

## Key sanitation issues: commitments, coverage, choice, context, co-production, costs, capital, city-wide coverage

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1. This Brief reflects on what we can learn from recent innovations in urban sanitation – drawing mostly on the papers on urban sanitation published in *Environment and Urbanization* during 2015; those from April 2015 are listed on the back page.

2. Water piped on premises is recognized as important for good provision for water – but it is also important for hand washing after defecation and so perhaps it should be considered part of adequate sanitation.

3. See the guidelines for toilet and water provision for those with limited mobility: Jones, Hazel and Jane Wilbur (2014), *Compendium of accessible WASH technologies*, WaterAid, London.

4. Substantial numbers of urban dwellers in high-income countries probably live with inadequate provision for sanitation – homeless people, illegal migrants and others in poverty who share accommodation or pay for beds in hostels (often contravening official standards) with poor-quality provision for sanitation. But they represent a very much smaller proportion of the urban population than in low- and most middle-income countries.

**SUMMARY:** *The Millennium Development Goals' target for sanitation will not be met in urban areas, even though the bar for "improved" sanitation is set very low. There are no reliable statistics, but we know that far more urban dwellers still lack adequate sanitation than have it – mostly low-income people in low and lower middle-income countries. In many countries, the percentage with improved sanitation has even declined since 1990. Is it actually possible to reach low-income urban dwellers with good-quality sanitation?*

*We need stronger **commitments** by governments and international agencies – most of which give little support to urban sanitation. Much of this should be within upgrading programmes. We need universal **coverage** – with **choices** about provision influenced by those who lack it and by local context. There is much to learn from examples of **co-production** of sanitation (and much else) between organized urban poor groups and local governments. **Costs** must match what can be afforded, which may mean choosing community or shared toilets. And systems of **city-wide coverage** are needed – not scattered projects.*

### I. WHAT IS NEEDED<sup>(1)</sup>

All the world's four billion urban dwellers need safe, quick, easy access to clean toilets, day and night – without fear, without a long walk or a long wait in line, and without needing to plan ahead or spend more than they can easily afford. They should be able to count on privacy and the means to wash anus and hands quickly and conveniently – difficult if water is not piped to the premises.<sup>(2)</sup> Toilets need to serve everyone – girls and boys, women and men of all ages and conditions. Women who are menstruating should have a way to wash and a place to deposit waste safely and privately. People with impaired mobility should not have to add toilets to the list of challenges they face.<sup>(3)</sup> Small children should be able to meet their needs without someone having to pick up and dispose of their waste or accompany them to a distant facility. Older children should be able to count on sufficient well-maintained toilets at school. And all toilets need to function so that wastes do not end up contaminating anyone's food, water or hands.

In high-income countries, nearly all urban dwellers can access a toilet the moment they want to. There is no need to consider "do I have time now?", "do I have enough cash?" or "will there be a long line?" Most of those reading this Brief have toilets at home with wash basins and running water, and we are so accustomed to our easy access that we don't realize how difficult it is for those without it. Access also tends to be easy in our workplaces, hotels, railways stations, airports, petrol stations, most restaurants and cafes, and many public spaces. There may be instances of unmet needs that certainly should be addressed, but the proportion of those inadequately served is very low.

Almost all urban dwellers in high-income countries also live in neighbourhoods with regular water supplies piped to all homes, functioning storm drains and regular collection of household solid wastes. There is no trade-off between universal coverage and the quality of provision.<sup>(4)</sup> Yet the system that meets sanitation needs so well in high-income and some upper middle-income countries serves only a small proportion of the urban population in low-income and most middle-income countries.

This Brief draws on the Editorial in the April 2015 issue of *Environment & Urbanization* on "Sanitation and drainage in cities". E&U Briefs are funded by UK aid from the UK government's Department for International Development and allow the Journal's main findings to reach a wider audience; however, the views expressed do not necessarily reflect the views of the UK government.



