IWA World Water Congress & Exhibition

11 – 15 September 2022 | Copenhagen, Denmark

Workshop on Sanitation in Urban Informal Settlements - pointing at realistic solutions for accelerating improvements.

- key messages from IWA World Water Congress 2022

”TAKE THE SLUM FROM THE PEOPLE AND NOT THE PEOPLE FROM THE SLUM!”

(Yirah O. Conteh, Slum Dwellers International)

Resume

During the IWA WWCE2022, extracts from considerable pools of knowledge and experience related to sanitation in urban informal settlements were presented at this workshop as well as the sessions on Inclusive Urban Sanitation and Advancements in Non-Sewered Sanitation, respectively.

This workshop - “Sanitation in Urban Informal Settlements” - was attended by about 50 participants from 16 countries representing academia/universities (40%), institutions/associations (25%), utilities (15%), companies (10%) and NGOs (10%). During the workshop and a subsequent wrap-up-meeting it became clear that the bridging and dissemination of existing knowledge is key to accelerate improvements to living conditions in urban informal settlements around the world. Thus, this summary document is focused on the provision of links to existing knowledge on sustainable implementation of improved sanitation in urban informal settlements.

It is the hope of the organisers that the widespread dissemination of this Summary Report via UN-Habitat, Slum Dwellers International, IWA Specialist Groups and other relevant networks may be of help to the end-users.

Content

Workshop description

The initial planning of the workshop started in the summer 2019 with the intention to add to the diversity of the Congress theme “Water for Smart Liveable Cities” and include a voice from the millions of people currently living in informal settlements characterised by poor sanitation and water quality. This is in direct continuation of the establishment of the IWA Specialist Group on Non-Sewered Sanitation (NSS) in 2018, the initiative on Regulating for Citywide Inclusive Sanitation (CIWIS) approach in 2021 and feeds into the new IWA Programme on Inclusive Urban Sanitation (IUS).

Given the 1½ hour framework of the workshop, the programme was organized in 3 parts: invited speakers from UN Habitat and Shack/Slum Dwellers International, respectively, short presentations from each of five IWA SGs relevant in this context, and finally a panel discussion with open feedback from the audience. The workshop was facilitated by Bo N. Jacobsen, Engineers Without Borders in Denmark (EWB-DK).

To facilitate dissemination of knowledge presented at the workshop, this summary report provides key messages, a library with links to further knowledge (Appendix A) as well as the presentations given at the workshop (Appendix B, separate document). Presentations were given by:

- Hezekiah Pireh, UN Habitat: *The SDGs and magnitude of WASH-challenges in urban informal settlements*
- Yirah O. Conteh, Slum Dwellers International (SDI): *Improving Access to Sanitation in Informal Settlements*
- IWA-SG Non-Sewered Sanitation - *disrupting the traditional utility service concept* Konstantina Velkushanova, IHE Delft / Jay Bhagwan, Water Research Commission, South Africa
- IWA-SG Efficient Urban Water Management - *From silos to synergies with wider planning of informal settlement improvements* Stuart White, Univ. of Technology Sydney, AU
- IWA-SG Resources-Oriented Sanitation: *Safe recycling of nutrients and energy recovery*, Kai Udert, EAWAG, CH.
- IWA-SG Sanitation and Water Management in Developing Countries - *Affordable vs. best available technologies*, Markus Starkl, BOKU, AT
- IWA-SG Health Related Water Microbiology: *Tools and experiences from monitoring WASH facilities and interventions*, James Ebdon, Univ. Brighton, UK

Key Messages from UN

According to the UN Sustainable Development Goals Report, 2022, it will require a fourfold increase in the pace of progress to meet the drinking water, sanitation and hygiene targets by 2030. With the current rate of investments and progress, 1.9 billion people will lack safely managed drinking water, 2.8 billion people will lack safely managed sanitation, and 1.9 billion people will lack basic hand hygiene facilities in 2030.

