RESEARCH REPORT

Community-driven sanitation improvement in deprived urban neighbourhoods

Meeting the challenges of local collective action, co-production, affordability and a trans-sectoral approach.

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Executive Summary

There is an international consensus that urban sanitary conditions are in great need of improvement, but sharp disagreement over how this improvement should be pursued. Both market-driven and state-led efforts to improve sanitation in deprived communities tend to be severely compromised, as there is a lack of effective market demand (due to collective action problems) and severe barriers to the centralized provision of low-cost sanitation facilities. In principle, community-driven initiatives have a number of advantages.

But community-driven sanitary improvement also faces serious challenges, including: 1) The collective action challenge of getting local residents to coordinate and combine their demands for sanitary improvement; 2) The co-production challenge of getting the state to accept community-driven approaches to sanitary improvement, and where necessary to co-invest and take responsibility for the final waste disposal; 3) The affordability challenge of finding improvements that are affordable and acceptable to both the state and the community – and to other funders if relevant; 4) The trans-sectoral challenge of ensuring that other poverty-related problems, such as insecure tenure, do not undermine efforts to improve sanitation.

Each of these challenges is analysed in some detail in the pages that follow. The report then goes on to examine two community-driven approaches to urban sanitation improvement that have been expanding for more than two decades, one in Pakistan and the other in India. It is argued that a large part of their success lies in the manner in which they have met and overcome the aforementioned challenges. Indeed, both overcame the co-production challenge to the point where sanitary improvement became the basis for attempts to radically improve community–government relations – relations unfortunately also very dependent on other political dynamics. They also systematically tackled other, less institutionally-rooted challenges, such as the lack of local technical skills in building and maintaining improved sanitary facilities.

The paper concludes that if community-driven efforts to improve sanitation in informal settlements explicitly tackle and surmount these challenges they are far more likely to succeed, and to be able to demonstrate the advantages of putting local residents and their organizations at the centre of sanitary improvement.

1 Introduction

Despite the so-called sanitary revolution of the 19th century, sanitary conditions remain atrocious in many parts of the world, with severe consequences for human health and well-being (Bartram and Cairncross, 2010; Parkinson, Mulenga and McGranahan, 2011). While the official statistics indicate that the world has already met the 2015 Millennium Development Goal (MDG) water target of ensuring that at least 88 per cent of the world's population has access to 'improved' water supplies, it is unlikely to meet the sanitation target, although that would only require 75 per cent coverage.[1] The official statistics (WHO/UNICEF, 2012) show far higher levels of improved sanitation in urban areas (79 per cent in 2010) than in rural areas (47 per cent).

Rural–urban comparisons can be misleading, however, even disregarding the possibility that a significant share of the worst-off urban residents is not included in the surveys that provide the basis for such comparisons. First, the dangers and squalor resulting from unimproved sanitation are particularly high in urban areas. Second, and related to this, since the hazards resulting from poor sanitation have spill-over effects, and do not just put those without adequate facilities at risk, the share of urban households facing serious sanitary problems is far more than this figure of 79 per cent coverage implies (by the same logic, rural estimates are also overstated, though not to the same degree). Third, there has been especially slow progress in urban areas, where the share with improved sanitation has only shifted from 76 to 79 per cent between 1990 and 2010. Since urban populations have increased considerably, this means that the number of urban dwellers without improved sanitation actually increased from 546 million to 736 million over this period (as contrasted to a fall from 2,139 million to 1,785 million in rural areas).

There is a general consensus in the international development community on the need to extend improvements in urban sanitation, and there is some pressure to adopt universal coverage with acceptable sanitation as the next global target (The High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, 2013; WaterAid, 2013). There are, however:

i. somewhat differing views on what constitutes acceptable sanitation;
ii. clearly divergent assessments of the underlying economics of sanitary improvement;
iii. radically contradictory views on the best institutional means of pursuing better sanitation, and on the underlying politics.

As far as what constitutes acceptable sanitation, the tendency in international development circles is to aim for safe sanitation, which can in principle be ascertained objectively on the basis of medical science. Unfortunately, in practice it cannot be ascertained at all, at least not as part of a large standardized global monitoring programme. Thus, it was largely on health grounds, with comparatively little evidence collected on the subjective preferences of users, that the WHO/UNICEF Joint Monitoring Programme identified a household as having access to 'improved sanitation' if it uses a facility that is not shared with other households and is either a flush toilet (draining into a sewer, septic tank or latrine pit), a ventilated improved pit latrine, a composting toilet, or a pit latrine with a slab (WHO/UNICEF, 2012, page 33).

[1] The targets are actually formulated in terms of at least 'halving', between 1990 and 2015, the percentage without access to improved water and sanitation. This means that when estimates of past provision levels change (as occurs quite regularly due to the methods used to estimate access to improved provision) the future levels to be achieved also change. As such, the figures given here may change somewhat before 2015.

However, the very term ‘improved’ was coined in part in recognition of the fact that it is not possible to monitor whether these improved sanitary facilities are safe (WHO/UNICEF, 2000, page 4).

Of particular relevance to the theme of this paper, the definition of improved sanitation has been applied to rural and urban settings alike, although the same facility that provides reasonably safe sanitation in a dispersed village settlements can be extremely hazardous in dense urban settings (the intention of the Joint Monitoring Programme is to devise standards that take account of rural–urban differences after the MDG period ends in 2015 (WHO/UNICEF, 2012, page 36)). Pit latrines with slabs, for example, are likely to pose serious health hazards in a tightly packed settlement of low-cost houses, especially where there is also flooding, or people are relying on dug wells for their drinking water. In some rural settings, on the other hand, even open defecation can be quite safe, depending on how it is practised.

Related to this, using statistics on household facilities to identify how many people face sanitation deficiencies is misleading because, especially in what are often termed informal urban settlements,[2] bad sanitation often creates public health problems and inconveniences. Open defecation, pit latrines that contaminate the groundwater or overflow onto the pathways when it rains, drains that carry one settlement’s sewage down to another’s washing place: these are sanitary inadequacies that can harm large numbers of neighbours who may themselves have perfectly good sanitation facilities.

In any case, the sort of indicators useful for monitoring sanitation coverage globally differ from the sort useful in deciding whether the sanitary facilities in a given location should be considered acceptable. This is partly due to practical data and measurement difficulties. Variations in technologies, physical contexts and hygiene practices are such that locally relevant indicators are not necessarily internationally comparable and those that are internationally comparable are not the most locally relevant. But there are also social and economic variations that influence which sanitation facilities should be considered acceptable in different contexts, at least for the short run.

A United Nations General Assembly resolution, passed on July 28, 2010, recognized ‘the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights’ (United Nations General Assembly, 2010). The human rights framework calls for the progressive realization of the right to water and sanitation, which in some contexts may mean temporarily privileging other essentials. Even if this is taken to be consistent with a single definition of acceptable sanitation, it implies that sanitary improvements must be assessed in the context of other unacceptable infringements of people’s rights, and implicitly acknowledges the importance of both the economics and the politics of sanitary improvement.

Unfortunately, disagreements over the costs and benefits of sanitation complicate the identification of what is acceptable, and bring in other strategic difficulties as well. In some

[2] Urban poverty has a number of dimensions, including but not limited to income poverty (Wratten, 1995). Shelter poverty is probably the dimension most closely linked to poor sanitation, and in many cities shelter poverty is concentrated in what are termed ‘informal settlements’, where housing is unplanned and does not conform to official regulations, sometimes to the point where the land is considered by local authorities to be illegally occupied. In this paper, we use informal settlement loosely to refer to areas where most residents live in shelter poverty, and where sanitation problems are likely to be most severe.

quarters, the benefits of sanitary improvement are widely held to outweigh the costs by a large measure, at least as one moves up towards 'improved' sanitation.

A recent assessment of the cost–benefit ratios of interventions to achieve universal access to improved sanitation by region found that the benefits averaged 5.5 times the costs, and were at least 2.8 times costs in every region (Hutton, 2012). Such estimates give the impression that the only real question is how such improvements can best be achieved. Indeed, the analysis may have been designed to support just this conclusion.

Another study, however, found that there are likely to be many circumstances where the costs of securing improved sanitation outweigh the benefits, and that too much depends on local circumstances for regional or global averages to provide a meaningful basis for investment decisions (Whittington *et al.*, 2012). More generally, while such analyses are meant to include the full range of private and public costs and benefits, in practice many of the more difficult to calculate are omitted, including benefits in the form of social capital and public amenity values.

Especially given the quasi-public nature of many of the benefits of sanitary improvement, these disagreements inevitable raise interrelated questions about who is to decide what quality of sanitary facility is acceptable, who should pay for improvements when conditions are not acceptable, and why is it right, for example, to ask the poorest residents to pay for sanitary facilities of a standard required to reduce public health risks to a level deemed acceptable by the affluent (standards that better-off residents would willingly impose on themselves as well as everyone else, but which worse-off residents would prefer to relax somewhat)? If there is a human right to water, set within a broader framework of rights to the opportunities needed to achieve an adequate level of living, then the answer would seem to be that the poorest should not be expected to pay more than their collective valuation of the improvement, if that. Related to this, it is difficult to defend programmes that try to maximize the quality of sanitary provision, without taking other dimensions of poverty and local priorities into account.

Disagreements about the costs and benefits of sanitary improvement, and over who benefits and who should bear the costs, are important, but less overt than the open dispute over which institutional arrangements should be used to drive improvements. Recent decades have seen a great deal of international debate, for example, over the relative merits of public and private water and sanitation providers (Corporate Accountability International, 2012). Bringing in private operators to run public utilities is presented by some as the best means of saving the lives of underprivileged children and by others as profiteering at the expense of these same children. This despite the fact that there is little evidence that shifting responsibilities for utility management between the private and public sector has much impact on provision one way or the other (Beecher, 2013; Budds and McGranahan, 2003). Utilities are not even responsible for providing a significant share of sanitation facilities. Moreover, the same governance difficulties that make it hard for a government to supervise a public utility in providing sanitary services also make it hard for it to regulate a privately run utility providing the same services. On the other hand, private enterprises and markets will not drive sufficient sanitary improvement on their own: people cannot be expected to pay to reduce the risk their unsafe facilities and practices impose on others without some form of public regulation or community encouragement.

Partly because of the difficulties in both public and private sanitary improvement efforts, and partly because they have actually been quite common and sometimes very successful, community-based sanitation provision has been advocated by some, particularly for rural areas (Mehta and Movik, 2011) but also for urban locations (Lüthi, McConville and Kvarnstrom, 2009; Lüthi *et al*., 2011; Satterthwaite, McGranahan and Mitlin, 2005). To a degree, this paper follows in this tradition and argues that in low-income urban settings the role of communities is often critical of sanitary improvement. Compared to the enormous literatures on provisioning through private enterprises and markets (the topic of a large share of the discipline of economics and of business studies) and on public provisioning and regulation (the topic of a significant part of economics, and a large share of planning studies), research on communities as providers or demanders of services is relatively undeveloped.

In the absence of conventional sewer connections, community organizations have important comparative advantages when it comes to addressing the institutional challenges that low-cost sanitary improvements pose. Unfortunately, community-based efforts also face some very significant challenges, and the focus of this paper is not on the relative merits of different institutional forms (particularly since most realistic models of community-based sanitation also have public and private agencies playing important roles). Rather, it is on the challenges communities face in improving sanitary conditions in informal urban settlements, and on how the challenges can be overcome.

Some of the key challenges that community-based sanitary initiatives need to overcome to be successful include:

1) *The challenge of overcoming local collective action problems*. Open defecation, unsanitary public latrines and the pollution of ground and surface water all create localized public hazards and squalor that neither private enterprises responding to individual demands, nor states responding to political demands, nor disorganized communities, have sufficient incentive to address.
2) *The challenge of finding solutions that public agencies or utilities will not only condone but contribute to*. Low-cost sanitary improvements generally require inputs from both utilities and residents of deprived neighbourhoods, as utilities rarely have the incentive or capacity to build and operate facilities in informal settlements, while the residents of informal settlements rarely have the incentive or capacity to manage their sewage once it flows or is otherwise transported out of their settlement.
3) *The challenge of agreeing on improvements that are both affordable and acceptable*. Where poverty is prevalent, even the collective willingness to pay for sanitation is unlikely to cover the costs of facilities deemed acceptable by health experts, governments or even by the community members themselves.
4) *The challenge of also addressing conditions not strictly within the water and sanitation sector, however defined, that undermine sanitary improvement efforts.* Especially in informal settlements, sanitation problems are physically intertwined with shelter, solid waste disposal and drainage deficiencies, and the barriers to sanitary improvement are often linked to other poverty-associated problems, ranging from tenure insecurity to fluctuating finances, many of which are very location specific.

