# Strategies for equitable access to urban sanitation: Bridging grid and off-grid technologies

## Advancing just sanitation across Mwanza

**Authors**
Betzabeth Olivares-Resendiz
Daniela Irazoqui-Ruelas
Meilin An
Mustafa Hamad
Sophie Avent
Yixuan Liu
Yiyao Shen
Zixuan Ye

**Figure 1:** Mwanza landscape, Tanzania, 2023. Photo Credit: Meilin An

# POLICY BRIEF

## Key points

• To ensure universal access, a diverse range of off-grid water and sanitation solutions should be considered. Feasibility should consider socio-economic and environmental conditions, alongside technical viability.

• An integrated approach to sanitation, water and waste management is necessary to avoid displacement of burdens along the sanitation chain.

• Pro-poor policies and inclusive financing are needed to provide fair sanitation in unplanned settlements. Cross subsidies and needs-based assessments will prioritise the marginalised and the most disadvantaged.

• Supporting community-led governance by empowering grassroots and strengthening collaboration among different stakeholders is crucial in ensuring inclusive access and achieving long-term benefits.

## Introduction

Access to adequate water and sanitation are recognised by the United Nations as human rights fundamental to health, well-being, and dignity (UN,2010; 2016). However, achieving universal access, as intended in Sustainable Development Goal 6 is still a challenge, especially in least developed countries (UN, 2022). Further, rapid urbanisation has led to an increased number of people living in unplanned settlements where access to basic services is inadequate (SDI, 2019).

In the city of Mwanza, Tanzania, 24% of the population receive wastewater services, and two-thirds of the population live in unplanned settlements (UN-Habitat, 2018). According to UN-Habitat (2018), 57% of families bury their waste in deep pits that are often unsafe to empty due to reasons related to the landscape and financial constraints. Consequently, its frequent for pits to overflow or be emptied during the rainy season, causing detrimental effects on the environment, human health, social relations, and water sources' safety.

To address the challenges posed by inadequate water supply and sanitation to the population of Mwanza, the Lake Victoria Water and Sanitation Programme (LVWATSAN) was launched with the aim of protecting Lake Victoria, the main source of water for the city (UN-Habitat, 2023). This program funded the Simplified Sewerage System project, adopted by Mwanza Urban Water Supply and Sanitation Authority (MWAUWASA) to increase access to wastewater services in a centralised manner.

dpu Development Planning Unit
UCL THE BARTLETT
OVERDUE Tackling the **sanitation** taboo across Urban Africa
ARDHI UNIVERSITY Weledi na Ustawi

Targeted at unplanned settlements, Simplified Sewerage System (SSS) implementation began in 2018 in Mabatini and Igogo settlements. It has brought health and environmental improvements to its beneficiaries; however, a lack of community engagement, economic barriers, and technical constraints are hindering its efficiency and long-term sustainability.

One of the constraints lies in the use of water required by the SSS to move waste along the network of pipes. Yet, provision of water and sanitation is detached, and the implementation of either service is done separately. So, a precondition to connection is household water connection, and a solid toilet structure along with a cleanable toilet pan, upgrades that come at cost to the users. Consequently, there is a positive correlation between socio-economic status and improved sanitation, resulting in the reinforcement of existing socio-environmental injustice. Furthermore, the current approach to connect the SSS to the conventional sewerage is limiting its expansion, leaving some houses unable to connect due to technical restrictions and lack of alternatives.

In Mabatini, sanitation and water conditions vary among residents and are affected by socio-economic status and terrain conditions. The settlement stretches from the city's main road up a hillside, and residents living on the higher slopes face more challenges than those found near the main road. In this context, mainstream approaches characterized by centralised provision under the control of state actors are insufficient to serve residents experiencing financial and terrain challenges. In turn, this has resulted in unequal water and sanitation access city-wide, where the worst conditions are present in unplanned settlements outside the city centre. Furthermore, the SSS implementation has followed a similar rationale, characterised by a lack of community engagement.

