major by the World Health Organization (WHO 2020).

<sup>9</sup> Flushing public urinals could release clouds of virus-laden aerosols within five seconds according to (Li, Wang, and Chen 2020). (Gormley, Aspray, and Kelly 2020) demonstrated the wastewater plumbing systems had contributed to the diffusion of the SRAS virus in Hong Kong in 2003.

<sup>10</sup> The issue is all the more problematic as dirtiness increases with the number of users, see for example research in Kampala (Gunther et al. 2012) and in Cape Town (SJC 2014).

<sup>11</sup> This is especially discussed in the African context by (Street et al. 2020).

<sup>12</sup> For example, in Mozambique, only 170 state secondary school out of 667 had sanitation facilities judged as sufficient for a reopening at the end of July 2020 (Hanlon 2020).