These problems are vastly different from those of managing piped water and sewer networks, sometimes taken to be the core business of the water and sanitation sector. It is the piped networks that allow for the centralized and integrated control of water and sanitation systems, creating the basis for water and sanitation utilities. When they are functioning properly, the water pipes keep the water free from contaminants in the local environment until it is released into a sink or household water container. In their turn, the

sewers and other drainage pipes prevent household wastewater and faecal material from contaminating the local environment as they leave the neighbourhood. The piped networks can be designed to a standard that allows the integrated system to be managed centrally, giving users comparatively little responsibility for maintenance provided they follow certain fairly straightforward guidelines. These conventional piped systems and their associated infrastructure are well suited to being run by large regulated organizations, including publicly or privately operated utilities. Universal connection to the piped networks, when it is collectively affordable, can also provide a relatively egalitarian political aspiration for a well-governed city, with a similar quality of services for all, and the cost burden shared through taxes, tariff structures and cross-subsidization.

Unfortunately, for a large number of cities in Asia and Africa, universal coverage with water piping is still quite a long way off, and universal coverage with conventional sewer connections is so far off as to be a counterproductive aspiration. Thus, while an estimated 72 per cent of Latin American urban households have a sewer connection, as do a large share of China's urban households, in most countries in South and Southeast Asia and Sub-Saharan Africa, the share is less than 10 per cent (Kjellén *et al.*, 2012). A lot could undoubtedly be done by improving and extending access to urban water and sewer networks, but particularly when it comes to conventional sewers it is clear that for hundreds of millions of urban dwellers progress will need to come from elsewhere.

In examining these obstacles and how they can be addressed, this article draws many of its lessons from a few longstanding community-based initiatives that have not only had local success but have influenced national practices and international thinking about urban water and sanitation provision. These include initiatives associated with the following four institutions, the first two of which have emphasized sanitation and are summarized in section 3 below:

1. The Research and Training Institute of the Orangi Pilot Project centre in Karachi, Pakistan (hereafter OPP) (Hasan, 2010; Pervaiz, Rahman and Hasan, 2008).
2. The partnership between of Mahila Milan, the Society for the Promotion of Area Resources Centre and the Indian Slum Dwellers Federation in Mumbai and Pune India (hereafter the Alliance) (Burra, Patel and Kerr, 2003; Patel *et al.*, 2012 draft).
3. The Development Workshop in Angola (hereafter Development Workshop) (Cain and Mulenga, 2009).
4. The International Institute for Environment and Development – Latin America (hereafter IIED-AL) (Almansi, Hardoy and Hardoy, 2010).

Each of these civil society organizations or alliances managed in different ways, to different degrees and in different contexts, to overcome the institutional obstacles summarized in Table 1 and described in more detail in the following section. None of the key organizations were originally formed to address water or sanitation problems. Rather, they were involved in community-oriented attempts to address the problems of deprived urban residents and came to focus on water and/or sanitation because it was a collective concern. In all of these initiatives, communities organized to articulate their concerns, but also to contribute directly to securing better services, *including* sanitation. In each case, official sanitation authorities and providers also ended up contributing, and co-production models emerged more or less by design. In each case, the alliances extended beyond the water and sanitation sector, often not only to address other shelter deficiencies directly but also to improve the

organizational capacities of the communities through financial management and savings systems. And in almost every case, affordability became a key issue, with the civil society organizations arguing for sanitation technologies that were not generally accepted in the water and sanitation sector of their time and place.

Table 1: Summary of the institutional challenges of improving sanitation in deprived urban neighbourhoods and related responses of successful grassroots initiatives

Institutional challenges	Response of successful grassroots initiatives
1. **The collective action challenge**: Bad local sanitation (and to a lesser extent water) is a collective problem that people in deprived neighbourhoods cannot be expected to confront individually.	Responses are rooted in community organization, and the collective nature of problems becomes part of the justification for collective action.
2. **The co-production challenge**: Even well-organized communities cannot take responsibility for what happens to human waste once out of the neighbourhood, while the public sector and its utilities are rarely able and willing to provide and maintain sanitation facilities in informal settlements.	Improvements are co-produced by coordinated measures on the part of both community residents and the official utility, both addressing the technical challenge and making the utility more responsive to community needs.
3. **The affordability challenge**: Technological 'solutions' that governments and the residents of informal settlements can agree are acceptable, they also find to be unaffordable, and vice versa.	Conventional solutions meeting all official standards and community aspirations are rejected in favour of affordable solutions that satisfy local needs.
4. **The trans-sectoral challenge**: Local urban sanitary and water deficiencies are amplified by poverty-related problems that cannot be addressed from within a narrow water and sanitation agenda.	Sanitary and water improvements are embedded in a broader poverty agenda, and tailored to local conditions.

The next section (2) of this paper examines the limitations of the public utility as a sanitation provider and then examines the four challenges to community-driven sanitation summarized in Table 1. Section 3 examines how community-based initiatives can meet these challenges, drawing heavily on the examples of the lane sewers pioneered by OPP and the block toilets pioneered by the Indian Alliance. The paper concludes that when community organizations and their networks can address these challenges, it can not only improve sanitary conditions, but can also provide an important basis for tackling other shelter-related problems faced by so many residents in informal settlements around the world. Indeed, the fact that the physical character of sanitation poses both a local collective action challenge and a co-production challenge makes it a potentially important starting point for more ambitious pro-poor agendas.

This paper was prepared as part of a recently initiated SHARE action-research project on developing city-wide strategies being undertaken by Shack/Slum Dwellers (SDI) and its affiliates, along with the International Institute for Environment and Development. The project cities are Blantyre (Malawi), Chinhoyi (Zimbabwe), Dar-es-Salaam (Tanzania) and Kitwe (Zambia) (For more details please see the Project Summary http://www.shareresearch.org/Resource/Details/summary_city_wide_project). The project focuses on improving sanitation in low-income communities through efforts driven by community organizations with the support of local governments and other stakeholders. Thus, while this paper makes no explicit reference to the work of Shack/Slum Dwellers International and its affiliated organizations, the structure of the paper is intended to be both relevant to and informed by SDI practice.

Future publications will make more explicit links between the obstacles identified, the practices and principles of SDI's work generally, and the efforts to improve sanitation in these cities in particular. The emphasis in this paper is on what more academic research on the one hand, and the experiences of OPP and the Indian Alliance on the other, can tell us about these obstacles, their importance, and how to overcome them.

2 Institutional challenges to low-cost sanitation in conditions of urban poverty

For most of the 20th century, the public utility was widely assumed to be the appropriate institutional form for providing urban sanitation, and sewer systems were assumed to be the appropriate technology. To understand the institutional challenges in informal urban settlements today, it helps to understand why this model was once so attractive, and why it has fallen out of favour in international development circles despite persisting as the dominant form in most cities of upper-income countries. Thus, before going on to look at the four obstacles, we look briefly at the ways in which urban sanitary improvement has changed institutionally.

2.1 Background to current challenges

Piped water and sewer systems were the jewels in the crown of the sanitary movement that swept the industrializing cities of the 19th century. The populations of these increasingly wealthy cities had an extremely high burden of mortality and morbidity, even in contrast to the poorer populations living in the surrounding countryside, and far beyond what is now experienced in even the poorest countries (Woods, 2003). This differential came to be known as the 'urban penalty,' and was probably due in part to urban inequalities and destitution, but also to urban crowding in insanitary conditions. Even before the role of microbes in spreading disease was demonstrated by Pasteur and others, people suspected that the urban accumulations of human waste were somehow to blame. Many believed that diseases were caused by 'miasmas' rising up from foul-smelling urban 'filth' – in many ways a stronger justification for sanitary improvement than the bacterial theory of disease that supplanted it (Rosen, 1993).

The poor were the worst affected by sanitation-related diseases, but even the wealthy were at risk, and in the right circumstances urban authorities could be put under pressure to clean things up. The periodic cholera pandemics could be especially traumatic. In 1848 *The Times* went as far as to describe cholera as, ironically, 'the best of all sanitary reformers' (cited in Wohl, 1984, page 117). The cost of sanitary provision was high, however, and 'cholera denial' was also common (Hamlin, 2009).

Sanitary improvement eventually became a central plank of more civic-minded urban authorities, but at times even people with relatively ruthless views of how the poor should be treated came to support sanitary improvement. Edwin Chadwick, a force behind the construction of sewers in English cities, had previously played a prominent role in England's Poor Laws, which would now be considered draconian. Yet the sewer systems that Chadwick helped to promote, though not initially extended to the working classes, eventually became one of the most significant urban improvements of the late 19th and early 20th century (Bell and Millward, 1998), and something that most modernizing and growth-oriented city authorities came to aspire to. Over time, responsibility for urban sanitation was consolidated in public utilities, provision was formalized and professionalized, and the ultimate goal became that of providing everyone with connections to piped water and sewers (Melosi, 2000).

By the middle of the 20th century, having the government provide sanitation gained academic legitimacy with the economic theory of public goods. A pure public good is one that benefits everyone, is not depleted when it is consumed, and from which nobody can be excluded. The incentive that an individual has to buy increments of a public good is negligible. In the absence of an effective market demand, so the argument goes, the government must either provide the sanitation or create regulations that force people to buy it – ideally up to the point where the public benefits from better sanitation no longer exceed the cost. The public goods argument seemed to justify making public utilities responsible for providing urban sanitation, supported by a combination of regulations, tariffs, taxes and subsidies.

Unfortunately, while public utilities and piped water and sewerage performed reasonably well in more affluent countries, they have not proved very successful in the cities of low-income countries. This is not really surprising. Many countries are still considerably poorer than the leading industrializing countries of the 19th century. Thus, for example, Maddison estimates that in 1820, while the average per capita income was $1,990, in Great Britain it was already $2,121 (Maddison, 2003, page 32), yet in 2001 the African average was only $1,498 (Maddison, 2003 page 200). Moreover, the cholera pandemics and other health risks that made sanitary improvement an elite priority in the 19th century have declined in severity and frequency, even in the poorer parts of the world, and discourses on the 'unsanitary' city have been replaced with a newer, greener environmental agenda and the pursuit of the world city (McFarlane, 2008; McGranahan *et al.*, 2001). The middle classes in low-income cities today are better able to protect themselves from the risks associated with bad sanitation in the more deprived areas. In effect, while sanitation problems remain very severe, both physically and ideologically they have become more localized within the low-income communities.

But perhaps most important, public utilities have proved to be ill-suited to providing the sort of low-cost sanitation options commensurate with their limited budgets. Piped water and sewerage systems, built and operated to an agreed standard, are comparatively easy to manage centrally. Aqua privies, improved pit latrines and condominial sewers are not. Despite their purported public interest mandate, public utilities have more often provided subsidized sanitation to the few rather than affordable sanitation for all. It probably didn't help that the standards for the piped systems have tended to be adopted from those of the more affluent countries, whose geographies and economies are very different.

Recent decades have seen a reaction against public utilities. There has been a neo-liberal push to increase private sector involvement in utilities generally, and this has extended to

water and sanitation utilities. Most advocates of having water and sanitation utilities run by private operators still accept the need for regulating these utilities and collectively negotiating their standards and levels of provision. There is little actual evidence that increasing private involvement improves the provision of water, let alone sanitation (Braadbaart, 2002; Clarke, Kosec and Wallsten, 2004; Kirkpatrick, Parker and Zhang, 2006). The studies that do indicate that privatization has improved provision and health (Galiani, Gertler and Schargrodsky, 2005; Kosec, 2013), do not seem to consider that the relationship may be the result of donors and governments favouring increased private sector involvement with increased investment and other forms of support. In any case, even if private operators could get utilities to operate more efficiently, there is no reason to think that they would be able to finance sewer connections in informal settlements, or have the ability and incentive to manage low-cost decentralized sanitation facilities. Private enterprises undoubtedly have important roles to play in sanitation provision, but they cannot be expected to lead the way.

If government agencies and public utilities are not going to drive sanitary improvement, then an obvious question is whether low-income communities can organize themselves better, both in order to implement improvements in their own neighbourhoods and to negotiate more effective support from public and private providers. From this perspective, there may also be a need to increase and improve government and private sector support for improved sanitation. Indeed, where communities do drive sanitary improvements, rather than waiting for public services, governments are likely to need to respond to ensure that the result does not simply displace the faecal contamination into local waterways. Similarly, private enterprises will need to improve their supply chains to respond to community demands, as advocated in what has come to be termed sanitation marketing (Devine and Kullmann, 2011; Water and Sanitation Program, 2012).

It is in this context that the obstacles mentioned in the Introduction arise. Deprived communities face a local **collective sanitation challenge** that neither private enterprises nor public authorities are likely to address. The public benefits from sanitary improvement may be less evident at the scale of the city or the nation, but they are extremely serious within sanitation-deprived neighbourhoods and micro watersheds, and near or downstream of locations where sewage is released untreated. Communities need to be better organized to meet these local collective action challenges. In the many areas where there is no government support for sanitary improvement, even organized communities will face an **affordability challenge**. They not only need to ensure that they pursue improvements that they can afford, but that these improvements will be accepted and indeed encouraged by the government. They also face the **co-production challenge**, as they ultimately need to get the government to give more than encouragement, and to take ultimate responsibility for the disposal of any untreated waste flowing or being transported out of the community. In the right circumstances co-production should also help communities to increase both the quality and quantity of government support for sanitary improvement. But particularly in informal settlements, sanitary problems tend to be physically and institutionally linked up with other shelter-related problems, creating what amounts to a **trans-sectoral** challenge. This trans-sectoral challenge is one of the reasons why public utilities are so often ill-suited to providing sanitary services in low-income settlements, and why organizations rooted within the community should be able to play a central role.