Analysis conducted within the UN-Habitat Programme have concluded that the responsibility and roles for providing NSS as a public service often fall in a limbo without reference to legislation or regulation at neither national nor local government levels. This complicates the mandates for utilities / companies to operate for the communities in informal settlements.

The future of the world's population is urban and the Least Developed Countries (LDCs) have a rising proportion of their population living in urban slums, or informal settlements. Examples were given from Kibera, Nairobi, the biggest slum in Africa. During Covid19, a lot of handwashing facilities were established, but how do we sustain this improved practice?

In summary, the Water, Sanitation and Hygiene (WASH) challenge in informal settlements is essentially a challenge of urban governance:

- **Urban policies and legislative frameworks rarely prioritize WASH -** The urban development sector in LDCs seldom appreciates the critical role of WASH in improving public health and eradicating poverty and inequality in human settlements and cities**.** There is a lack of integration between spatial plans and infrastructure and service plans;

- **Lack of a citywide WASH service vision –** WASH sub-sectors and related sectors such as health, education and agriculture are working independently with strategies and programmes shaped by their own priorities and interests. Sometimes the topic is victim of government-reorganization;

- **Low government expenditure for WASH resulting in a huge financing gap** - In Africa, for example, total current investments must be tripled to an annual amount of $114 billion, requiring six times the current rate of national government spending on the WASH sector;

- **Lack of clarity in the mandates, roles, responsibilities and relationships among national and subnational institutions -** Responsibilities for the different elements of the urban water cycle are often spread across a wide range of Institutions. Informal settlements are not always formally acknowledged as a part of the city/jurisdiction and therefore not included in service delivery;

- **Most public water utilities in LDCs suffer from a wide range of interrelated institutional weaknesses -** Most utilities lack adequate financing and often operate in environments where full cost recovery is not feasible;

- **Inadequate data to guide decision-making** on service delivery, investments, regulation, planning and accountability.

Key Messages from SDI

Slum Dwellers International (SDI) is a network of community-based organisations giving voice to the urban poor in 32 countries and hundreds of cities and towns across Africa, Asia and Latin America. In each country where SDI has a presence, affiliate organisations come together at the community, city and national level to form federations of the urban poor.

“Know Your City” is a global campaign of Slum Dwellers International (SDI), United Cities and Local Governments of Africa (UCLG-A), and Cities Alliance. Around the world, slum dwellers collect city-wide data and information on informal settlements. This work creates alternative systems of knowledge that are owned by the communities and have become the basis of a unique social and political argument that supports an informed and united voice of the urban poor. SDI’s databases are becoming the largest repositories of informal settlement data in the world and the first port-of-call for researchers, policy makers, local governments and national governments. Much information is available on the SDI web platform https://sdinet.org/, and more may be available on request.

Examples of typical sanitation arrangements in urban informal settlements were presented by SDI-representative based on his own experiences from Freetown, Sierra Leone. This was to contemplate the mantra “don’t speak about us without us”.

- In coastal areas toilets/latrines typically discharge directly into marine waters; to be washed away with tidal flows. In other areas toilet/latrine waste goes directly into small streams and drainage ditches. Often sanitary facilities are constructed by one family and sometimes shared by several families.
- Toilets can also be constructed by an entire community to share - this can be the case if the local drainage ditches have limited capacity and are unable to adequately remove toilet waste. In this case, larger sanitary facilities can be constructed at the nearshore, ensuring waste is dumped directly to the sea. Thus, keeping the drainage ditches cleaner and the local environment safer. These larger facilities often incorporate separation of genders.

The local communities are in most cases not a homogeneous population group. There may be subgroups based on family relations, religious or other cultural backgrounds.