In this policy brief it is claimed that a new strategy is necessary to supply access to safe and sanitary facilities for all people. For this, it presents four strategies, each with specific recommendations. To begin, it is important to embrace both grid-based and off-grid sanitation methods, tailoring both in accordance with local topography and the beneficiary's budget. Secondly, and in consideration of the connected nature of water and sanitation, these services need to be integrated to maximize benefits. Thirdly, through implementing inclusive financial mechanisms improved water and sanitation services will be accessible to all. Finally, active engagement at all levels may be enabled by merging current governance institutions and supplementing them with new organisations to enhance community-led governance.

While this brief integrates findings upon research undertaken in Mwanza during January and May 2023, the recommendations are aimed to be a set of guiding principles useful in other contexts. Research for this brief encompassed both desk-based and field-based research, the latter conducted over a period five days between 28th April and 3rd May in Mabatini (Figure 2).

The tools used for the field-based research included multiple focus group discussions and surveys with users of the SSS and residents not connected to the system, as well as interviews with city council members, the utility, an SSS contractor and community representatives. Data collected included information on costs, economic capacity, water and SSS connectivity, community engagement, and experiences regarding impacts from the project and needs around sanitation. Lastly, a community workshop was held to report back findings and identify recommendations and strategies to ensure equitable benefits and access to sanitation improvements. This work is part of a wider partnership called OVERDUE, working alongside Ardhi University, CCI and the Tanzanian Federation of the Urban Poor to advance just sanitation across Mwanza.


**Figure 2:** Map of sanitation connections and houses visited during fieldwork conducted in April-May 2023. Mabatini settlement, Mwanza, 2023. Source: Authors.

**Figure 3:** Sanitation conditions in houses connected to SSS (right) in comparison to houses not connected (left), Mwanza, 2023. Photo Credit: Meilin An and Sophie Avent.

## 1. Strategies

### 1.1 Diversify technological solutions

Currently, a single approach is guiding the implementation of sanitation solutions in Mwanza, characterised by centralisation and higher water use in comparison to off-grid solutions such as pit latrines and septic tanks. In unplanned settlements, the full expansion of connections to a central sewerage line is technically unfeasible due to rocky and hilly terrain with slopes greater than 30% (COWI, 2016), compounded by socio-economic constraints that prevent improvements or high operating costs from being afforded. Consequently, both grid and a diverse range of off-grid water and sanitation technologies should be considered to ensure universal and just access.

To improve sanitation conditions in unplanned settlements and city-wide, technological innovation alone is insufficient, and a limited focus on implementation has caused unintended negative impacts to some residents. Currently, the conditions guiding the utility's expansion works are limited to physical factors and technical feasibility; population density, terrain, and distance from the main sewerage line. Residents' ability to pay is overlooked. Additionally, possible environmental and safety impacts related to construction are not accounted in mitigation measures. For example, rock removal for construction material has resulted in landslides and localised flooding, in one instance damaging a house and forcing residents to move. Consequently, areas of Mabatini have been left inaccessible to vehicles, affecting both the safety and mobility of residents.

Moreover, the implementation of the SSS is being conducted in a piecemeal fashion, carried out by different contractors per phase. In turn, construction approaches differ, resulting in inconsistent benefits among beneficiaries and localised issues out of the control of current contractors. As such, successful implementation of a diverse range of solutions depends not only on their technical suitability, but in the consideration of their related environmental and socio-economic impacts. To maximize the benefits of advancing sanitation through technological solutions and increase adequate access, a set of recommendations is presented.

**Develop clear guidelines to guide the implementation of any solution in an integrated manner.**
These should be flexible to continually incorporate improved practices learnt over time, spatially specific, and account for unforeseen circumstances including mitigation measures for unintended impacts. To find appropriate technologies, feasibility studies need to encompass environmental considerations, mitigation strategies and economic status of beneficiaries. This will ensure that suitable sanitation technology is found, and its provision is both suitable and sustainable.

**Support the implementation of innovative decentralised water and sanitation solutions.**
This can be done by empowering communities to lead initiatives. For instance, in Kibera, Kenya, bio-centres were constructed in collaboration with a local NGO and community-based organisations (Case study Box 1). Water saving and waterless toilets are an alternative solution in places where water access

and availability is limited, making an increased use unaffordable. Also, they have the benefits of avoiding pollution of water sources and water stress, contributing to preventing water impacts worsened by the effects of climate change. A decentralised approach using communal septic tanks would also contribute to the expansion of the SSS. This would be a solution in places where connection to main sewerage lines is not practical.