2.2 The local collective action challenge

It is not surprising that sanitation often lags behind household water provision given that it combines some of our most private behaviours (which people don't generally like even talking about collectively) with some of our more public impacts (which people don't really want to do much about individually). According to the WHO/UNICEF monitoring programme, an improved sanitary facility is 'one that hygienically separates human excreta from human contact' (WHO/UNICEF, 2010, page 34). The most serious consequences of not separating excreta from human contact arise when people come into contact with the excreta of others, not with their own. From an environmental perspective, good sanitary facilities not only need to protect people from exposure to excreta, but to ensure that the nutrients in the excreta are recycled (Esrey *et al.*, 1998; Langergraber and Muellegger, 2005), and global resources such as phosphorous are not unnecessarily depleted (Cordell, Drangert and White, 2009). From a user's perspective, good sanitary facilities should also be convenient, clean, safe and private. But at their core, sanitary facilities that separate human excreta from human contact do not just serve the interests of individual users, but ensure that other people are not exposed.

As such, sanitary improvement generally requires that people collaborate, not just by making private deals, but by coming to collective agreements and cooperating with each other. This can involve getting a public agency to represent their collective interest, but it can also involve less formal or in any case less governmental organizations. Complicating matters, there are rarely well-defined boundaries to the 'communities' whose sanitary conditions are 'collective'. Proximity matters, but so does geography, which combines in turn with technology and custom to influence where the impacts of poor sanitation fall. A hanging toilet over a stream will put one group of people at risk, open defecation on a local field another group, a poorly constructed and maintained pit latrine another group again, and faecal matter disposed of along with solid waste another group again. Moreover, the groups exposed to collective risks are unlikely to overlap more than very roughly with the lanes that must organize collectively to put in and manage a condominial sewer or the residential neighbourhoods that must organize collectively to put up and manage public toilet blocks.

Different faecal oral diseases are also likely to spread through different routes, and improvements may be necessary in both domestic domains under the control of individual households and in the public domain (Cairncross *et al.*, 1995). Complicating matters still further, one group's sanitary solution can become another group's risk as sewage flows or is transported from one neighbourhood into another. There can be, in effect, a nested set of collective action problems, starting within the home, then at the level of different community groupings that are the principal concern of this section, and then extending to larger scale consequences that a community clearly cannot deal with.

2.2.1 Local collective action problems

Someone living in an unsanitary neighbourhood cannot buy their way to good sanitation, even by purchasing a high-quality toilet and a sewage connection. Others also need to improve their sanitary facilities in order improve the neighbourhood's overall sanitary conditions. In deprived settlements, it is not uncommon for children to defecate in public spaces such as fields or drains, for faecal material in poor-quality latrines to be accessible to flies, for pit latrines to contaminate groundwater used for drinking or to overflow during the rainy season, for children to play freely and to share facilities even when they have diarrhoea, or for infant faeces being disposed of with solid waste that remains uncollected in piles around the neighbourhood. Just a few such hazards create serious health risks,

especially for infants and children. Of course a wealthy household can go further to protect themselves, by either moving to a more expensive neighbourhood where sanitation conditions are better, or by taking measures to isolate themselves (and particularly infants and children) from their own neighbours. They can build a wall around the house yard, place a household garbage container on the other side of the wall, screen off the kitchen, spray the house regularly to control insects, take children to play and be educated elsewhere, and have family members come and go from the house in a private vehicle. This is not, however, an option most people living in informal settlements can afford.

In economic terms, and ignoring the spillovers between neighbourhoods and other parts of the city, this sanitary challenge can be viewed as a spatially delimited public goods problem. A neighbourhood of self-serving individuals will not achieve adequate sanitary conditions because the benefits from each individual's sanitary investments and behaviours are shared by the local public, and each individual benefits from the investments and behaviours of others. In effect, the situation will arise where every individual would be better off if everyone acted to improve the sanitary conditions, but no individual has the incentive to improve sanitary conditions themselves. There is a collective demand for improved sanitation, but it is not converted into behaviours and purchases because the benefits any individual receives depends primarily on the actions of others. In effect, if people are self-serving, a collective institution is needed to make the collective demand for sanitation effective.

The conventional textbook solution to this sort of public goods problem is for the government to provide the good at subsidized prices, impose regulations requiring people to purchase the good, or implement some combination of these. Public utilities providing piped water and households sewer connections usually rely on a combination, at least when approaching universal coverage. In low-income settings a number of problems arise:

1. While subsidies can in principle be used to compensate for insufficient demand, few governments in low-income countries are willing or able to collect the taxes necessary to subsidize prices to the point where even people living in informal settlements receive adequate facilities at a price they can afford, and the beneficiaries are often the 'the few relatively well-off people who can understand the system and capture the subsidies' (Mara *et al*., 2010, page 3).
2. Given a lack of effective demand for the services, people may accept subsidized or free facilities, but not maintain them or use them in a manner that protects the community.
3. Where part of the population cannot afford facilities the state deems acceptable (see section on affordability below), simply imposing regulations requiring people to purchase such services will be either inequitable or ineffective or both.
4. When utilities are underfinanced or corrupt, and services are intermittent or low cost and unreliable, imposing compulsory payments can become a serious problem: why should people pay the official price for services that they did not receive or which were not of the official quality?

Carefully tailored and targeted subsidies, and well-managed facilities, should in principle be able to overcome most of these problems, but in practice public agencies and utilities rarely achieve either. The politics of pricing are not supportive of well-designed subsidies, and it is very difficult to select and manage appropriate low-cost sanitation facilities without the help of users, especially when they are not much in demand.

It is increasingly recognized that making a sharp distinction between (monolithic) government and (atomized) markets can be misleading. Governments provide quite a diverse institutional landscape, and people are not narrowly self-serving (Benkler, 2011). Particularly within small groups where people are in regular contact with each other, the scope for cooperative behaviour is appreciable. Applying a wide variety of methods, research on common property resources has shown the diverse institutional responses to collective action problems, and the scope for self-organizing in response to local collective action problems (Poteete, Janssen and Ostrom, 2010). Some of the variation in the local success in resolving collective action problems relate to the characteristics of the problems, the characteristics of the groups involved, or the presence of top-down interventions (including some that influence self-organizing behaviour), but a large part of the variation remains unexplained (Banerjee, Iyer and Somanathan, 2007). Behavioural economics has shown how comparatively small changes in how choices are framed can make a big difference to people's health-related behaviour, and how this can potentially be used to 'nudge' people towards individually or socially beneficial behaviours (Thaler and Sunstein, 2008). Even in competitive markets herd behaviour and what Keynes referred to as animal spirits are common (Akerlof and Shiller, 2009), and in the right circumstances communicating and networking can help to create beneficially cooperative behaviours (Ormerod, 2012). Even in cities like Chicago there are significant and persistent neighbourhood effects that would seem to have a social basis, and influence collective health and well-being in ways that highlight the importance of informal communities in urban neighbourhoods (Sampson, 2008).

2.2.2 Sanitation marketing to address collective action problems

In principle, it is possible to use conventional private sector approaches to stimulate demand for sanitation, in an attempt to overcome the collective action problems that inhibit private demand for sanitary improvement. Indeed, 'sanitation marketing' has become a popular approach among international donors, and in particular those already inclined to look to the private sector for solutions, such as the World Bank (Devine and Kullmann, 2011). It is supported by a common perception among public health professionals that people are not sufficiently motivated by the potential health benefits of sanitation, and are more likely to be motivated by factors other than health, including ones that marketing conventionally targets. This perception is reinforced by consumer surveys, which suggest that people are more likely motivated by convenience, smell, safety or status (Jenkins and Sugden, 2006). Attempts to market products whose consumption serves the public good is part of a broader trend towards what has come to be termed social marketing (Lefebvre, 2011).

Even within the social marketing literature, it has been recognized that an excessive focus on individual behavioural change and a failure to engage with underlying structural problems can produce poor results (Wymer, 2011). In the case of sanitation and other quasi-public goods, one of the underlying structural problems is the collective action problem under discussion. Marketing to individuals may increase their private demand, but cannot be expected to tap the higher collective demand, or to prevent sanitary offences by selfish individuals. Another structural problem, of less immediate concern to this paper, is that the sanitation supply chains often display systemic weaknesses, with the result that well-designed sanitation facilities cannot be secured at an efficient market price (this is often a particular focus of sanitation marketing, though it falls largely outside what is normally considered marketing).

There have been some large successes attributed to sanitation marketing initiatives, but it is not clear that those documented are really based on marketing sanitation to individuals. During a period of rural sanitation marketing in two provinces in Vietnam between 2003 and 2006, 15,000 of 32,000 households targeted gained access to sanitary toilets. This increased access to sanitary toilets in the pilot areas from 15 to 46 per cent. A follow-up study found that the share also increased substantially after the project ended (Sijbesma, Truong and Devine, 2010, page iii). However, the programme involved a wide range of activities, on both the supply and demand sides, including developing more affordable sanitation technologies, training masons, producers and small shopkeepers to produce, market and deliver these models and, working with village heads, community health workers and Women's Union members to promote them (Devine and Sijbesma, 2011). What characterized the approach was not an emphasis on applying commercial marketing, but on upgrading the supply side by working with the private producers of sanitary services, and upgrading the demand side by working with various people active at the community level (Sijbesma, Truong and Devine, 2010).

A brief introductory guide to sanitary marketing states: 'Keep in Mind – Sanitation marketing is about more than just training masons. It involves a more comprehensive demand and supply strengthening strategy drawing on social and commercial marketing and behaviour change communication approaches' (Water and Sanitation Program, 2012). The very notion that sanitation marketing might be mistaken for training masons illustrates how very far from what most people would describe as commercial marketing this approach has come. This same guide (Water and Sanitation Program, 2012, page 4) suggests that at the low-cost end, sanitation marketing is equivalent to community-led total sanitation (CLTS), whose roots lie in participatory research, which is in some respects as far removed from commercial marketing as one can get (Bongartz *et al.*, 2010; Kar, 2008; Mehta and Movik, 2011; Sah and Negussie, 2009).

2.2.3 Community organization to address local collective action problems

Local collective action problems are also a challenge to communities, but there are a number of advantages that, from a social-scientific perspective, community-level institutions might be expected to have when it comes to local sanitary problems (McGranahan *et al.*, 2001, Chapter 5). As a somewhat unorthodox graduate microeconomics textbook puts it:

> Communities sometimes solve problems that both states and markets are ill-equipped to address, especially where the nature of the social interactions or the goods and services being transacted preclude complete contracting. An effective community monitors the behaviour of its members, thereby making them accountable for their actions. Community governance relies on dispersed private information that is often unavailable to states, employers, banks, and other large formal organizations to apply rewards and punishments to members according to their conformity to social norms. In contrast to states and markets, communities effectively foster and utilize the incentives that people have traditionally deployed to regulate their common activity: trust, solidarity, reciprocity, reputation, personal pride, respect, vengeance, and retribution, among others.' (Bowles, 2004, page 490)

As Bowles and Gintis point out in a paper on social capital and community governance, 'communities solve problems that might otherwise appear as classic market failures or state failures: namely, insufficient provision of local public goods such as neighborhood amenities'

(Bowles and Gintis, 2002, page F422). They point to three advantages that communities have, all of which are very relevant to sanitary improvement:

- First, in a community the probability that members who interact today will interact in the future is high, and thus there is a strong incentive to act in socially beneficial ways now to avoid retaliation in the future.
- Second, the frequency of interaction among community members lowers the cost and raises the benefits associated with discovering more about the characteristics, recent behaviour and likely future actions of other members. The more easily acquired and widely dispersed this information, the more community members will have an incentive to act in ways that result in collectively beneficial outcomes.
- Third, communities overcome free-rider problems by its members directly punishing 'anti-social' actions of others. Monitoring and punishment by peers in work teams, credit associations, partnerships, local common situations and residential neighbourhoods is often an effective means of attenuating incentive problems that arise where individual actions affecting the well-being of others are not subject to enforceable contracts.
  (Bowles and Gintis, 2002, page F424)

Better organized communities should in principle not only be able to address their collective action problems more effectively, but also to hold public agencies to account in ways that cannot be achieved by low-income citizens acting alone. Such organization would eventually need to transcend community boundaries to be fully effective. On the basis of an empirical analysis of a wide range of public goods (not including sanitation) in India, a recent study found that 'among the historically disadvantaged social groups, those that mobilized themselves politically gained relative to the others' (Banerjee and Somanathan, 2007).

There is a significant urban literature on the role of community-based organizations in addressing the shelter needs of low-income urban dwellers, including improved sanitation (Mitlin and Satterthwaite, 2013 forthcoming). For rural areas, a recent study based on small interventions in 32 villages in India (with 38 villages selected as controls) found that establishing self-help groups did improve the local basis for achieving collective action and concluded that 'SHGs and other membership-based organizations for the poor, where they promote collective action, do so not by enforcing a commonality of tastes, but by reducing uncertainty surrounding cooperation' (Desai and Joshi, 2012). It may be significant that the interventions for this last study were undertaken by a women's organization, the Self-Employed Women's Association (SEWA), with a long and successful track record in setting up self-help groups, and not by a conventional development NGO or consultancy.