As advice to the local utilities or external NGOs preparing interventions for improving the WASH facilities in informal settlements, the following should be observed:

- Do not consider the intervention as a project, it is a process;
- It is a must to include the slum-dwellers from the beginning in the process and to invest time and patience in reaching consensus among representatives of the various subgroups;
- The slum-dweller communities are used to working independently of external sources and instead make use of the local workforce – as there are often a range of skilled workers within such communities. Use of local materials should be encouraged throughout the implementation in order to ensure local capability of maintenance and long-term sustainability; these can to a certain extent be purchased via local small savings;
- Women should take ownership of water points; this will require a shift in mindset;
- Enabling one community will spread the good ideas to others - Initiating pilots will typically happen in one community but involving at least four other communities. This primes the dissemination of the good ideas as the ‘champion community’ proceeds with the pilot project.

Key messages from IWA Specialist Groups

Non-Sewered Sanitation (NSS)

Several concepts and technologies for non-sewered sanitation have successfully been practiced over decades and since its formation in 2018, been disseminated by the IWA Specialist Group on non-sewered sanitation (NSS). An outline of the NSS development and strategy was described in the July/2021 issue of the IWA magazine The Source.

Citywide Inclusive Sanitation (CWIS) is a public service approach to planning and implementing urban sanitation systems to achieve outcomes summarized by Sustainable Development Goal 6. CWIS focuses on outcomes and system functions rather than specific system designs. So, sanitation authorities may and must consider the range of possible technologies, service and business models.
A public service approach to urban sanitation acknowledges the market failures inherent with urban sanitation systems. This approach does not preclude, but rather improves private sector incentives to expand investments and stimulate innovations along all stages of the sanitation value chain. The development points from the current citywide sanitation planning to the more decentralized sanitation sensitive design (SSD).

A key question: Why using so much resource for transport and treatment of urine and faeces?

NSS aspires to bridge equality and social status gaps. Flush toilets are often considered the gold standard, but the aim is to provide dignified sanitation. The SG aspires to provide better solutions than pit latrines and explores possibilities of resource recovery as well as reduction of water use. Improving sanitation will often save water, which is important in water sensitive cities.

Efficient Urban Water Management (EUWM)

Use of standardized solutions is advisable to ensure a high quality of the end-product.
In industrialized countries, the use of product standards has enabled higher efficiency in production as well as higher and more uniform quality of products. This may be relevant, in particular, when NSS solutions are based on modular, pre-fabricated units.

As an example, high-volume, single flush toilets being predominant in the market have during the last 20 years been replaced by low-volume dual flush toilets and thereby reducing the water flows associated with toilet flushing.