5. See details of this for 40 African cities at <http://www.iwawater.wiki.org/xwiki/bin/view/Articles/AfricanCitiesSanitationStatus>. See also the paper by Chloe Parker listed on the back page.

6. Mitlin, Diana and David Satterthwaite (2012), *Urban Poverty in the Global South: Scale and Nature*, Routledge, London.

7. O'Keefe, Mark, Christoph Lüthi, Innocent Kamara Tumwebaze and Robert Tobias (2015), "Opportunities and limits to market-driven sanitation services: evidence from urban informal settlements in East Africa", *Environment and Urbanization* Vol 27, No 2. This will be available in print in October 2015 and on OnlineFirst before then.

8. Wankhade, Kavita (2015), "Urban sanitation in India: key shifts in the national policy frame", *Environment and Urbanization* Vol 27, No 2. This will be available in print in October 2015 and on OnlineFirst before then.

9. See the paper by Sridhar Vedachalam and Susan J Riha listed on the back page.

10. See the paper by Anupama Nallari listed on the back page.

11. As described in the paper by Marni Sommer, Suzanne Ferron, Sue Cavill and Sarah House listed on the back page.

12. See the paper by Evans Banana, Patrick Chikoti, Chisomo Harawa, Gordon McGranahan, Diana Mitlin, Stella Stephen, Noah Scherbrucker, Farirai Shumba and Anna Walnycki listed on the back page.

13. See the paper by Sheela Patel and SPARC listed on the back page. For a longer history of how community sanitation evolved see Burra, Sundar, Sheela Patel and Tom Kerr (2003), "Community-designed, built and managed toilet blocks in Indian cities", *Environment and Urbanization* Vol 15, No 2, pages 11–32.

14. See reference 7.

15. See the papers by Anupama Nallari and by Marni Sommer, Suzanne Ferron, Sue Cavill and Sarah House listed on the back page.

16. See reference 12.

## II. HOW BAD PROVISION REALLY IS

The Millennium Development Goal sanitation target was to halve the proportion of the population without improved or basic sanitation since 1990. It will not be met in urban areas. Between 1990 and 2012, the proportion of the urban population in "developing regions" without improved sanitation fell from 36 to 27 per cent. It would need to fall to 18 per cent this year to reach the target. In sub-Saharan Africa, the proportion without improved sanitation stood steady at 59 per cent. In many nations, the proportion of the urban population with "improved" sanitation was lower in 2012 than it had been in 1990. Most of the urban population of sub-Saharan Africa and a high proportion in Asia have no provision for sewers, effective storm drains or regular piped water supply to their homes.<sup>(5)</sup> These gaps prevail in an astonishingly long list of cities with several million inhabitants,<sup>(6)</sup> as well as a far longer list of smaller centres. But even these figures greatly under-represent the scale of the problem, since the UN definition of "improved" sanitation includes forms of provision that are totally inappropriate for most urban contexts.

In Nairobi's and Kampala's informal settlements, few use a latrine that is not shared or public, often at a distance.<sup>(7)</sup> Blantyre (Malawi), Chinhoyi (Zimbabwe), Dar es Salaam (Tanzania) and Kitwe (Zambia) are among hundreds of African cities where most of the population have very inadequate provision. Most of India's 5,000-plus urban centres lack sewers and most of its urban population have no sewer connections.<sup>(8)</sup> An assessment of sanitation in 421 cities in India, including the extent of open defecation, found that not one city could be considered healthy and clean.<sup>(9)</sup> Bengaluru (formerly Bangalore) has one of the most successful economies in India. Yet less than a third of its metropolitan area is served with underground drains or sewer networks; the system is a hundred years old and leaks, causing groundwater contamination and polluting water pipelines. Adolescent girls in low-income families there describe the many deprivations that result – the health risks, lack of privacy, fear of sexual harassment and assault.<sup>(10)</sup> Inadequate sanitation can even mean giving up on school. These problems are commonly faced by women and girls in other cities.<sup>(11)</sup>