Many of the better documented urban examples have involved networked community organizations (often rooted in savings groups), supported by non-governmental organizations that provide technical support but not organizational or political leadership (Mitlin and Satterthwaite, 2013 forthcoming). This can be difficult within the confines of conventional development assistance. Thus, for example, a study of outside support for community associations in Kenya found evidence that 'funding changed group membership and leadership, weakening the role of the disadvantaged'(Gugerty and Kremer, 2008).

2.2.4 CLTS and the potential for community collective action on sanitation

CLTS is the most obvious recent 'experiment' in intervening to support local collective action in relation to sanitation. It is an overtly community-based approach, and involves very much the sorts of actions that might be expected to overcome the collective action problems

associated with neighbourhood sanitation, at least in rural settings. Kamal Kar, credited with starting the CLTS movement, places collective action at the centre of CLTS. Indeed, he suggests that the benefits of CLTS lie not just in the sanitary improvements themselves, but that 'more importantly it builds the collective strength and self-confidence of the communities to move ahead with many other local initiatives' (Kar, 2011).

CLTS is often triggered with the help of outsiders, but does not rely on investing outside resources or subsidies into the local sanitation facilities to succeed. To simplify, pursuing CLTS within a community involves four steps:

1. Collecting local evidence on sanitary conditions and the location of faeces in particular, building on the knowledge of community members (including children).
2. Examining that evidence publicly, in a manner designed to 'ignite' collective disgust with the ingestion of faecal matter implied by existing conditions.
3. Building on that disgust to reach a collective agreement on replacing all open defecation with the use of affordable toilets.
4. Creating adherence to that agreement through the traditional means by which close communities regulate themselves, ranging from pride and shame, to gossip and revelation, and eventually to retribution.

CLTS has many adherents and spread rapidly through Bangladesh and parts of India, and on to upwards of 40 other countries around the world (Mehta and Movik, 2011). Kamal Kar estimates that about 20 million people have benefited since CLTS started in 2000 (Kar, 2011), and is very sanguine about its potential in Africa, where needs are high but conditions very different (Kar and Milward, 2011). There have undoubtedly been exaggerated claims. However, some of the statistics cited as evidence of the failings of CLTS, such as that 'only' 39 per cent of the CLTS villages examined in some studies actually go on to become open defecation free (Mara *et al.*, 2010, page 4), could also be read as very positive results.

The health benefits and transferability remain uncertain, and there are differences of opinion on both the costs and benefits of CLTS, among advocates as well as between advocates and detractors. One can debate whether the no-subsidy policy[3] that many proponents of CLTS adhere to is appropriate (Kalimuthu and Hossain, 2008), whether the resulting improvements are really sustainable (Robinson, 2006), whether CLTS addresses gender equity (Adeyeye, 2011), whether eliminating open defecation necessarily results in sufficient health improvements , whether the 'shaming' really conforms to the principles of participatory research or undermines people's human rights (Bartram *et al.*, 2012), and whether more needs to be done to support the most deprived groups (da Silva Wells and Sijbesma, 2012).

There is a tension between the desire to improve the quality of the sanitation facilities achieved through CLTS (a particular concern of sanitation professionals) and the desire to avoid having it become another externally dependent toilet construction programme (a particular concern of advocates of participatory research and action). There is a broader tension between the community-driven ideals of CLTS and the donor-driven realities of the international development programmes, within which CLTS is being increasingly embedded. There is also the danger that some communities will use oppressive tactics to enforce sanitary improvements (Bartram *et al.*, 2012), and that people considered to be outsiders or otherwise inferior will be targeted. Regardless, there are clearly some very important lessons to be learnt from the CLTS experience, even when it comes to urban sanitary improvement.

[3] The no subsidy policy does not extend to promotion and outreach, and is not followed by all CLTS programmes.

Despite some successes in peri-urban settings, CLTS has not taken off in urban areas as it has in rural (Kar, 2011, page xiii). This is perhaps not surprising given that in urban areas there is more need for infrastructural investment as opposed to just behavioural change, and households cannot be expected to build the toilets themselves without any assistance, owing to the higher cost and greater skills required to build urban sanitation facilities, the relative scarcity of land and the difficulties in securing relevant permissions. Moreover, looking back at the four steps that communities go through during the CLTS, and considering each in turn:

5. *In terms of collecting physical evidence*. Urban neighbourhoods are physically somewhat less amenable to a rapid sanitary assessment.
6. *In terms of triggering a community*. Urban residential communities are somewhat less well defined and more heterogeneous, making them somewhat less amenable to rapid 'triggering', particularly led by outsiders.
7. *In terms of the focus on open defecation*. A narrow focus on open defecation is less appropriate, but affordable alternatives remain difficult to identify.
8. *In terms of using the conventional means communities use to regulate themselves.* The are likely to be less effective in urban areas, at least without more organized support.

Urban neighbourhoods vary enormously, and some will be more amenable to CLTS than others. Informal settlements and peri-urban settlements are likely to be among the more amenable. The differences are sufficient, however, such that it is worth considering whether a somewhat different approach to community-based sanitary improvement is appropriate to urban settings. For example, rural CLTS has apparently not encountered problems taking a relatively narrow approach to sanitary improvement, whereas both urban experience and conditions suggest that community-based sanitary improvement should be embedded in a broader approach to urban poverty alleviation (this relates to the tran-sectoral challenge examined in section 2.5). Similarly, rural CLTS initiatives have ignored issues of the ultimate disposal of faecal material, and the role of utilities in this, while again urban experience and conditions suggest that this is critical (this relates to the co-production challenge examined in section 2.3 below).

Overall, while creating a community-wide agreement on sanitary improvement in urban neighbourhoods may require more organization than CLTS can provide, there are good reasons to be optimistic about the possibilities. The principal lesson from CLTS is that community cooperation can, in the right circumstances, radically increase the effective demand for sanitation. Similar lessons may apply to some of the other successful approaches reported, such as the use of Community Health Clubs in rural Zimbabwe, one of whose principles has been to influence people in a coordinated group so that changes were approved by group decision rather than expecting each individual to take personal decisions (Waterkeyn and Cairncross, 2005). This is likely to apply to urban as well as rural areas, even if the means of tapping that demand may be different.

2.3 The co-production challenge

The term 'co-production' was originally coined by researchers in the United States in the 1970s to describe the potential for 'public producers' (e.g. police, school teachers, health workers) to produce more than they could as professionals working independently by working with 'clients' desirous of being safer, better educated or healthier. Some years later, in a path-breaking article, Nobel Prize-winning economist Elinor Ostrom argued that the sharp conceptual divide between government and civil society is a trap, hiding the potential

synergies that can be gained from co-producing goods and services (Ostrom, 1996). Defining co-production as ‘a process through which inputs from individuals who are not “in” the same organization are transformed into goods and services’, she presented case studies of co-production from Brazil and Nigeria, assessed their benefits and drawbacks, and concluded that ‘co-production of many goods and services normally considered to be public goods by government agencies and citizens organized into polycentric systems is crucial for achieving higher levels of welfare in developing countries, particularly for those who are poor’ (Ostrom, 1996, page 1083).

Sanitation provided the basis for one of the two case studies Ostrom presented and continues to be prominent in more recent work on co-production (Mitlin, 2008). There are a variety of reasons why sanitary improvements are often best co-produced, particularly in informal urban settlements. Some of the reasons are more related to the sorts of incentive problems involved in collective action at different scales (community and city); other reasons are more related to the relative competencies at different scales. But most important from the perspective of advocates of co-production, by co-producing sanitation, residents of informal settlements should be able to secure better services from their governments, and in return public agencies should be able to secure more public spirited behaviour from some of their worst-off citizens.

In terms of incentive problems, communities are comparatively well situated to address sanitation’s neighbourhood collective action problems, but public utilities are far better situated to deal with dealing with the collective action problem posed by the disposal of the waste outside of the community. Thus the importance of co-production for sanitation is related to the way the collective action problems typically play out, with communities needing to take a lead in supporting intra-community collective action, and larger public sector actors needing to address the extra-community collective action challenge.

In terms of relative competencies, community residents, organizations and local enterprises have a comparative advantage in constructing and managing simple low-cost systems situated within the community, while public agencies, utilities and large contractors have a comparative advantage in constructing and managing technologically sophisticated systems centred outside of the community. This will tend to reinforce the division of responsibilities suggested by the incentive problems.

In some circumstances, these may not be sufficient justification for co-producing sanitation. In affluent urban settlements, where people can cover the full cost of conventional sewers with household connections, it may well make more sense for the systems to be constructed and managed centrally. In poor rural settlements, provided the community actually can address the local collective action problem, it may well make more sense for the residents themselves to construct simple but reasonably safe latrines, and change pits when the old ones are full, perhaps even planting trees on the filled in sites of the old latrines (Mara, 2008, 2012). In informal urban settlements, however, conventional sewers are typically unaffordable, while simple pit latrines are unsafe and require emptying. Most simple but safe technologies require residents to take some responsibility for managing the facilities within a

residential area, but also require an external agency to take some responsibility for the ultimate disposal of the hazardous waste.[4]

Condominial sewers, Ostrom's Brazilian example (Ostrom, 1996), provide an example of a relatively high-end sanitation system that can still be made affordable in relatively low-income areas, and generally requires co-production. The condominial sewers are smaller in diameter than conventional sewers, are laid less deep, cost a third to half that of conventional sewerage and can become cheaper than on-site systems as density increases past about 150–200 people per hectare (Mara, 2012). 'Whereas conventional systems essentially provide services to each housing unit, condominial systems deliver services to each housing block or any group of dwellings that could be termed a neighborhood unit or "condominium".' (Melo, 2005). The condominial system drains to a point for treatment, removal or connection with a trunk sewer. Even within Brazil, the elected neighbourhood associations formed to initiate the condominial sewers in a given area have played a range of different roles, functioning variously as advocates, service providers and organizers of collective action (Watson, 1995). The original justification for engaging with local residents, and getting their cooperation, was primarily to keep costs down, to allow the residents to play a role in designing the local system and perhaps most important to provide the capacity and responsibility for dealing with the blockages that often arise with small diameter sewers. In Brazilia alone, the condominial system has been used to extend sewer connections to half a million people (Melo, 2005), and it has also been deployed in a number of other cities.

The public toilet block is an example of a low-end sanitary facility that also works best when the service is co-produced, in part because of the need to handle the final disposal of the waste, either through emptying or sewering (unless ecological methods are applied). Often, public toilet blocks are built and intermittently maintained by public agencies. It is common to see such toilet blocks overflowing, broken down, used for other purposes (e.g. for storage) or otherwise failing to fulfil their purpose. Because of the difficulties often encountered with public and shared toilets, in the monitoring of progress towards the global sanitation target for 2015 such toilets are defined as unimproved and their provision is not treated as progress towards the target. There are notable exceptions, however, even in India where the widespread failure of public toilets has been noted in the course of evaluating large-scale programmes in the country (Sanan and Moulik, 2007).

The Sulabh Sanitation Movement grew out of efforts to eradicate manual scavenging involving the collection of bucket latrines (Pathak, 2011), and has involved the construction of over a million private pour-flush latrines, but also several thousand public toilet complexes operated on a pay-per-use basis (Goyal and Gupta, 2009; Jha, 2003). The toilet complexes have been co-produced by government agencies and Sulabh, and have focused particularly on sites such as stations, markets and hospitals, but also some residential areas. The Sulabh public toilets are maintained day and night, and recover costs through charges. They have been very successful in many public locations, but have been less successful in very low-income settlements where the charges are considered onerous. An alternative model in India, in some ways more similar to the condominial system, with its emphasis on community organization, emerged from the Indian Alliance, described in section 3.2 below.

[4] Ecological sanitation is an exception, in that the waste becomes a resource, at least when it is functioning well. The fact that such disposal is not needed is a potentially important advantage, particularly where the public agencies are clearly unwilling to be co-producers of sanitation. Decentralized wastewater treatment can also provide an exception, if the waste is treated in a facility within the community. In both cases, however, the other reasons why co-production is likely to be advantageous still apply.

In all of these cases, community or worker involvement has not just provided a service at the community scale, but has helped to change the politics and policies of sanitary provision at higher scales. Ostrom's discussion of the condominial systems makes explicit the link between the collective action challenge and the co-production challenge, and also relates it to social capital: 'the condominial system depends on three difficult challenges: (i) the organization of citizens and their fulfilment of promises to undertake collective action (what Judith Tendler (1995) refers to as social capital *outside the* government), (ii) good teamwork within a public agency (what Tendler calls social capital *within the* government), and (iii) effective coordination between citizens' (Ostrom, 1996, page 1075).

As Watson argues, when it is working well: 'the condominial system activates residents by engaging them during project implementation, when service level, layout, maintenance arrangements, and cost recovery mechanisms are negotiated. This fosters an active, vocal constituency that puts in motion the accountability mechanisms needed for good agency performance' (Watson, 1995, page 49). Alternatively, in relation to the public toilet blocks Appadurai (2001) describes a co-operative representing women's savings groups using community designed toilets to 'negotiate support and changed policies' and to further 'deep democracy'. Such examples indicate that co-production is not just as a practical means of overcoming management problems, but can potentially become the means of radically transforming the politics of practice (Albrechts, 2013).