## 1.2 Integrate service provision

In implementing and operating sanitation technological solutions, such as the SSS in Mwanza, shortcomings in integrating sanitation-related services, such as access to water, are major barriers hindering the provision of just sanitation.

In Mwanza, SSS received widespread acceptance at the community level, nevertheless, its high reliance on water is counterproductive. All residents connected to utility water have experienced water supply issues in the settlement, either related to frequency of access or water pressure, both of which are limiting supply. Several households connected to SSS lack water connection but have a pour-flush toilet which demands water use. This creates not only a sanitation problem but a business opportunity for those residents benefiting from a water connection, both of which can give rise to conflict within the community. Residents buying water by the bucket pay between 3-4 times higher than the utility charge. Most importantly, widespread water shortages and leakages are undermining the health, sanitation and environmental benefits of the system.

Despite the reported high coverage of water connection in Mabatini, residents are still sceptical about the actual number and location of houses connected to both water supply and wastewater services. It is widely believed that areas situated on steep hills generally lack access to utility services. Similarly, residents are currently unaware of the details about the utility's tariffs and water supply arrangements. Specifically, the water and wastewater tariff, connection cost to both water and SSS, and MWAUWASA's responsibilities for ensuring access to water. Together, these factors create obstacles for collaboration with the community.

Under the Tanzania Water Supply and Sanitation Act (2019), it is mandatory for water supply and sanitation authorities to ensure continued water provision, maintenance of water supply and sanitation works, provide information on sanitation and water supply and conservation. The Act also enables utilities to suggest tariffs and tariff increases, although they do not have the autonomy to implement these decisions without scrutiny from the Energy and Water Utilities Regulatory Authority (EWURA). To ensure compliance with these mandates and advance sanitation, the following recommendations are presented.

**Integrate planning of sanitation and related services.**
It is documented that water and sanitation entities with a clear, and integrated plan for sanitation provision with pro-poor orientations had success in providing better access to water and sanitation (Walter and Beal, 2022). To achieve this, sanitation issues should be planned along with water access, waste management and solid waste management.

**Consider water supply alternatives** to combat water insecurity posed by increased sanitation services, water connections and climate change. The use of rainwater harvesting, and purification systems should be explored. Since SSS specifically does not require the use of potable water, domestic rainwater harvesting can be used as an alternative. Further, **increasing the routine maintenance of both water pipes and sewerage pipes** is crucial for limiting leaks, environmental pollution, and health consequences.

**Case Study 1:** Kibera, an unplanned settlement in Kenya is taking initiative by constructing a "reinvented toilet" so-called communal "bio-digester" as an environmental-friendly and alternative approach to conventional sanitation.

By learning from experiences of the dome digester in Asian countries (Kweya et al., 2016), they have successfully managed to give onsite treatment to faecal waste. This infrastructure is constructed in firm anaerobic tanks that collect and decompose waste utilising a natural biological process. This reduces the potential of odour and pathogen pollution to the surrounding environment and produces biogas as a renewable energy resource which can be used for electricity conversion.

Started in 2006, it has led to an improvement of overall sanitation and a decrease in community illness. The infrastructure is supported by the local utility, managed with an innovative pricing regime by monthly pricing that supplies unlimited access to all the local households instead of pay-per-use options, supplying decision-making dynamics considering different socio-economic status of households. (Kweya et al., 2016).

## 1.3 Develop inclusive financial mechanisms

In Mwanza, increasing demand for water, coupled with low ability to pay, leaves some residents unable to afford what they need. It is estimated that 20% of people in Mwanza lack income (UN Habitat, 2018) and household incomes are generally low; failure to take this context into account when providing sanitation services not only results in residents losing access to basic services but also compromises their hygiene and health. While the utility has implemented the SSS and connected many houses in Mabatini, most residents were responsible for upgrading their toilets to accommodate the SSS and have a water connection. Low-income residents have encountered financial difficulties in upgrading their toilets and facilitating a water connection due to the high financial burden. Although, some have used the Mwanza Sanitation Forum and Fund, which provides soft loans, to help, it is not yet well known and financial aid for sanitation infrastructure and services is uncommon.