## III. UNIVERSAL OR EQUITABLE PROVISION?

So how do we respond to the fact that the conventional sewer systems that work so well in wealthier nations are not possible? The draft Sustainable Development Goals (SDGs) pledge that "no one will be left behind". But sewer systems are considered too expensive and beyond the capacity of local governments or utilities in low- and many middle-income countries. Cheaper solutions will be required here, with an emphasis on universal provision rather than equality in the quality of provision.<sup>(12)</sup> This does mean that equity is sacrificed, especially where middle- and upper-income groups have sewer connections and water piped to their homes. But if there is a commitment to universal provision, all disadvantaged or excluded groups can use it to press for their needs to be addressed in some way.

## IV. CONTEXT, CONTEXT, CONTEXT

There is little mention of context in discussions of sanitation (and water) within the United Nations and around the SDGs. Improved provision for water and sanitation is defined the same way for all areas, as if needs were identical for rural herders and those in densely occupied neighbourhoods with no empty space. Solutions need to be developed locally so they fit local contexts and engage those without services in devising the most appropriate responses. Without generous external funding (which at present does not exist), these responses must be cheap enough to work at city scale in settlements where people have very limited capacity to pay, and in cities with little investment capacity.

This often has to mean shared solutions. How well or badly community or public toilets work depends also on context – on design, management, maintenance, costs, opening hours, distance from people's homes, number of toilet seats per user, provision for different needs, and safety, especially at night.<sup>(13)</sup> Women generally take responsibility for managing the sanitation needs of households including cleaning toilets, as well as fetching water if it is not piped to the dwelling. The priorities of women and girls are critical. Women bear the brunt of the hardship when needs are not met<sup>(14)</sup> and, along with girls, may face high risk of sexual violence when toilets are too far away and paths and toilets are poorly lit at night. Men and boys can also more easily relieve themselves in open spaces or wash in public than women and girls.<sup>(15)</sup> Tenants must also be considered – they often face particular disadvantages in access to decently maintained toilets, as well as the likelihood that their rents will be raised if facilities are improved.<sup>(16)</sup>

## V. CO-PRODUCTION OF SANITATION

Where local governments can work with community organizations, it can bring down costs and help generate more revenue. This kind of co-production can also make shared and community solu-

17. See reference 13.

18. See reference 12.

19. For the early history, see Orangi Pilot Project (1995), "NGO Profile: Orangi Pilot Project", *Environment and Urbanization* Vol 7, No 2, pages 227–236. See also Hasan, Arif (2006), "Orangi Pilot Project: the expansion of work beyond Orangi and the mapping of informal settlements and infrastructure", *Environment and Urbanization* Vol 18, No 2, pages 451–480; and Hasan, Arif (2008), "Financing the sanitation programme of the Orangi Pilot Project: Research and Training Institute in Pakistan", *Environment and Urbanization* Vol 20, No 1, pages 109–120.

20. Russel, Kory, Sebastien Tilmans, Sasha Kramer, Rachel Sklar, Daniel Tillias and Jennifer Davis (2015), "User perceptions of and willingness to pay for household container-based sanitation services: experience from Cap Haitien, Haiti", *Environment and Urbanization* Vol 27, No 2. This will be available in print in October 2015 and on OnlineFirst before then.

21. See reference 13.

22. For data on Kampala and Nairobi, see reference 7.

tions work where a toilet for each household is too expensive. There are some powerful examples:

- In Mumbai, municipal government covered the capital costs of city-wide community-managed public toilets and local communities cover their own operating and maintenance costs.<sup>(17)</sup>
- In Blantyre (Malawi), Chinhoyi (Zimbabwe), Dar es Salaam (Tanzania) and Kitwe (Zambia), city and national federations of slum/shack dwellers tested a variety of solutions to see what was possible in informal settlements with very low-income groups.<sup>(18)</sup>
- The best-known example of large-scale co-production is the sanitation system championed and supported by the Orangi Pilot Project Research and Training Institute (OPP-RTI) in Karachi and other urban centres. Community-managed work laid the "small pipes" and local government provided the sewers and drainage mains that these connected to.<sup>(19)</sup> All households in a lane had to agree to the intervention and raise the funds before work started.