With the wide array of technologies and institutional and economic settings, there is an enormous range of different co-productive arrangements possible, and evidence suggests that the arrangements matter. Even with the relatively standardized condominial system, Nance and Ortolano (2007) distinguish between having communities participate in mobilizing, decision-making, construction and maintenance, and examined these different forms of participation when comparing three condominial sewer systems in Recife and four in Natal. The results suggested that participation in mobilizing and decision-making were associated with better performance, but that participation in construction and maintenance were not. They also confirmed a generally higher level of performance in Natal than Recife, where implementation was relatively poor. Such results add a dimension to the analysis of co-production, though they are perfectly consistent with Ostrom's notion that the three principal challenges for condominial sewer systems lie in the quality of social capital outside government, the quality of social capital inside government, and the quality of engagement between the community and the government.

While the more political advantages of co-production continue to attract attention, sanitation experts more concerned with the technical obstacles to extending sanitation in informal settlements have come surprisingly close to advocating co-production in an article on 'A new paradigm for low cost urban water supplies and sanitation in developing countries' (Mara and Alabaster, 2008). With respect to sanitation, they argue that provision should be based on having service providers work with groups of residents, and that these groups should be required to cooperate to manage their sanitation blocks, on-site sanitation systems or condominial sewers. Alternatively, when community-based initiatives manage to improve facilities within low-income neighbourhoods, they often need to be able to rely on a public utility, or the equivalent, to handle the ultimate disposal of the excreta. Community sewers need a trunk sewer to drain into, and most other sanitation systems need mechanized waste removal and treatment, away from the community.

Co-production can be a political and a technical challenge, whether the initiative is coming from the public sector, from the community, or from some third party. Social capital is often scarce within the public sectors of low-income countries, and within informal settlements. Achieving productive cooperation between public and community organizations might seem a tall order. Indeed, even in the successful examples of community-driven sanitation described in section 3, relations between the communities and the public agencies were very uneven and changing. In each case, however, finding better ways for communities to engage with public agencies was critical to their success.

Moreover, while a lack of social capital may make co-production a challenge, the big advantage that Ostrom ascribes to co-production is precisely that it helps to create social capital, and can improve relations between public service users and their governments. This would be a special prize in informal settlements, where relations can get very bad, with extremely adverse consequences.

2.4 The affordability challenge

Virtually by definition, the unacceptably poor cannot afford acceptable water and sanitation services – just as they cannot afford acceptable health care, food and other commodities. This is not in itself an institutional problem, except inasmuch as excessive social inequality is itself heavily influenced by institutions (Acemoglu and Robinson, 2012). However, affordability becomes an institutional problem when institutions preclude low-cost options that would otherwise be chosen, drive up the costs of financing sanitary improvements incrementally, or divert subsidies away from those who need them the most. Some of the most serious institutional problems concerning affordability and sanitary improvement relate to the misuse of standards, though there are other institutional sources of affordability problems, and other institutional improvements that could render sanitary improvement more affordable to low-income urban households.

While most of the discussion in this section focuses on affordability at the level of the household or community, it is important to recognize that there are very different interests in sanitation within the household. Men, women and children have different sanitation needs and priorities, and some individuals in a household may have special sanitary needs. It is infants and children who are generally most at risk from sanitation-related illnesses. Among adults, it is women who bear most of the burden of inadequate sanitation, and who tend to be more responsible for maintaining household hygiene and caring for sick infants and children (Songsore and McGranahan, 1998; Tacoli, 2012). As such, it can be misleading to treat the household as a decision-making unit with common priorities, able to afford certain technologies and not others. Indeed, it is reasonable to surmise that measures giving women more control over household finance, or more say in community affairs, or a greater role in local government, would be likely to result in more resources being devoted to sanitary improvement, and for different improvements to be chosen. In effect, how power is distributed within the households, even when the power is exercised in other arenas, will influence what is considered affordable and what isn't.

Even ignoring these intra-household and inter-gender issues, the affordability of sanitary improvement is a slippery concept, which economists tend not to use. It focuses attention on ability to pay, sometimes to the point where the amount people can afford to pay is treated as independent of the quality of the good and of the benefits it provides. This contrasts sharply with economists' tendency to focus narrowly on benefits and willingness to pay, ignoring all

constraints on ability to pay except for income and competing demands for other consumer goods. In this section, we try to take an intermediate approach, focusing on ability to pay but recognizing that affordability varies with both the benefits provided and the institutional context.

Addressing the collective action problems described in section 2.1 above does not, strictly speaking, make sanitary improvement more affordable though it does increase people's willingness to pay. Co-production, on the other hand, can make sanitary improvement more affordable, both by reducing costs and at least potentially by shifting some of the financial burden to those better able to afford it (through, for example, progressive taxes and subsidized public contributions to the co-production). Before turning to other measures that can make sanitary improvement more affordable, it is worth considering some of the ways in which measures to promote sanitary improvement can actually exacerbate affordability problems.

One of the conventional ways of addressing the sort of collective action problem posed by sanitation is to require people to maintain certain minimum standards, so that they do not impose undue burdens on others. Ideally, such standards are clearly affordable, in the sense that every household is better off when all households make the sacrifices necessary to meet the standard. Under such conditions, some people will benefit more than others and there may be serious questions about who should bear the financial burdens. But to claim that the households that benefit less cannot afford to meet the standard would be misleading. Affordability is clearly a problem, on the other hand, if meeting a standard pushes a significant share of low-income people further into poverty.

If common sanitation standards are imposed across a whole population so as to secure public benefits, and achieving these standards is paid for by users, then wealthier households have a vested interest in higher standards than do poorer households, even if everyone receives the same quality of sanitation at the same private cost. In effect, wealthier households would have to sacrifice less, given what economists refer to as the declining marginal utility of income. Imposing the standards on home owners rather than users might give tenants temporary respite but would soon be likely run into underlying market forces: landlords will respond by some combination of increasing rents and reducing rental supplies.

In principle, subsidies can be used to prevent this affordability problem from arising, enabling low-income neighbourhoods to benefit also from the high sanitation standards. Such subsidization, even if targeted to low-income households, should not be taken to imply that the overall policy combination of standards and subsidies benefits the poorer households disproportionately. Indeed, a significant subsidy may be required just to equalize the benefits of a high standard (and, of course, past a certain point high standards do not provide net benefits).

Unfortunately, countries where coverage is low typically also have low tax revenues and little appetite for large subsidies. Informality, in its various forms, can be one of the reasons for low tax revenues and also for low spend, as the residents are often politically weak or even disenfranchized. Underfunded but price-controlled utilities will typically only be able to serve a small share of the population, particularly with expensive technologies such as sewers and sewer connections. Under such conditions, high standards can easily divert the limited subsidies available to the middle-class households. This is often treated as an inherent outcome of subsidizing water and sanitation services, though it is better described as the

effect of price controls that are insufficiently subsidized. As already indicated in previous sections, subsidies can lead to problems, but it is unfair to blame subsidies when governments fail to provide them.

In the absence of subsidies, one way of preventing high standards from burdening low-income households, is to allow standards, particularly for more localized burdens, to vary in line with local preferences and affordability. In principle, this would allow low-income residents to benefit even if they have to cover the costs of meeting their somewhat lower standards. In many economically 'splintered' cities, allowing water and sanitation standards to be differentiated is a response to, rather than a cause of, high levels of social differentiation, and can also be a pragmatic means of preserving the public capacity to deliver subsidized services to the poorest residents (Jaglin, 2008). There have reportedly been instances when some of the rights to set standards have been devolved to the settlement level, as with Sri Lanka's community action planning system (Jayaratne and Sohail, 2005). Generally, however, it is not only hard to gain acceptance for the notion that the residents of informal settlements should be able to negotiate their own standards, but hard to secure local agreement on standards, particularly in the absence of well-organized communities.

Part of the affordability challenge for sanitation is that even local residents do not have a good idea of how valuable sanitary improvements are, or to whom. This is a classic problem with public goods, as without a market people have little incentive to reveal their preferences. Experts have a different sort of knowledge, often linked to more health-related consequences, but among experts too contradictory assessments are common. A recent cost–benefit analysis of a variety of health-related interventions including 'total sanitation' (involving relatively low-cost technologies) found that given the uncertainty and variability in the costs and benefits for sanitation 'there is a strong case for decentralizing program design and investment decisions to the regional and local levels where people are more likely to have first hand, experiential data that they can use in decision making about efficient allocation of resources' (Whittington *et al.*, 2012, page 19). While the case for local decision-making is indeed strong, there is also considerable uncertainty and variability at the local level, especially where trust is lacking and communications are poor.

Such uncertainties and practical difficulties should not be allowed to divert attention from the more political obstacles to addressing affordability. Within the political sphere there is usually more pressure to advocate high standards of sanitation than to fund the means of achieving these standards, particularly in informal settlements.

In practice, support for high urban sanitation standards may be stronger among more affluent groups, but support often also comes from those claiming everyone deserves adequate sanitation. Thus, civil society organizations, and particularly those adopting a rights-based approach, will tend to see any move towards affordable standards for unacceptably low-income people as an acceptance of unfair inequalities. They are likely to combine their support for higher standards with the view that landlords and public service providers should cover a large share costs. Even when this support does not materialize, they are, understandably, likely to resist any acceptance of low standards, particularly if this can be interpreted as accepting that people do not have a right to sanitation.

On the other hand, particularly where there is rapid urban growth and rural–urban migration, urban elites (and others) are inclined to see lax standards and subsidized services as forces

drawing more people to the city, creating a migratory Malthusian trap. In some cities and neighbourhoods there is evidence of strict standards being used successfully to exclude undesirable migrants (Feler and Henderson, 2011). It is difficult to know how widespread this is, but high standards, including high sanitary standards, can clearly work against deprived households, and particularly women, who are likely to encounter these standards more as a vehicle of harassment than of improvement (Tacoli, 2012). This is not a new phenomenon. In her socioeconomic history of women and class in Accra, Robertson (1984) notes that: 'The sanitary inspectors became the personification of the colonial government for many residents of Central Accra. In some years hundreds and even thousands of women were prosecuted for having standing water or filth in their compounds. So many women came up before the District Court for sanitary offenses that the routine "he" referring to the accused in the court records was eventually changed to a routine "she".' Such overt targeting of low-income women is not as acceptable within governments as it was in the colonial period, but the tendency has been not so much to lower the official standards as to reduce their enforcement.

There has been little research on why excessive standards are so often promulgated, or on the implications of having such standards and not enforcing them. There is however a large body of literature on the urban informal sector where such problems are endemic (Boudreaux, 2008; Potts, 2008; Roy, 2005), and there are indications that inappropriately high standards can be an unhealthy compromise between pro-poor rights-based advocacy and the attempts to exclude poor groups from cities (Feler and Henderson, 2011; McGranahan, Mitlin and Satterthwaite, 2008).

To at least some degree, the tendency for many contemporary low-income settlements, particularly in Sub-Saharan Africa, to be 'informal' and not to conform to formal planning and building codes, reflects the fact that there is a superficial consensus on the need to improve conditions, and fundamental disagreement on how this is to be achieved. Thus, while some see informal settlements as reflecting the failure of local authorities to plan for and support low-income urban populations, others see them as reflecting the failure to enforce minimal standards on these same populations. Still others see them as reflecting spontaneous and organic development distorted by the admittedly half-hearted government interventions. Generally, however, informality is a somewhat perverse outcome of the failure to agree on how to achieve higher urban standards rather than an outcome that any group seriously advocates for. At least since John Turner's pioneering work in the late 1960s and early 1970s, it has been observed that 'planning and building codes designed to improve and maintain modern housing standards often have the opposite effect in many parts of the world' (Turner, 1967). Turner himself recognized the innovation and ingenuity present in many informal settlements, and how important it was to support the residents' own improvement efforts, but they also reflect a failure to address problems of affordability within the formal city.

International efforts to finance sanitation improvements through development assistance have reinforced the tendency to support internationally acceptable standards, and particularly those that can be provided by international companies and international technologies. This tendency has persisted, even though consensus within the development establishment has long been that hardware subsidies are problematic. Thus, the World Bank has long argued that water and sanitation subsidies tend to be captured by the relatively wealthy (Serageldin, 1994), and alternative lower cost and less centralized technologies have been advocated by research centres such as IRC, Practical Action (previously the Intermediate Technology

Development Group), WEDC and other water and sanitation researchers (Cairncross and Feachem, 1993; Mara, 1996; Tilley *et al.*, 2008). Nevertheless, lenders have tended to finance costly water treatment and other systems, which only serve the relatively wealthy and often leave the borrowers indebted.