Sanitation systems typically demand increased water use and the SSS has resulted in a significant escalation of water costs. One resident's water bill increased fourfold since connection, a prospect that is simply unaffordable for most households. MWAUWASA's city wide tariff uses a tiered billing system based on water consumption and more usage is associated with higher water cost per unit. So, houses with multiple tenants sharing a water tap experienced amplified water usage due to the SSS connection, resulting in a substantial increase in water expenses. This occurrence, despite the individual tenant's low per capita water consumption, represents an unfair burden and highlights the utility's blind spot in accounting for shared infrastructures. To avoid burdening low-income residents with costs that are unaffordable and unsustainable, the following recommendations are proposed.

**Conduct a needs-based assessment** when considering upgrading sanitation infrastructure to find the right solution. Those with urgent needs of upgrading their toilets and the most vulnerable, including the elderly and the economically inactive, need to be prioritised when selecting beneficiaries for improved sanitation infrastructure and related services.

**Introduce flexible repayment of construction and connection costs** to allow water and sanitation access to more residents.

**Ensure a pro-poor approach to water provision and improve transparency.** According to the UN, the cost of water and sanitation services should be lower than 5% of family income, whereas data has shown 16% of Tanzanian city dwellers spend more than 5% of their income on water alone (Beard and Mitlin, 2021). A solution could assess the number of households sharing one tap and reduce the unit price for shared compounds. In addition, cross-subsidies in which higher income citizens are charged more to finance lower income ones, could bring diverse benefits. While SSS is considered low cost, its funding came from overseas development aid and future financing options are unclear. The relative ease of raising the revenues through cross-subsidies could be an advantage to support further SSS coverage and other sanitation service improvements in low-income settlements , which has proved to be effective in Zambia (Case study Box 2) and Burkina Faso (Acey, et al, 2019). But there needs to be a clear regulator commitment to ensuring that the fund is used in low-income districts only. Other pro-poor water tariff methods have already been used in African countries. For example, South Africa provides free basic water to low-income households, while in Kenya customers can read their own meters, have the possibility to use mobile money to pay their bills, and make smaller, more frequent payments. (Beard and Mitlin, 2021).

Finally, an itemised well descripted utility bill, including water tariff and usage, wastewater tariff and connection costs (if applicable) will facilitate community awareness and collaboration through an increased transparency.

## 1.4 Support community-led governance

Currently, the implementation of sanitation solutions, such as SSS, is characterised by a lack of community engagement. Participation is limited to a one-way flow of information from officials and contractors to community leaders and residents. Community meetings take place at the beginning of the project to inform people about benefits and requirements, and surveys for house selection are conducted prior to implementation. However, engagement is limited as meetings are targeted at landlords and owners and experience a low rate of attendance. Furthermore, surveys tend to happen close to the beginning of construction works, preventing negotiation. Consequently, most residents are uninformed, unempowered, and excluded from decision-making processes.

This is further exacerbated by the lack of transparency on sanitation projects' costs and timelines, as well as the breakdown of water bills. In Mabatini, beneficiaries of SSS lacked knowledge of how the system would impact them financially, and other residents were unaware of how to be connected to the system. These conditions hinder the agency of the residents, preventing them from negotiating conditions according to their economic ability. Additionally, lack of participation is replicated along the chain, resulting in

**Case Study 2:** Since 2007, all non-poor Lusaka Water and Sewerage Company (LWSC) customers in Lusaka, Zambia, have been subject to a sanitation levy. It is separate from and in addition to the sewerage tariff charged to all customers. The levy goes into a sanitation fund that is set out specifically for low-income settlement sanitation upgrades, with schemes implemented including both grid and off-grid solutions. As of 2012, the levy has sponsored 200 on-site sanitation facilities and SSS in low-income peri-urban regions through disbursements totalling at least $2 million (Norman, Daryanani and Peal, 2012).