Examples of sanitation co-production show great variety, but have some common elements. Residents are active in discussions of what should be done, to what standards, at what cost and for whom. Trade-offs have to be made around what they want, what they can afford, what support they get from local authorities, and the need to factor in the priorities of different household members – especially women, children and those with impaired mobility. Co-production can make the local authority or utility aware of what unserved residents can bring to local solutions. Communities can also help supervise public agencies and the contractors and hold them to account if they do not deliver what was agreed.

## VI. KEEPING THE SERVICE AFFORDABLE

While much of the attention around innovation in sanitation focuses on toilet technology, in fact the more important developments are around the roles and tasks of low-income households and community organizations, the funding to support them and the cooperative support of local authorities. Sanitation provision, including the removal of faecal sludge, can be viewed less as the provision of hardware than as a service with daily, weekly or monthly costs to individuals or households. One challenge is making this service affordable to low-income households – say US\$ 3 or 4 per household per month. In informal settlements in Cap Haitien, Haiti, a container-based sanitation system provides each household with a toilet and a regular emptying service, making high-quality sanitation available without sewers. But there is still a gap between the monthly cost of providing this and what households can pay.<sup>(20)</sup> In Mumbai, community-managed toilet blocks with washing facilities can be covered by charges of US\$ 1–2 per household each month.<sup>(21)</sup> Costs for public toilets vary a lot,<sup>(22)</sup> and what seems low can still be unaffordable to many. Even US\$ 0.05 per use for a family of six, each using the toilet four times a day, would mean US\$ 30 a month. Individuals may choose to use the public toilet only for defecation, but this raises the difficult issue of where they can urinate safely.

The hope that privatization (and private capital investment) would play a major role in expanding high-quality provision for water and sanitation in urban areas has proven to be vastly overstated. Corporatized and privatized utilities (as well as traditional public ones) have been found to be seriously wanting. Perhaps the focus on privatization should have looked more closely at what market solutions were providing on the ground. Market innovations depend on demand to cover their costs. Many look to ways of using markets, for instance through loans to households for improvements or cheaper, more effective latrine-emptying services, to increase this demand. In Nairobi, Sanergy is seeking to provide better, more accessible public toilets in informal settlements through selling franchises. The Reinvent the Toilet Challenge, supported by the Bill & Melinda Gates Foundation, is a welcome catalyst for rethinking sanitation, but should emphasize more solutions that are safe and convenient (for women, men and children) and that cost households no more than US\$ 3–4 per month. Within any settlement, commercial enterprises will serve those who can afford to pay – but will not produce the settlement-wide or city-wide systems that are needed.

## VII. KEY LESSONS FROM EXPERIENCE

Experience provides some key lessons:

**Don't dismiss sewers:** Sewer systems transformed the health and convenience of everyone in cities in high-income and many upper middle-income countries. If sewers are "too expensive for the poor", how is it that so many Latin American cities have reached close to universal provision? And how has the Orangi Pilot Project managed this with full cost recovery, persuading local government to provide the mains to serve community-level pipes? And although much still needs to be done in South African cities, the proportion of their populations with good-quality sanitation is much higher than in the rest of the region.

Sewers get bad press in both environment and development circles. Yet when they can be competently installed in dense settlements, the unit costs per household can be much lower than for on-site sanitation. Sewers also provide for the disposal of other household wastewater and cut costs by elim-

inating the need to empty pits or septic tanks or manage wastes on-site. In many contexts, sewer systems may be the best option – although more work may be needed to cut water use in toilets and to treat sewage. When properly done, they provide benefits over many decades. London and many other European cities still benefit from sewers constructed 150 years ago.