International monitoring efforts can also reinforce the notion that there are standards that should be universally applied. The WHO/UNICEF Joint Monitoring Programme, responsible for monitoring progress towards the international water and sanitation targets, is careful not to suggest that only high-cost technologies like sewered toilets are adequate, but did decide that shared toilets should be considered 'un-improved' (WHO/UNICEF, 2013, page 12). This was perhaps a reasonable decision from the perspective of estimating the number or percentage of households with adequate sanitation (though within the Programme there is now a proposal to include shared facilities serving less than five households as improved (WHO/UNICEF, 2013, page 11)), but creating sharing sanitation facilities, and in some circumstances building and maintaining public toilet blocks, may sometimes be the best affordable sanitary improvement available. Even if external funding is available such restrictions can mean that the external funders are only able to reach a small share of the deprived households.

International and local NGOs sometimes play significant role in improving sanitation and, particularly when financed by international donors, are likely to take international guidelines seriously, creating affordability problems. CLTS has gone explicitly against this tendency by focusing on the elimination of open defecation rather than the provision of a specific alternative. This has undoubtedly helped to make it more affordable and replicable. For more conventional sanitation projects there are likely to be strong pressures to prioritize improvements that meet some minimum standard than improvements that have the potential to reach everyone. Indeed, this is implicit in the Millennium Development Goal target of halving the share of the population without access to basic sanitation between 1990 and 2015 – this can be achieved without improving conditions at all for the share still without access to the prescribed 'basic' standard.

More generally, a pilot sanitation project set up by an NGO will be treated as a failure if the facilities are not considered to be of acceptable quality, at least in the short run (sustainability, like affordability, is often sacrificed). This will be the principal focus of visitors, experts and users (who rarely bear the full cost). Cost will also be a concern, but the tendency will be to try to achieve the necessary standard at the least cost, rather than to achieve an affordable improvement of the highest quality. This is especially, though not only, the case if official regulations or international guidelines are influencing the choice of technology. For somewhat similar reasons, as externally funded projects try to expand coverage beyond the pilot scale, they will tend, like utilities, to target a small number of households. Some or all may be low-income households, but coverage is limited as long as there is no funding available allowing such services to be provided to everyone.

Low-cost technologies are only part of the means through which sanitary improvements can be made more affordable. Savings groups and loans with reasonably low interest rates can help households secure the financial needed to make lumpy payments, such as for latrine construction. Training for artisans can help to reduce the cost of constructing latrines or other facilities. Efforts to improve production technology or secure returns to scale in sanitation facilities can reduce costs on the supply side. As already indicated, measures that give women more control over expenditures, including sanitation, as well as making the decision

to improve sanitary conditions more collective, would be likely to increase the amount that households would be willing to pay for sanitation. Taken together, such changes could make a large difference.

2.5 The trans-sectoral challenge

On the side of the public sector, it is common to view sanitary improvement alongside water as services that are the responsibility of the water and sanitation sector. However, the financial and institutional centre of the water and sanitation sector lies with the investment in and management of piped water and sewer networks, which is where the bulk of the finances go even in relatively poor countries. Without these networks, the problem of getting sufficient clean water manifests itself very differently from that of disposing safely of human waste, though both can become physically intertwined with each other and with a range of other local environmental challenges. As described above, it is the piped networks that allow for the centralized and integrated control of water and sanitation systems. When they are functioning properly, the piped networks keep the water free from contaminants in the local environment until it is released into a sink or household water container, and prevent wastewater and faecal material from contaminating the local environment as they leave the neighbourhood.

The challenges are quite different when, as is often the case in low-income urban settlements, water is drawn from local wells or is being carried, carted or trucked into the settlement, or when human faecal material is being deposited in less expensive facilities such as condominial sewers, eco-san toilets, aqua privies, bucket toilets, open drains, pit latrines, in bags or on open land. Local management becomes more important, and local problems such as accumulations of solid waste, pest infestations, flood risks are more likely to intrude (McGranahan *et al.*, 2001). A variety of interconnected problems can arise. It is not uncommon, for example, for pit latrines to contaminate the wells, faecal matter to find its way into the waste, uncollected waste to find its way into the drains causing flooding, flooding to cause pit latrines to overflow, or for flies to breed in faecal material and land on food in unscreened cooking areas. The resulting sanitary risks will vary depend on the particular combination of technological, behavioural and locational conditions found in a given neighbourhood.

In addition to these trans-sectoral physical challenges, there are also what amount to trans-sectoral institutional challenges. Some of these challenges, commonly found in informal settlements, relate to land tenure. In the extreme, utilities may not be allowed to provide sanitation and water services to settlements considered to be illegal. In other cases, they are not under any obligation to do so, at least until the settlement has been recognized by the government. Often the obligations are ambiguous or contradictory. Until recently, the water company in Nairobi was not allowed to build water infrastructure in some settlements of questionable legality, but was simultaneously under pressure to find innovative ways of getting them water, and to reduce illegal tapping of water pipes (McGranahan *et al.*, 2006). When the French company Suez Lyonnaise des Eaux, at the start of what they hoped would become a wave of privatizations, prepared a manual on ‘Alternative solutions for water supply and sanitation in areas with limited financial resources’, they explicitly warned against supplying settlements lacking tenure (Suez Lyonnaise des Eaux, 1998), through this later became a point of contention in their contract for water and sanitation services in Buenos Aires (Schusterman *et al.*, 2002). From a human rights perspective, people who live in informal areas are people like any others, who have a right to basic needs like water and

sanitation that governments have an obligation to recognize. From the perspective of neighbouring and more affluent settlements, on the other hand, these same people may be viewed as squatters, who cannot afford to live in a well-regulated city and should go home to rural areas. Politicians are likely to be divided over such issues, and as already indicated in previous sections informal settlements can be seen as a compromise between draconian evictions and generous redistributions. Unfortunately, such compromises are rarely a good basis for sanitary improvement.

It is also often claimed that tenure problems can reduce a household's incentive to improve their own home, and by implication their incentives to invest in a sanitary toilet. After all, if you may be evicted soon, why invest in a costly toilet? Actually, the possible effects on residents' and homeowners' incentives, and on the collective incentives of the residents, are far more complicated than this suggests, and some of these complications hinge on the difference between investing in sanitary facilities (that will be lost in the event of a forced departure) and adopting sanitary behaviours (which have immediate benefits). The threat of eviction undermines the incentive to invest in sanitary improvement, but not the incentive to engage in sanitary behaviour. Insecure rental tenure, on the other hand, undermines the investment incentive for the people occupying the home, but may increase it for the landlord, at least if they can extract higher rents.[5] Rental tenure also undermines the collective incentive of a community of renters to engage in sanitary behaviour, again especially if the landlords can extract the benefits in higher rents. On the other hand, when improvements can be expected to increase the security of potential owner occupiers, by increasing the legitimacy of the settlement, the tenure insecure may have even more incentive to support improvements than normal owner occupiers (Robinson, 2005). And of course, the complications are far greater if one takes into account such factors as intra-household decision-making and the way sanitary problems affect different groups (as opposed to affecting a well-defined community).

In addition to these tenure problems, there are many other social, political and other institutional factors that can interfere with sanitary improvement. The collective organizations that do exist may, for example, actively interfere with collective efficacy in addressing sanitation problems. Thus, for example, in the absence of rule of law, gangs making money from trading in illegal drugs or other illegal merchandise may emerge. These gangs are likely to undermine other forms of organization within the community, particularly organizations led by men, which are likely to be perceived as a threat to the gang. The gangs themselves may serve some social functions, but are unlikely to be an appropriate organizational form for sanitary improvement. Political parties may engage in local organizing, but this is often for the purposes of competing for support within the community, which is again rarely an appropriate organizational form for sanitary improvement (though urban political organizations did provide toilet blocks during the early years of Rawlings in Ghana). This form of political organizing can interfere with local collective action, and so too can the sort of political brokering done informally to gain political support through distributing benefits. Research on low-income urban areas in Argentina has shown the often corrosive effects of political brokers who 'direct flows of goods, information and services from their political patrons to their clients and flows of political support (in the form of attendance at rallies, participation in party activities, and sometimes votes) from their clients to their patrons' (Auyero, 2007). Such political brokerage can easily undermine attempts to develop collective

[5] Large landlords, who own most of the homes in a settlement, may also be able to capture most of the public benefits in higher rents.

decision-making on local environmental problems (Almansi *et al.*, 2011), but being unofficial is difficult to challenge formally.

These physical and institutional conditions are closely intertwined with poverty, in its various guises (e.g. low incomes, ill-health, lack of education, social exclusion, legal discrimination, political disempowerment). They are extremely difficult to address systematically and are well beyond the scope of a project or programme designed to improve sanitary facilities. Often they are tacitly understood locally, but not well articulated in any formal arenas. The resulting importance of local knowledge and context provides one of the conventional justifications for taking a participatory approach to sanitary improvement, and also to integrated approaches to sanitary provision that also address other aspects of poverty (Ali and Stevens, 2009).

3 How two community-based initiatives met these challenges

Without either strong grassroots engagement or more economic resources than most cities in low-income settings can afford, it is extremely difficult to overcome these challenges. Community organizing and networking is no easy solution. Even a comparatively strong community-based organization is likely to have difficulties developing the level of cooperation required to create a demand for sanitation that reflects local collective interests. It is also likely to have difficulties convincing the local government or utility to co-produce sanitary improvements in informal settlements. It is likely to face pressure from within the community as well as from authorities and donors to try for improvements that are not affordable at scale. And to the extent that community organizations do engage with national or international promoters of sanitary improvement, they are likely to be pressured to take a narrow sectoral approach, and to engage in pilot projects that yield short-term success but do not persist and cannot be reproduced at scale.

The following two examples are of community-based initiatives in different parts of South Asia that have persisted and have gone to scale. Indeed, they have had a major influence on city-wide and even national sanitation policies. This scaling up, and in particular this integration with official policies, has not been without its costs. Nevertheless, in both of these examples community-based initiatives not only overcame the four challenges described above, and improved sanitation in a large number of low-income communities, but they also used this success to provide a strong foundation for addressing other dimensions of urban poverty. Learning from these successes is important, not because they can be replicated elsewhere, but because they reveal important principles upon which it may be possible to build successes elsewhere, even in quite different circumstances.

3.1 The Orangi Pilot Project , Pakistan[6]

The Orangi Pilot Project (OPP) was started in 1980 by Dr Akhtar Hameed Kahn, already a well-known development practitioner and thinker, whose austere ways of living and working still imbue the organization today (for summaries of the development of the Orangi Pilot project see: Hasan, 2010; Mitlin and Satterthwaite, 2013 forthcoming; Pervaiz, Rahman and Hasan, 2008). It began as an action research and extension project in Orangi, which was then Karachi's largest *katchi abadi* or informal settlement. In the course of an extended dialogue with residents and others, sanitation emerged as a key issue. A low-cost sanitation programme was initiated, aiming to provide the technical and organizational support for

[6] This section draws heavily on summaries of the development of the Orangi Pilot Project's sanitation work in Pervaiz, Rahman and Hasan (2008), Hasan (2010) and Mitlin and Satterthwaite (2013 forthcoming).

residents to build a sanitary latrine in each house, an underground sewer in each lane, and a collector sewer in each neighbourhood, this last feeding into a trunk sewer provided by the state.

In 1988 the OPP was divided into four institutions, with the OPP-Research and Training Institute responsible for sanitation, housing and education programmes. By 2008, the OPP's[7] approach to sanitation had been adopted by about 90 per cent of Orangi's informal housing, or about 865,000 people (Pervaiz, Rahman and Hasan, 2008, page 1). Moreover, the approach spread to most other informal settlements in Karachi, and to many other cities in Pakistan and beyond. Indeed, when Pakistan adopted a National Sanitation Policy in 2006, it was in large part based on the OPP approach. The approach has also been very influential internationally, though replication has not always been successful.

There is considerable overlap between the four challenges discussed in this paper and the four barriers identified by the OPP in the early 1980s:

1. The *sociological* barrier of lacking the community organization to engage in collective action.
2. The *psychological* barrier of thinking that improved sanitary facilities should and will be given to them by the government.
3. The *economic* barrier of not being able to afford to cover the costs of conventional sanitation facilities.
4. The *technical* barrier of not having access to the technical support needed to develop affordable sanitation systems of reasonable quality.

The *sociological* barrier is related to the collective action challenge, the psychological barrier is at least tangentially related to the co-production challenge, and the *economic* barrier is related to the affordability challenge. The *technical* barrier actually bears a closer resemblance to what is referred to in the literature on sanitation marketing as problems in the supply chain, and is not an issue discussed in any detail in this paper. It is worth noting, however, that there was an analogous barrier in the communal block latrines that the Alliance had to overcome.

3.1.1 OPP and the collective action challenge

The lane, with its 20-40 households, its lane managers, and its sewer, has been the critical unit of local collective action achieved through OPP. (Hasan, 2008; Hasan, 2010; Pervaiz, Rahman and Hasan, 2008). The organized lane and its sewer are particularly critical as they represents the coming together of neighbouring households to take control of the problems in their street, moving out of the private sphere into the public. The size of a lane is small enough to allow for cohesive organization, while the possibility of radically improving sanitation in the lane by acting in cooperation, provided sufficient incentive to work collectively. In effect, people could shift from individual to collective decision-making, and tap their full demand for improved sanitation, hidden when people were making their sanitation decisions independently. The small size of the lanes also helped to ensure that, at the early stages when OPP was relatively unknown, this community organization would not be considered a threat to the traditional neighbourhood-level authorities.