**Figure 4:** A single water tap shared by different households, a common situation found in unplanned settlements. Mwanza, 2023. Photo Credit: Mustafa Hamad.

new burdens for residents, such as maintenance issues, ensuring proper operation, and increased costs.

Altogether, these conditions have the risk of making the system inoperable in the long-term, deepening inequalities, and hindering the project's benefits and sustainability.

In contrast, several cases prove that community participation and ownership lead to more sustainable and effective sanitation outcomes (SDI, 2017; Lampoglia & Rolim, 2006). Therefore, a shift in power from citizen participation to citizen control (Arnstein, 1969), in the form of community-led governance, is envisioned as a way forward for ensuring just access and the equitable distribution of the benefits of sanitation provision. In this context, community-led governance is based on the principles of participation, capacity building, partnership and collaboration, social inclusion, transparency, and accountability.

It is suggested in this policy brief that these principles can be put into practice via a series of policy proposals that are particular to Mwanza but can also be adapted to other cities:

**Improve collaboration between stakeholders along the sanitation chain**, such as government at the ward level, local government entities, and sanitation provision institutions, by strengthening existing governance structures and involving lower-level community representatives, such as ten-cell leaders representing both landlords and tenants. Through collaboration, these organisations will be able to combine their resources, experience, and knowledge in order to produce sanitation strategies that are adequate and sustainable. Building residents' capacity specifically offers the advantage of decreasing maintenance concerns such as blockages, quick response, which prevents outages, and access to financial resources. For example, capacity building for communities can be targeted at providing information and skills to access and manage resources available for sanitation improvements such as microfinance or grants, especially for decentralised systems, which in addition have the potential to increase economic opportunities for residents through jobs and revenue from waste recovery.

Furthermore, collaboration should **empower inclusive decision-making to account for the diversity of needs and capacities among residents, while distributing roles and responsibilities among the members of the community.** This would provide the residents of unplanned settlements with the ability to take part and lead on the planning, implementation, and administration of suitable solutions, particularly decentralised which require on-site management. Two existing spaces can be embedded and strengthened to fulfil this objective: The Mwanza City Sanitation Forum and Fund, created as a meeting point among stakeholders as part of the research conducted by OVERDUE, and the SSS Committee, which was designed by MWAUWASA to collect community issues and questions related to the implementation of the SSS.

Currently, the Forum assembles representatives from MWAUWASA, the municipality health office, the Tanzania Federation for the Urban Poor, the ward officer for Mabatini, pit latrine manual emptiers and community health officers. For its part, the SSS committees are made up of community committees formed by residents who volunteer to be part of them and elected in a community meeting, and sanitation stakeholders from MWAUWASA. The two spaces combined have the representation of the government and non-government sectors for issues related to sanitation in Mwanza, however, lower-level organisation and representation is limited in both spaces.

As such, it is proposed that horizontal forms of organisation are strengthened, such as the potential role that ten-cell leaders can play to organise and represent residents around sanitation issues, being the current leadership role recognised as the closest to them. Furthermore, following the current governance structure at the ward level, collaboration among ten-cell leaders with local leaders at the mtaa level can help make visible issues and needs specific to residents, leveraging their political power.

Therefore, it is recommended to integrate the SSS committee into the Forum as a task force for SSS related issues and include lower-level representation as described above and other community-based organisations that maybe present in Mwanza (although not identified in Mabatini) to support long-term efforts. A structure for stakeholder collaboration is presented in Figure 6.

**Ensure transparency of procedures and allocation of costs, and accountability between officials, utility, and residents** to facilitate the effectiveness of two-way communication from the ground up and top-down and empower residents who can advocate for their needs directly, ensuring that their voices are heard at the policy-making level through participatory decision-making processes, facilitated by the space described above.