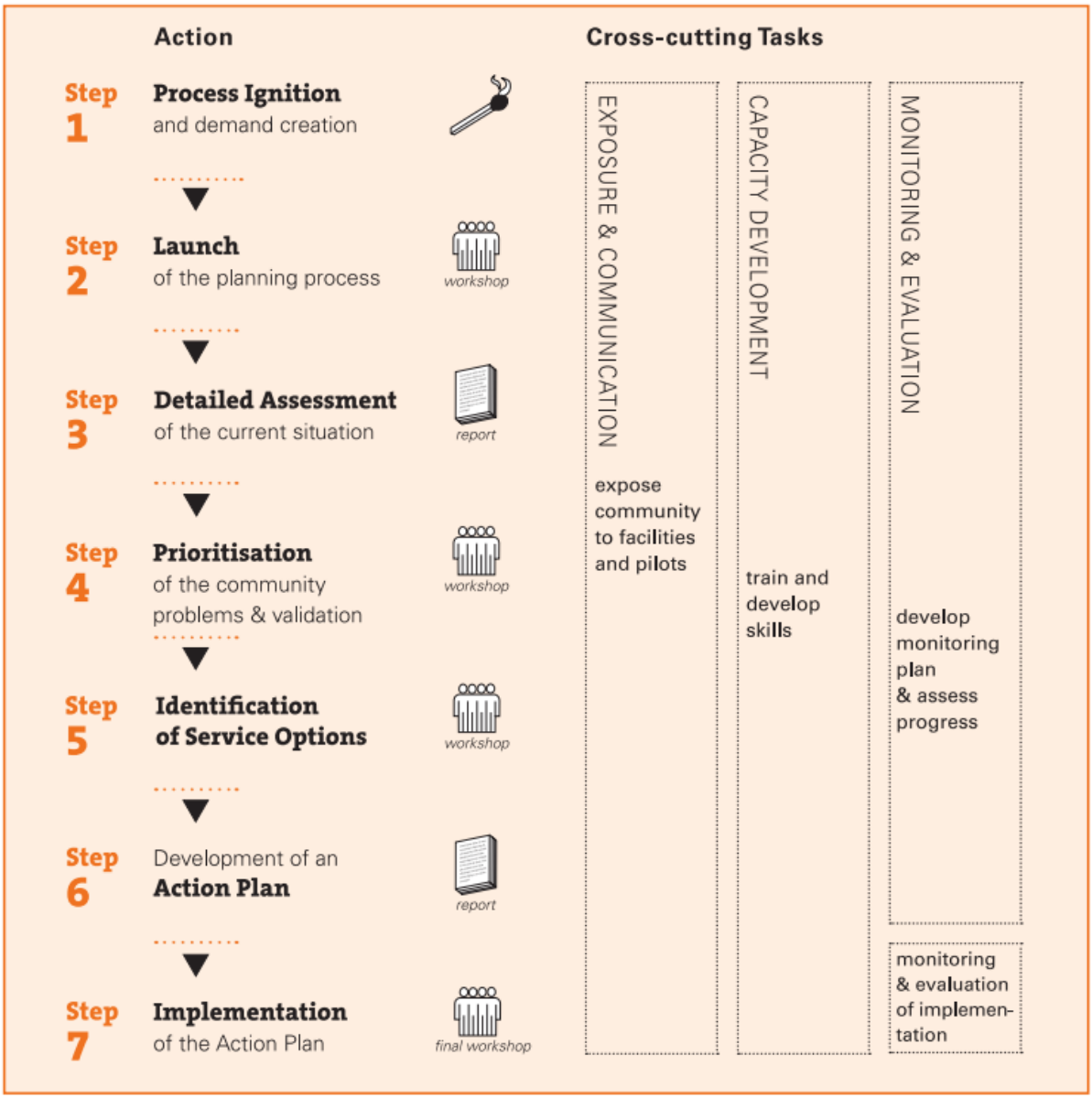
One may speak of 4 generations of urban water systems starting with the unmanaged, as was the case centuries ago in most cities and today in many informal settlements, via the centralized and transitional systems in modern cities, respectively, towards the emerging decentralized systems with a higher degree of integration in urban planning and greater fitness for purpose.

Resource-Oriented Sanitation

There has been a considerable development and documentation on concepts and methods for recovery of resources related to sanitation. Reuse of nutrients from separated urine provides added value as fertilizer, collection and treatment of faeces removes pathogens and water may be recovered, e.g., for handwashing or flushing.

An entire compendium Sanitation Systems and Technologies has been prepared by UN-Habitat, the Water Supply and Sanitation Collaborative Council (WSSCC) and Eawag-Sandec being freely available Link . This includes technology information sheets for a wide range of well-tested concepts and techniques, e.g., pit systems, toilet variants, urine separation, treatment systems, sludge treatment, and more.
A related web platform has been developed for Community-Led Urban Environmental Sanitation Planning (CLUES): link. This includes a number of guidelines, articles, case stories and a management toolbox are also included in several languages.

Much in line with the messages from SDI and as a precursor for installing new technology, it is important to include the local communities and establish and maintain local ownership through the entire process of planning and implementation. This is illustrated below as an extract from CLUES.



Source: CLUES [link]

As it appears, a series of workshops/meetings should be held on the way to ensure the involvement and acceptance from the entire community.

Sanitation and Water Management in Developing Countries

Among the topics dealt with by this Specialist Group, the topic “Affordable vs best available technologies” had been selected for this workshop.