[7] For simplicity OPP is used in this section even when it might be more accurate to refer to OPP-RTI, at least for the period after OPP-RTI was separated from the other parts of OPP.

Adding a bit to this simple account, it is important to recognize that the OPP model eventually developed around a nested set of collective action levels, each with associated technologies: the household and its toilet, the lane and its lane sewer, the neighbourhood and its collector sewer, and the public at large and its state-provided trunk sewer. Each level is organized somewhat differently, and the environmental health externalities are only avoided if each level plays its part. If the state did not provide the trunk sewer, the collector sewer would pollute the city, if the neighbourhood did not provide the collector sewer the lane sewer would pollute the neighbourhood, and if the lane did not provide their sewer the household's sewage would pollute the lane.

Initially the basic process was for OPP to hold public meetings in the lanes, discussing sanitation conditions in detail, and indicating that if a lane organization was formed and appointed lane managers, then OPP staff would provide technical support. The technical support typically included surveying the lane, mapping and costing the work, demarcating the position of the drain, providing tools and overseeing the entire execution – but not handling the finance, which was done by a lane manager and lane committees. The lanes OPP first engaged with were those near a natural drainage channel to which the sewage could be diverted. Later, when the process spread to lanes further from natural channels or sewers, OPP would identify the need for collector drains, and when the local government refused to fund these, confederations of lanes were formed to finance and build them. Similarly, the natural channels where the sewage from several lanes came together often had to be sewered through the actions of these groupings. Over time many lanes also organized themselves spontaneously, having seen others succeed.

Procedures for supporting the community organization developed in part through trial and error, and changed over time. The OPP did not interfere directly in the functioning of the lane organization and nor did it involve itself in settling disputes related to the sociological and economic aspects of sanitation. If disputes delayed the programme in the lane, it did not matter to the OPP because the OPP had no targets. Also, while the organization of the lanes was at the core, and played a somewhat analogous role to triggering within Community Led Total Sanitation, higher levels of collective action were also encouraged and to some degree supported. Not only were the confederations of lanes formed to deal with neighbourhood-wide coordination, but when city-wide issues arose there was collective action at this level too. Thus, in resisting a large loan-financed sewerage project proposed for Korangi (another area of Karachi), with US$70 million from the Asian Development Bank, over 20 public fora were organized, with large numbers of activists, NGOs, community organizations and others involved (Pervaiz, Rahman and Hasan, 2008, page 33).

3.1.2 OPP and the co-production challenge

Relations between OPP and the local government have changed considerably over the years and with it the forms that co-production has taken. Co-production is, however, implicit in the concept of component sharing central to OPP's approach. Moreover, the extent to which the OPP approach has shifted the practices of public providers in Karachi has been exceptional, and in many ways over and above the aspirations that Ostrom and others have had for co-production. In effect, OPP fostered a system in which local residents became at once far more willing than previously to take on responsibilities officially borne by the public providers, but also far more effective in getting these public providers to deliver on their remaining responsibilities. OPP played a mediating role, in part by making public agencies aware of the informal sanitation systems of the residents. It was able to map the physical reality of the

sanitation situation, not only in Orangi but eventually in all of Karachi. This information did not exist with government institutions and its international consultants because they worked on the belief that the informal systems did not exist, and in effect that there was no scope for co-production.

The simplified sewers used by OPP bear a close resemblance to the condominial sewers that formed the basis for Ostrom's example of sanitation co-production in Brazil. To a first approximation, the outcome was similar in that local residents had to cooperate, act collectively and co-produce their sanitary improvements, eventually with the public providers as partners. In Orangi, however, the local government contributions came relatively late in the process, and contribution of local residents was less directly linked to the quality of the technology and more immediately to the absence of an affordable public provider.

By organizing to work collectively in the lanes, conventionally the terrain of the public sector, the residents both encroached on and engaged with the public sector. This engagement, facilitated and to some degree mediated by OPP, did make the public providers more accountable to the low-income residents. Moreover, it was the physical properties of sanitary burdens that ensured that the public sector did need to engage and co-produce improvements, once local residents were getting their waste out of the neighbourhoods. The state could ignore insanitary public spaces so long as these public spaces were confined to the lanes of low-income settlements, but once the sewage was flowing more freely across the city it became an indisputably public problem that the state has had to address. It addressed the challenge in a constructive manner, because the costs of inaction rose, while the costs of co-production were far less than the full costs of even the low-cost sewerage provision. These same characteristics made sanitation a particularly appropriate area of work for an organization like OPP. With some technical support, local collective action could yield large and visible benefits, and OPP could contribute while strengthening rather than replacing local organization. Simultaneously, the need and scope for co-production provided a route to scaling up the community engagement to city-wide and eventually national interventions.

With scaling up came closer relations with local government. In recent years the strategy has been to work persistently and patiently with the relevant government staff, building up a relationship of trust and credibility (Pervaiz, Rahman and Hasan, 2008, page 3). Government officials in their turn have turned to OPP as a source of expertise, including local knowledge, and for their close relations with communities. Some even treat OPP as an extension of the public provisioning system. Indeed, at some point OPPs role may indeed no longer need to be separate from that of the state's, though that may still be a long time in the future.

3.1.3 OPP and the affordability challenge

As already indicated, Dr Akhtar Hameed Kahn had an austere approach and lifestyle before arriving to work in Orangi, and one of the core principles of OPP's sanitation work has always been to help people to achieve the sanitation that they should be able afford – which is not necessarily the sanitation they want or deserve. Prior to OPP's sanitation work, there was the perception in Orangi, apparently encouraged by 'land grabbers' and middlemen who had developed the settlement, that more affluent areas received sanitation services for free. Local officials claimed that the affluent paid for their sanitation through their high development charges, which Orangi residents could not afford. Further investigation revealed, however, that these development charges were in fact many times more than what

should have been necessary to cover costs, especially when foreign assistance was involved.

Thus, one of the first challenges OPP faced was to develop an approach that would yield a significant improvement in local sanitary conditions, while keeping the costs to a minimum. They worked backwards, starting with what people could afford. They then modified engineering standards to make the sanitation facilities affordable. It worked, if not in a first iteration, then in a second or third. Compromises had to be made, but they could be justified. OPP drew the lesson that engineering standards may be friendly to contractors, but they were not friendly to communities.

The costs were eventually brought down to less than the equivalent of US$20 per household. To keep costs low, the underground sewer system was designed as simply as possible, adjusting official standards to local conditions and taking advantage of, rather than replacing, the natural channels, and whenever possible building on the drainage work already in place. Equally important, OPP's own overheads were kept low, its salary structure was kept in line with local rates, and volunteerism and self-help principles were applied. On the other hand, the materials and construction costs for the sewers the communities were responsible for were not subsidized at all – though training and trunk sewers were provided free, creating the basis for co-production.

OPP has also agitated against large-scale and costly sewerage projects when the public sector has been planning them, as with the loan-financed Korangi sewerage project described above. Thus, OPP has tried to address the affordability project within the design and operations of the low-cost sanitation system, within their own operations, and even with the operations of the public provider. Their diagnosis is that at every level the failure to pursue affordability can undermine sustainability and scalability.

3.1.4 OPP and the trans-sectoral challenge

The OPP was started with about six months devoted to dialogue and investigation by Dr Khan and collaborators (Hasan, 2010, page 58). Sanitation was the first of four major problems identified during these investigations, along with the need for better health care, education and income earning opportunities. Sanitation was never conceived of as a separate sector, but always part of the residents' broader shelter and settlement-related problems. Even after the OPP Research and Training Institute became a separate institution in 1988, it retained responsibility for other housing-related work. Moreover, all of these settlement problems were understood politically as well as technically, recognizing that the technical has political dimensions and vice versa.

This is not to say that all of OPP's activities were brought together and offered as an integrated package. Indeed, after some problems emerged when loan and sanitation-related activities were being pursued in tandem, they were separated out, and communities organizing for sanitation were not offered loans. OPPs sanitation approach was, however, carefully tailored to local physical and social characteristics and only implemented when the local residents agreed that it was needed. The trust in OPP's advice on sanitation, on the other hand, derived from the range of their activities and, as the system expanded, on the evident success of the system in other areas.

The OPP approach to sanitation is probably best known internationally for its mapping (documenting existing drainage channels and informal sanitation systems, and influencing the government to align public investments with these pre-existing natural and informal systems) and component sharing (whereby local residents are responsible for the internal development up to the trunk sewer that is the responsibility of the state). However, these practices are themselves manifestations of a highly principled approach, not so much to sanitation as to urban participatory development (Hasan, 2010).

3.2 Mahila Milan, SPARC and the Indian National Slum Dwellers Federation

The Alliance builds on the partnership of a predominantly male national organization of slum dwellers (NSDF), a female collective built around savings groups (Mahila Milan), and a professional but unconventional NGO (SPARC or the Society for the Promotion of Area Resource Centres). The work of this multifaceted alliance has been presented by academics in such diverse guises as a radical new approach to deepening democracy (Appadurai, 2001) and a manifestation of edgy urban entrepreneurialism in the slums (McFarlane, 2012). It has attracted funding from an equally wide range of funders, locally and internationally.

The NSDF goes back to the mid-1970s and grew out of a protest movement, resisting evictions, and demanding access to land and services. SPARC was formed in the mid-1980s in Mumbai by disaffected staff from a more conventional NGO. SPARC partnered with NSDF in 1985, and in 1986 they joined forces to organize the savings groups that formed Mahila Milan or 'women together', starting with six clusters of pavement dwellers also in Mumbai. With consummate skill, the Alliance leadership brought together NSDF's political savvy and national networking, SPARC's professional and formal knowledge, and Mahila Milan's community organization. And right from the start, they have used soft power to negotiate collectively with the state, including even with police sent out to oversee evictions. (Mitlin and Satterthwaite, 2013 forthcoming.)

Sanitation had long been a concern of the members of all of these organizations before the Alliance formed. NSDF had been involved in demanding more and better maintained latrines from politicians and public agencies. SPARC staff had been engaged with women's community organizations around issues like worms in children, raising awareness but not being able to address the underlying lack of facilities. The early pavement dwellers of Mahila Milan had extremely serious sanitation problems: the costs of using private toilets were more than most could afford and the alternatives were particularly unsanitary and degrading (Patel *et al.*, 2012 draft).

The approach to sanitation that emerged in the early 1990s from the efforts of the Alliance centred on community toilet blocks that right from the start deviated from the conventional ones provided by through government programmes:

- for the first time the municipality commissioned a collective of low-income residents to build a municipal toilet;
- it was built not for the public but for a specific pavement community;
- local residents contributed significantly to the design;
- Mahila Milan women and other community members contributed the labour;
- it attracted lots of media attention.

Not everything went smoothly with the first toilet so constructed, and the planned connection to the nearby sewer was held up by years due to problems with permissions and an

intervening electric cable: in effect this particular toilet fell foul of the co-production challenge, despite having received municipal funding. However, it became the inspiration for many toilet blocks to come (Patel *et al.*, 2012 draft).

Over the years there has also been a significant scaling up. Thus, by 2012 it has been estimated that over 1,000 community-designed and managed toilets with 20,000 seats have been provided through the Alliance (Mitlin and Satterthwaite, 2013 forthcoming). The Alliance has also built demonstration toilets in informal settlements in many other parts of India. The Alliance's city-wide sanitation programme in Pune, implemented between 1998 and 2007, also encouraged other states, including Maharashtra, Andhra Pradesh, Gujarat, Orissa, Pondicherry and Tamil Nadu, to promote similar programmes. The Alliance also helped to shape and contributed to the Mumbai Sewerage Disposal Project and the Mumbai Metropolitan Region Abhiyan universal sanitation programmes. Finally, SPARC was on the task force that crafted India's national sanitation policy, announced by the Government of India in 2008 and is a member of the National Advisory Group on Sanitation (NAGOS).
As described below, the Alliance's approach to sanitary improvement worked implicitly to address the four challenges. They put the community residents and local organization at the centre of the initiative (addressing the collective action challenge), secured contributions from the government (developing a co-productive relationship over time), innovated with communal block latrines (prioritizing affordability) and linked the toilet construction to other development efforts (across several sectors). Moreover, like OPP they also worked to develop the skills in constructing appropriate facilities within the communities.

3.2.1 The Alliance and the collective action challenge

For the Alliance, getting toilet blocks up and functioning has been as much about increasing collective capacities within the communities as about improving sanitary conditions. The very choice of communal toilet blocks matches the collective nature of the problem with a collective response.[8] Community-based organizations become the local agents of change, helping in the design, choosing the location, and setting the membership fee. For many communities, such a toilet is the largest collective action they have taken together, and yet is small enough to be realistically achieved. SPARC provides technical support, and can play an important legal role, but on the ground it is networks of Mahila Milan and NSDF that deliver. The Alliance also shakes things up, and helps the residents combine their individual demands (which, being for a public good, are largely ineffectual on the market) into a collective demand for a cleaner and healthier and safer neighbourhood. Moreover, building, operating and managing communal toilets not only builds on but contributes to all three of the advantages that Bowles and Gintis (2002) ascribe to communities when it comes to providing local public goods:

- First, it increases the likelihood that community members will be interacting in the future, increasing the overall incentive to act in socially beneficial ways.
- Second, by increasing the rate of interaction at a sanitary facility, it spreads information about the hygiene behaviour in particular, facilitating both monitoring and sanctioning.
- Third, it provides opportunities for community members to apply social sanctions to behaviour contributing to collective sanitation problems.