**Figure 5:** Participatory workshop to devise strategies to improve sanitation in Mwanza, 2023. Photo Credits: Authors. (Photo has been blurred to maintain anonymity)

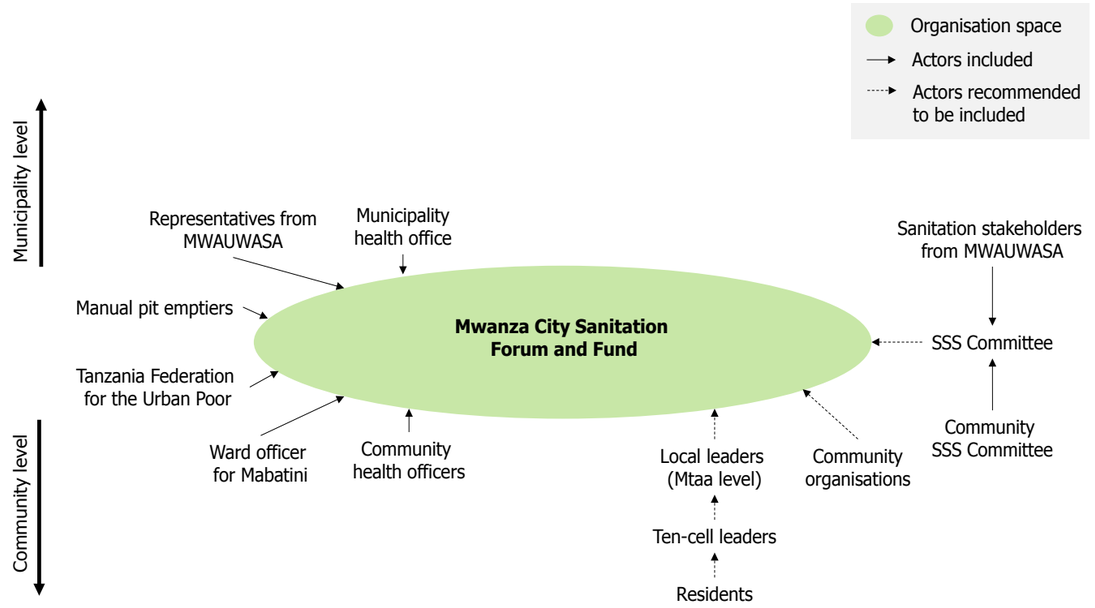


**Figure 6:** Proposed structure for inclusive stakeholder collaboration in Mwanza. Source: Authors.

**Diversify communication channels and methods**, to ensure continued communication among stakeholders and the inclusion of disadvantaged groups in participatory decision-making processes. These categories include the elderly, those who are economically inactive, and individuals who have physical disabilities. Radio broadcasts, social media platforms, posters, flyers, and initiatives based on the requirements of the community are a few examples.

## 2. Interactions

Although presented as specific recommendations related to a strategy, some recommendations can be considered as pre-conditions for the successful implementation of a different strategy. For instance, it can be considered that the implementation of a diversity of technological sanitation solutions, especially decentralised, needs the leadership of actors directly in contact with the infrastructure. In turn, community-led governance is necessary to ensure these initiatives are successful in the long run.

Furthermore, a strong and continued collaboration among stakeholders helps build trust for future initiatives, while empowered communities can take the lead on improving the situation in other sectors beyond sanitation, for example, waste management.

Similarly, beyond the sanitation benefits related to off-grid technologies, namely to reach universal access, embracing off-grid technologies can signify savings related to improved health and environmental quality, plus increased income from potential economic activities from the on-site operation of systems. These added economic benefits can help people invest in further sanitation improvements and other needs.

## 3. Conclusion

Through the four strategies and respective recommendations addressed in this policy brief, a set of guiding principles is provided for the successful implementation of an integrated sanitation provision with a pro-poor approach, that understands the needs and capacities of users. It also covers resilience building, in the context of climate change, by considering feasible alternatives to water supply and sanitation solutions, either off-grid or grid, that could improve sanitation in unplanned settlements and city-wide

These strategies could be implemented in existing policies or applied by relevant institutions to achieve equitable urban sanitation. While this brief is based upon research undertaken in Mwanza, Tanzania, these recommendations can be adopted and integrated elsewhere taking context-specificity into consideration.

## Acknowledgement

We extend our gratitude to all the institutional actors, NGO partners, community leaders and residents from Mwanza and Mabatini for their active and valuable participation in this project. We would also like to thank our local partners Festo and Richard that joined our group as well as Professors Adriana Allen, Rita Lambert, Pascale Hofmann as our tutors, for their valuable contributions, knowledge and guidance.