The terms CATNEP (Cheapest Available Technology not Entailing Prosecution) vs BATNEEC (Best Available Technology Not Entailing Excessive Costs) entail the dilemma for many decision-makers in the tendering processes. Unfortunately, it is the experience in Global South that the CATNEP principle is often prevailing and/or technologies fail after some time of operation. Affordability to pay generally very low for sanitation services.

Technologies envisaged by UN SDG (Target 6.2) should be ”adequate and equitable”. This target is not very ambitious and such technologies may not be safe or be considered Best Available Technology (BAT). The so-called ”innovative” technologies implemented in Global South lacked sometimes technical maturity.

Technical standards can ensure minimum maturity and safety of technologies.
As an example, ISO 30500 (2018) for ‘Non-sewered systems – Prefabricated integrated treatment units – General safety and performance requirements for design and testing’ defines the requirements for the quality of the NSS system outputs for solid and liquid discharges, as well as odour, air and noise emissions.
Along with the ISO 31800 (2020) for “Faecal sludge treatment units – Energy independent, prefabricated, community scale, resource recovery units – Safety and performance requirements” this provides a regulatory platform that has the potential to catalyse the rollout and upscaling of NSS as solutions of choice to extend safe and dignified sanitation coverage.

Recommendations:

- Setting global standards for technical maturity of and emissions from sanitation systems will benefit the Global South.
- However, sustainability of sanitation systems (economic, social, institutional aspects) considered equally important, and informative suggestions are provided in those 2 standards. Question: Can it be standardized?
- Uniform global emission standards related to sanitation systems are a highly debated topic and some flexibility to allow for local conditions may be needed.

Health Related Water Microbiology

From a microbiological point of view, it is important to understand contamination sources/pathways:

- It improves understanding of the transmission and risks
- It helps identify origin of inputs and understand responsibility
- It helps assess the effectiveness of interventions (mitigation)
- It helps understand treatment efficacy (removal)

In particular faeces – not urine – contain pathogens. E.g., 1 g of faeces can contain:

- 10,000,000 viruses
- 1,000,000 bacteria
- 1,000 parasite cysts

Results from a recent study tracking typhoid transmission in Kolkata’s (IN) urban slums using low-cost Microbial Source Tracking tools showed numerous pathways for transfer of diseases. Raw fruit and vegetables and food from street vendors in addition to wastewater and surface waters contained both human-specific and non-specific phages (virus).

Also examples from low-cost treatment based on coagulation and flocculation by adding hydrated lime to Cholera waste in Haiti during emergency situations were also outlined.

Reliable and low-cost analytical test kits (e.g. CBT kits, Bluephage kits, MinIon sequencer) for detection of pathogens and faecal indicators are becoming available, however, there is a need to develop a Microbial Toolbox for specific uses and user-groups e.g. local communities – to monitor occurrence of infection risks.

Highlights from discussions

Thinking holistically is key:

- Service provision in informal settlements should be in integrated programmes.

- Community-level ownership should be implemented very early in the process, and building of trust during this stage is very important. Key groups include end-users and other stakeholders, community leaders and influencers. Remember that all communities are different and consist of different groups of individuals.

- Remember to link all water together - for example also to consider handling of grey water. For reasons of time constraints and priorities, it was not dealt with in this workshop, however, it is included in the work of IWA SG on non-sewered sanitation.

- Remember not only to focus on sanitation in tropic climate regions. In other regions, e.g., the arctic dwellers deal with frozen water and frozen ground 8 months each year resulting in similar challenges for access to drinking water and sanitation.

- Focus also on capacity building in order to facilitate local dissemination of the implemented solutions.

Send more data:

- More data from informal settlements is needed, but we also need to take risks and just start developing sanitation.

- Collection of basic data on informal settlements by SDI-network has been mentioned, but other networks of scientists / laboratories organised in the UNESCO initiated Global Water Pathogen Project (GWPP) collect and report data, e.g., from Covid19 wastewater surveillance studies.