[8] Communal toilet blocks have their own problems, and the choice of these toilet blocks probably had more to do with affordability than with their collective character. However, this collective character is by no means insignificant, and can go from a disadvantage to an advantage depending on how local residents respond to the collective challenge.

In terms of their implications for collective solidarity, pride and action, the Alliance sharply distinguishes public and community toilets. Public toilets are built for anyone and everyone, and owned by nobody. Local groups have no reason to claim ownership or to draw any links between the quality of the toilet and the quality of the neighbourhood people. A community toilet is held in common by a well-defined group of people. A high-quality community toilet reflects a high-quality community. 'Within the murky politics of land and tenure in Indian cities, the construction of a community toilet can be a powerful manoeuvre, *especially if it is built by the community itself'* (Patel *et al.*, 2012 draft, emphasis in original).

Successful toilets have also been used to provide evidence to other communities that local collective action can make a difference, allowing success to build upon success. The formal networks of Mahila Milan and NSDF provide vehicles for both sharing lessons among different neighbourhoods and cities, and for engaging in higher level collective action. Ideally, the toilets are matched with other activities and structures that bring groups within the community together, such as savings groups, which if well organized can help run the toilet too.

The community action associated with the toilets is sometimes made visible by placing a community meeting room on top or adjoining the toilet. This not only provides a useful venue for community organizing, but a community incentive for ensuring the toilets are kept clean. This incentive is amplified when the toilets are managed by a caretaker who also lives in the immediate vicinity.

3.2.2 The Alliance and the co-production challenge

The Alliance's early work on community sanitation was a radical departure from the conventional government approach to sanitary provision and involved co-production from the start. One of the major problems the Alliance had identified in their dialogue with communities and government officials was that while there was significant funding for sanitation disbursed through a myriad of mechanisms, these programmes did not match what under-serviced communities wanted or needed (Patel *et al.*, 2012 draft). There was not enough funding in the government programmes to provide sewered toilets to more than a small minority in these communities, and the alternatives that the municipality could afford, such as public toilet blocks, tended to be inappropriately located, poorly designed or badly managed. What the work of the Alliance managed to demonstrate to both communities and the state was that if communities could take charge of identifying appropriate locations, tailoring the design to local needs and constructing and maintaining the toilet, the same level of municipal investment that funded failures in the past could yield major improvements in local sanitary conditions.

For the Alliance, the basic principle is that the unserved local residents need to be at the very centre of sanitary improvement, and should drive the process – and that a key role of the Alliance it to enable this. The local state is needed, however, not only to provide linking infrastructure and legal sanction, but also to provide capital funds and the basis for scaling up the local initiatives.

To oversimplify somewhat, the Alliance pursue an approach wherein communities plan, construct and manage toilets in their settlements, while the state provides permissions, capital costs and infrastructure. With support from the Alliance, communities assess the sanitary conditions and use surveys and meetings to both elicit and measure the collective

demand for toilets. They locate sites where toilets can be constructed, form local committees to oversee design, planning and construction and ultimately to maintain the toilet. They approach the relevant authorities for permissions and negotiate arrangements under which municipalities pay for capital costs.

Through expanding circles of negotiation, co-production of particular toilets was used to provide the basis for co-production in particular settlements, co-production in particular cities, and so on. Negotiations built on past negotiations and became in turn stepping stones for exploring more extended relationships with higher authorities or for meeting other local needs. At all of these levels, the Alliance believes community involvement is critical to making sure provisioning matches community needs, that there is transparency and accountability in the funding, and that the facilities and services are maintained. State involvement, on the other hand, is critical to financing capital costs, providing the extra-settlement disposal infrastructure and services, and ensuring that the sanitary improvements conformed with and were recognized by officialdom.

Over the years the Alliance has been involved in many different modes of co-production. In some cases the community secured funding independently of the municipality (for example with grants negotiated through the Alliance), and the municipality had a marginal role. In others, the Alliance and indirectly local residents were formally commissioned through a government programme, and in some of these cases the community's collective role was far less than originally envisaged. These modes of co-production evolved over time, but the underlining principles and the practices that supported them have been maintained and followed as much as possible.

At times it has been necessary to negotiate difficult trade-offs, or to strategically accept sub-optimal modes co-production in order to maintain momentum. In 1999, a non-profit company, *SPARC Samudaya Nirman Sahayak (SSNS Nirman)*, was established to 'assist federations in bidding for contracts and managing the technical and financial aspects of housing and sanitation projects' (Patel *et al*., 2012 draft). This has allowed the Alliance to tap local, national and international funds and greatly increased the scale of their operations, but in many of these operations it has proved impossible for the Alliance to ensure the communities, or the 'community contractors', keep the desired degree of control over the process. At the same time, the Alliance and its approach has received considerable attention and some funds precisely because of its innovative approach, combining community engagement with constructive relations with the state. In effect, the Alliance has had to maintain various different profiles and operating procedures, some better reflecting the potential for communities to drive the co-production, others better reflecting their potential to co-produce at scale.

Despite its various different modes of co-production, the Alliance's strategic engagement fits at least roughly with Albrecht's presentation of co-production as challenge to traditional planning, that relies on collective action and combines a needs-based and rights-based approach so that 'it is inclusionary (for those in and outside the system), intends to secure political influence and to change the status quo with specific projects, it combines local and scientific knowledge on an equal base, and it provides an interaction between the delivery of public goods (plans, policies, projects) and building strong, resilient, mutually supportive communities.' (Albrechts, 2013). The 'deep democracy' (Appadurai, 2001) fostered by this approach could not prevent political reversals (Roy, 2009), but it did demonstrate the potential for radically transforming relations between the state and its more deprived urban

citizens.

3.2.3 The Alliance and the affordability challenge

If a toilet is shared by two or more households it cannot be considered 'improved', according to the definition used by the WHO/UNICEF Joint Monitoring Programme on Water and Sanitation, the official United Nations group responsible for monitoring progress towards the Millennium Development Goal targets for water and sanitation (WHO/UNICEF, 2013). In the absence of information on the quality and usage of the latrines, this assignation may be a warranted first approximation, at least when it comes to shared block toilets: it is possible that the great majority of such toilets do not provide services of a quality and price that, from a Millennium Development Goal perspective, deserves to be considered 'improved' and on par with a simple unshared rural pit latrine with a slab. Moreover, there are indications that even the sort of prices charged by the Sulabh toilets (above), and relatively short distances, can put off users, particularly those most vulnerable to poor access to sanitation, women and children (Biran *et al.*, 2011).

The Alliance's position on toilet blocks, however, is as follows:

> If a house is smaller than 250 sq. ft. and there is no running water, drainage or sewerage access to that dwelling, it is better to have a toilet outside of the house for hygienic, practical and cultural reasons. Secondly, by taking on community toilets, the Alliance provides sanitation access for the bottom 30 per cent. The poorest households cannot afford to make contributions for individual toilets, and those that are better off can usually already finance toilets on their own. Finally, state subsidies are finite, and community toilets produce greater outreach for universal sanitation. (Patel *et al.*, 2012 draft)

The toilets built with support from the Alliance cost roughly US$600 per seat, or US$12 per person assuming 50 people per toilet. The membership charges of about US$1 per month per family for unlimited use are considerably less than families would have to pay for prevailing pay-per-use toilets (Patel *et al.*, 2012 draft).

This is not to say that the Alliance toilets are designed to the lowest possible specifications and without any special features. Indeed, the considerable savings achieved by the increased usage and returns to scale of a toilet block are balanced with design features that residents want and can feel proud of. Some of the popular innovations have included separate doors and queues for men and women, children's toilets, easily accessible toilets for those with special needs, two-way swing doors, a bathing place and a room for the caretaker. Achieving affordability forced compromises, but did not preclude small luxuries.

3.2.4 The Alliance and the trans-sectoral challenge

As with OPP, the Alliance's attention and approach to sanitation emerged in discussions within communities rather than as a condition attached to external funding or as a particular sectoral activity being rolled out – at least until government programmes were used to scale up the approach. The approach the Alliance has always preferred is to build the capacity of poor communities to explore solutions and set precedents in sanitation provision, including through savings and credit activities, slum surveys and mapping, peer exchanges, toilet exhibitions, construction of toilet blocks and other activities. It has seen sanitary problems as

a manifestation of deeper problems, closely linked with other deprivations, rather than reflecting deficiencies peculiar to the water and sanitation sector.

Moreover, the Alliance saw the strategic importance of sanitary improvement not only in its immediate benefits but as a stepping stone towards more comprehensive upgrading of settlements and recognition of their residents, collectively as well as individually. Thus, when a community achieves better sanitation they have found that it can, in the right circumstances, use this to gain legitimacy, improve tenure security, and build the sort of social capital that can drive more and different improvements. There are inevitable trade-offs when engaging with large-scale government sanitation programmes, and part of the trans-sectoral challenge is to minimize these trade-offs while maximizing the advantages that linking up with large-scale sectoral programmes provide. Among the advantages are that by proving that community-based workers (mostly women) have the technical capacity to construct cheaper and better quality toilets, the Alliance can help to address employment needs in the community and open the door to other forms of locally beneficial community contracting.

For meeting the trans-sectoral challenge, it matters that not only are most staff/members of all three Alliance partners intimately familiar with the range of challenges that the homeless and the residents of designated slums and informal settlements face, but the membership of two of the partners live or have lived in such conditions. Moreover, savings groups and other forms of community organization are far more central than sanitary improvement to the approaches deployed by the Alliance. Issues of housing, tenure, tenancy, housing security and the like are not seen as separate from sanitary improvement, but as part of the complex of issues that must be addressed, together or separately, depending on local conditions and contingent opportunities.

3.3 Summary of common elements

These two case studies are based in different countries and involved quite different technologies. Over the years they have undoubtedly inspired each other. International networking has become integral to community-driven upgrading in recent decades, and OPP and the Indian Alliance are very familiar with each other's approaches. In terms of the four challenges that are at the centre of this report, they have taken rather different approaches, but with important similarities.

3.3.1 Overcoming the local collective action problem

Both of the initiatives involved concerted attempts to organize community members in such a way that their collective demands could be articulated and acted on collectively. The 'component- sharing model' of the OPP, for example, makes the lane, with around 20 to 40 households, the informal unit responsible for building and maintaining the sewer going down their lane (Pervaiz, Rahman and Hasan, 2008, page 59). Community toilet blocks were favoured by the Alliance in Mumbai and Pune in part because they provided a good basis for community organizing.

3.3.2 Working to improve community-government relations

Both of the initiatives took advantage of both the practical suitability and the strategic potential of co-producing sanitary improvement, and used co-production to secure more public support for locally driven sanitary improvement. In Karachi the division between 'internal' and 'external' infrastructure, with lane residents responsible for the former and the

public provider for the latter, is central to the model of collaboration. Over time the OPP approach has become part of the mainstream and is reflected in the national sanitation plans, which rely on a significant level of co-production. In Mumbai and Pune, the choice of sanitation was related to co-production from the start, with the public sector typically responsible for the final waste disposal and usually for capital costs, but with community organizations also co-producing both the sanitary facilities and playing a lead role in their management. Again, the approach came to influence city and eventually national approaches to urban sanitation improvement.

3.3.3 Prioritizing affordable technologies and payment systems

Many of the best regarded sanitary initiatives in informal settlements have succeeded in part by using technologies considered to be sub-standard within the formal water and sanitation establishment (Paterson, Mara and Curtis, 2007). This not only applies to initiatives led by private operators and local authorities (Brocklehurst, 2001; Komives, 2001; cited in Paterson, Mara and Curtis, 2007), and to rural CLTS (Kar and Bongartz, 2006), but also to some of the best known urban community-driven sanitation initiatives such as the simplified sewerage utilized in the Orangi Pilot Project (Pervaiz, Rahman and Hasan, 2008), and to the communal toilets developed by the Alliance (Burra, Patel and Kerr, 2003). The success of the Orangi Pilot Project relied on working with a simplified sewer system that, initially, was not considered to be of a high enough standard to be acceptable to local authorities and service providers. In Mumbai and Pune, success centred on working to improve the design and management of communal toilets at a time when most international experts in the water and sanitation sector were inclined to treat all communal toilets as substandard.

3.3.4 Approaching sanitation from a trans-sectoral perspective

For both OPP and the Alliance, the work on sanitation emerged from lengthy dialogues within low-income communities, and sanitation was very much addressed as part of a broader effort to improve living conditions. Both sets of institutions also work on a range of other shelter issues and draw heavily on the knowledge and experience developed in the course of this other work. And in both cases there are good reasons to believe that if sanitation ceased to be a local priority, it would also cease to be a priority for these organizations.

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