In some locations, a system of localized sewer networks may be the best solution, if land is available for decentralized wastewater treatment. This requires the provision of both capital and land, but costs would be considerably less than for a city-wide network. Costs could be shared – with households contributing prior to connection and loan finance increasing the likelihood that such costs would be affordable. In the longer term, the local authority or utility could invest in linking up these decentralized systems; the land for the decentralized wastewater treatment would then be available for green space or other public facilities, or be sold to help finance the additional investment required.

**Where sewers are not possible:** What can be done when there is little or no external support, no piped water supply and no sewers to connect to? Where households can only afford US\$ 3–4 per month for sanitation, what are the viable options? Shared on-site sanitation emerges as a viable solution where densities are relatively low and systems can be upgraded through investments in septic tanks (which can also be shared to reduce costs). Without sewers, however, low-cost provision poses many institutional challenges and the lowest-income groups will struggle to afford their contribution when wages are low and there are multiple demands on small incomes.

**The extra benefits of ecosan need testing:** External agencies often present on-site sanitation as the most appropriate solution because of the potential for producing energy (methane/biogas) and fertilizer from faecal sludge. Done well, this can reduce the pollution of water bodies better than sewer systems, and without treatment facilities; and toilets needing little or no water are essential where there is no regular water supply piped into each home. But household toilets are unlikely to generate enough methane to be worth the cost of tapping it, and composted/treated toilet wastes have to be sold at a price that covers capital costs and the cost of collection, treatment and delivery to local farmers. Might the desire of external agencies to be seen as more “ecological” be promoting solutions that may be less effective at reducing risks to health from faecal contamination?

**Upgrading:** Much urban sanitation improvement in Latin America and some Asian countries came from “slum” upgrading schemes that addressed a range of needs – including water, housing quality and tenure. In many schemes this included the installation or extension of sewers and their connection to households. This is a reminder that focusing more broadly on measures such as upgrading can contribute to better sanitation.

**Regulations:** Many of the solutions that work well for low-income groups contravene regulations. When local authorities first see the data produced by the federations from their city-wide sanitation surveys a common response is that this situation is appalling and environmental health regulations should be enforced. But such a response simply compounds the problem, as low-income households are further penalized. Regulations can be helpful guides – but many need revision. Considerable collaboration between local government and organized communities can be required to develop appropriate regulations.

**Getting the data on which to act:** Much official data on sanitation comes from national sample surveys, like the Demographic and Health Surveys. These provide inadequate detail, and their sample size is too small to provide relevant data for specific cities, let alone for the more local scale that is necessary for assessing needs. We need data that informs and guides local solutions, which requires detailed assessments by district and street. Census data should provide this, but this is rarely available in a form that local authority and civil society groups can use, and at best only every 10 years.

One important innovation has been the detailed surveys and maps of informal settlements undertaken by the organizations and federations of slum/shack dwellers.<sup>(23)</sup> These have alerted local governments to the scale of the problem, informing discussions of how best to address this.<sup>(24)</sup> In Chinhoyi, one among many possible examples, community-led household surveys, discussion groups and mapping of provision for water and sanitation led to the development of affordable responses (albeit contravening local bylaws) and the co-production of sanitation facilities with local government.<sup>(25)</sup> The OPP-RTI work also included detailed local assessments and maps of each district to provide the basis for planning sanitation improvements. This information covers social concerns, the built environment and geo-physical realities.

**City-wide sanitation:** In most urban centres in low and lower middle-income countries, official sanitation providers, whether municipal departments or private utilities, lack the capacity to meet their responsibilities and are not set up to support low-cost sanitation provision – which may contravene regulations. Urban sanitation is increasingly treated as a private good with little regard for the resulting cost inefficiencies, or the exclusion of those who cannot afford the available approaches. More attention is needed to solutions that work for low-income groups and can be covered by local resources.