Simple solutions please:

- Build simple solutions that can be easily maintained by the local workforce with local materials and at low cost.

Finally, Bo N. Jacobsen pointed out the importance of remembering, that "Perfect can be the worst enemy of the good enough."

Appendix A: Library of relevant links for inspiration and help for future projects

Data and reports from UN:

The Sustainable Development Goals Report 2022
https://unstats.un.org/sdgs/report/2022/ and in particular
https://unstats.un.org/sdgs/report/2019/goal-11/.
Entire report available here: https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf

2018 Revision of World Urbanization Prospects
https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html

Urban Population Living in Slums by Country or Area 1990 2018 (Thousands)
https://data.unhabitat.org/datasets/cd4e1deb72ea49bd8f3403f8a9edfe6d_0/explore

Informal settlements vulnerability mapping: https://data.unhabitat.org/pages/slum-data-surveys

From SDI (Slum Dwellers International)

www.sdinet.org
www.codohsapa.org
Data: https://sdinet.org/explore-our-data/ (more data can be obtained from SDI by request)

Technical solutions and ISO standards

Blue Diversion Autarky Toilet:
www.autarky.ch

Project Saraswati 2.0 supported by the European Commission's Horizon 2020 Programme (Grant Number 821427):
https://projectsaraswati2.com/

ISO standards can be downloaded here (if accepting end user license agreement; link last accessed on 22.08.2022):
https://sanitation.ansi.org/Download

Implementation and sustainability

Guidelines for Community-Led Urban Environmental Sanitation Planning: https://www.eawag.ch/en/department/sandec/projects/sesp/clues/ and in particular https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/schwerpunkte/sesp/CLUES/CLUES_Guidelines.pdf

Compendium of Sanitation Systems and Technologies, 2nd edition: https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/schwerpunkte/sesp/CLUES/Compendium_2nd_pdfs/Compendium_2nd_Ed_Lowres_1p.pdf

Affordability of decentralized wastewater systems: A case study in integrated planning from INDIA: https://www.mdpi.com/2073-4441/10/11/1644

Ensuring sustainability of non-networked sanitation technologies: An approach to standardization: https://pubs.acs.org/doi/10.1021/acs.est.5b00887

Can International Non-sewered Sanitation Standards Help Solve the Global Sanitation Crisis? https://zenodo.org/record/5997803

Addressing sustainability of sanitation systems: Can it be standardized? https://www.igi-global.com/article/addressing-sustainability-of-sanitation-systems/218520

Contacts

Institute for Sustainable Futures, Australia: https://www.uts.edu.au/isf

Research on resource oriented sanitation at Eawag: www.eawag.ch/en/research/humanwelfare/wastewater/decentralised-resource-recovery-from-wastewater

Operational Collaborative Tool for Ongoing Practices in Urgent Sanitation https://octopus.solidarites.org/

The Global Sanitation Graduate School (GSGS): https://sanitationeducation.org/

The Global Water Pathogens Project (GWPP) https://www.waterpathogens.org/

IWA
https://iwa-connect.org/

IWA The Source July/2021: "Non-sewered solutions to the sanitation divide": https://iwa-connect.org/search?searchFor=all&previewDocument=6107b1ac71a67a15598f2396

IWA initiative on Regulating for Citywide Inclusive Sanitation:
https://iwa-network.org/projects/regulating-for-citywide-inclusive-sanitation/

IWA Specialist Group on Resource-Oriented Sanitation:
https://iwa-connect.org/group/resources-oriented-sanitation

IWA Specialist Group on Sanitation and Water Management in Developing Countries:
https://iwa-network.org/groups/sanitation-and-water-management-in-developing-counties/

IWA Specialist Group on Health Related Water Microbiology:
https://hrwm-watermicro.com/hrwmgroup/

Appendix B: Presentations given at the workshop

- In separate document