## References

Acey, C., Kisiangani, J., Ronoh, P., Delaire, C., Makena, E., Norman, G., Levine, D., Khush, R., and Peletz, (2019). 'Cross-subsidies for improved sanitation in low-income settlements: Assessing the willingness to pay of water utility customers in Kenyan cities', World Development, v. 115, pp. 160–177. Available at: doi: 10.1016/j.worlddev.2018.11.006.

Arnstein, S. (1969). 'A Ladder of Citizen Participation', Journal of the American Planning Association, v. 35(4), pp. 216–224. Available at: https://doi.org/10.1080/01944366908977225.

Beard, V. and Mitlin, D. (2021). 'Water access in global south cities: The challenges of intermittency and affordability', World Development, v. 147, 105625. Available at: .2021.105625.

COWI. (2016) Water Supply and Sanitation for Mwanza Town and Satellites. Technical Assistance for Preparation of Master Plan, Detailed Designs & Tender Documents. Mwanza Urban Water and Sanitation Authority (MWAUWASA) & European Investment Plan (EIB)

Devkar, G., Thillai Rajan, A., Narayana, S and Elayaraja, M. (2019). 'Provision of basic services in slums: A review of the evidence on top-down and bottom-up approaches', Development Policy Review, v. 37(3), pp. 331–347. Available at: https://doi.org/10.1111/dpr.12355.

Kweya, M.G., Mugwima B.N., Omotto, J., Rosana, E. (2016). 'Managing human waste in informal settlements: Bio-centres in Kibera informal settlement, Kenya'. Sociology and Anthropology, v.4 (11), pp. 966-971.

Lamploglia, T.C. and Mendoca, S.R. (2006) Alcantarillado condominal: Una estrategia de saneamiento para alcanzar los objetivos del milenio en el contexto de municipios saludables. Lima, Perú.

Norman, G., Daryanani, A. and Peal, A. (2012). 'Sanitation surcharges collected through water bills: A way forward for financing pro-poor sanitation?', Water and Sanitation for the Urban Poor Discussion Paper 004. Available at: https://www.wsup.com/insights/sanitation-surcharges-collected-through-water-bills-a-way-forward-for-financing-pro-poor-sanitation/ (Accessed: 24 May 2023).

UNCTAD. (2023). Ensuring safe water and sanitation for all. Available at: https://unctad.org/system/files/official-document/dtltikd2022d1_en.pdf. (Accessed 29 May 2023)

United Nations (2022). The Sustainable Development Goals Report. Available at: https://www.un.org/development/desa/dspd/2022/07/sdgs-report/ (Accessed 29 May 2023)

UN-Habitat (2023). 'The Lake Victoria Water and Sanitation Project'. Available at: https://unhabitat.org/the-lake-victoria-water-and-sanitation-project (Accessed 29 May 2023).

UN-Habitat (2018). Youth-Led Mwanza City Informal Settlements Baseline Survey. State of Living Conditions and Access to Urban Basic Services. Available at: https://unhabitat.org/sites/default/files/2020/06/mwanza_community_mapping_report2020.pdf (Accessed 26 May 2023).

Slum Dwellers International (2017). SDI Annual Report 2017. Cape Town. Available at https://sdinetorg-1c78b.kxcdn.com/wp-content/uploads/2018/02/sdi-annual-report-2017.pdf

Water Supply and Sanitation Act (2019). Gazette of the United Republic of Tanzania No. 8 Vol. 100. Available at: https://faolex.fao.org/docs/pdf/tan199085.pdf

Walter, C.G. and Beal, C.D. (2022) 'Developing a best-practice model for water and wastewater services in informal urban settlements in Tanzania', International Journal of Water Resources Development, v. 38(3), pp. 403–425. Available at: doi:10.1080/07900627.2021.1909541.

**For further information, please contact:**
**Adriana Allen (a.allen@ucl.ac.uk),**
**Tim Ndezi (ccitanzania@gmail.com) or**
**Wilbard Kombe (kombewilbard18@gmail.com)**