For generally improved health outcomes, every city dweller needs access to sanitation that safely disposes of their wastes – avoiding defecation in the open or into plastic bags, or waste paper dumped

23. See Patel, Sheela, Carrie Baptist and Celine d’Cruz (2012), “Knowledge is power: informal communities assert their right to the city through SDI and community-led enumerations”, *Environment and Urbanization* Vol 24, No 1, pages 13–26. See also other papers in *Environment and Urbanization* Vol 24, No 1, available at <http://eau.sagepub.com/content/24/1.toc>.

24. See the paper by Evans Banana, Beth Chitekwe-Biti and Anna Walnycki listed on the back page.

25. See reference 24.

26. See the paper by Francis Odemerho listed on the back page.

27. Almeida Neto, Domingos José de and Léo Heller (forthcoming), "Which is riskier: life on the floodplain or in housing imposed from above? The case of flooding regions in Rio Branco Acre Brazil", *Environment and Urbanization*.

28. See reference 19.

29. Das, Priyam (2015), "The urban sanitation conundrum: what can community-managed programmes in India unravel?", *Environment and Urbanization* Vol 27, No 2. This will be available in print in October 2015 and on OnlineFirst before then.

30. For a TEDx presentation on this issue, see <https://www.youtube.com/watch?v=95Lq2T9OoFo>.

wherever possible (often in drains). To avoid contamination of the city environment, solutions have to be found for the lowest-income groups. Every city also needs a city-wide system for drainage that can cope with storms. Most on-site sanitation lacks sufficient protection from seasonal floods, which can spread toilet wastes all over the flooded areas. Links between sanitation and drainage at city scale are often overlooked – as documented in the cities of Warri in Nigeria<sup>(26)</sup> and Rio Branco in Brazil,<sup>(27)</sup> where rapid city growth overwhelmed the capacity of the local authority to expand the city-wide drainage system. Of course, city-wide systems (and the funds to provide them) are also needed for piped water, water treatment, solid waste collection and management, faecal sludge disposal, and storm and surface drainage. Such city-wide systems can bring enormous advantages to low-income groups.

The focus of sanitation solutions has tended to be on the household or immediate neighbourhood, or, at the other extreme, on sewer networks for the city. There is a need for innovation at the settlement level, for solutions that work for between 200 and 10,000 households.

**What role for external capital?** If we accept that solutions must be locally devised with the full engagement of those who are inadequately served, this means a complete rethink of external funding systems for sanitation. Donors need the capacity to listen to, work with, and support local governments and civil society organizations to develop locally appropriate solutions including co-production. This means rethinking conventional donor strategies that focus on support for national policies. It also means going beyond supporting a few innovative "community" initiatives and developing the financial and institutional means to support this at scale. This may mean support for forms of provision that many funders do not fund at the moment (shared toilets, community toilets) and for organizations they do not usually fund (especially representative organizations of slum/shack dwellers and where possible local government).

It is often assumed that urban sanitation improvements in low- and middle-income countries need external financing. But the OPP model shows this is not always so – indeed, OPP sought to avoid external funding because it always comes with (often inappropriate) conditions and can be far more costly than locally developed solutions.<sup>(28)</sup> Most of the funding for the extension of piped water and sewers in Latin American countries was funded by national and local governments. But donor investments in innovation are also a critical component, as recognized by the federations in urban centres in Malawi, Zimbabwe, Tanzania and Zambia. What will transform the quality and extent of provision for sanitation in urban areas (and much else) are competent and accountable local governments working with those who are inadequately served – often with co-production as the most effective response, and with support to households to take on new management and maintenance responsibilities.<sup>(29)</sup> This provides a challenge to official aid agencies and development banks as their funding systems are not suited to supporting this.<sup>(30)</sup>

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