

Falling through the net: access to water and sanitation by the peri-urban water poor

There is still a considerable gap that needs to be filled in order to meet the water and sanitation target of the Millennium Development Goals. Current efforts are driven by the particular way in which the problem has been conceptualised, and this has implications for a large part of the population that lacks access to water supply and sanitation services (WSS), but is continually overlooked. This paper takes a closer look at official attempts to improve WSS in order to understand their underlying assumptions and subsequent implications for the provision of services. This is contrasted with evidence from research in Cairo, Caracas, Chennai, Dar es Salaam and Mexico City, which sheds light on the continued struggles of the peri-urban water poor in gaining access to services. Peri-urban communities in these cities have developed a number of needs-driven practices in order to compensate for the inefficiency of the formal WSS system, but remain largely invisible and unsupported due to their political status. The paper argues for recognition and active involvement of the peri-urban water poor to have a realistic chance to address the global water and sanitation challenges.

Keywords: access to water and sanitation, peri-urban interface, community participation.

1. Introduction

Improvements to water supply and sanitation services (WSS) have been a part of the development agenda for decades, with a substantial proportion of the world's population still lacking such access. The Millennium Development Goal (MDG) Target 7c aims to “[h]alve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation” (UN 2010). International statistics¹ establish that the majority of people still unserved by WSS live in countries of the Global South, and it is predominantly low-income households in Africa and Asia that struggle to gain access to WSS. Lack of access is evidently manifest in rural areas, but the number of rural people gaining access to drinking water and improved sanitation facilities has increased steadily since 1990. There is no doubt that the scale of urban water poverty is less significant; however, the number of people lacking access to WSS in urban areas is fast increasing and this phenomenon is most prominent in the so-called peri-urban interface (PUI). Poor communities living in the PUI frequently ‘fall through the net’ regarding any formal effort to tackle the challenges of WSS.

This paper focuses on issues related to the access to WSS in the peri-urban context, and will illustrate how the peri-urban water poor are largely invisible in the formal WSS system, and this invisibility is reproduced at various levels. The first part of the paper takes a closer look at official WSS efforts and examines the underlying assumptions and conceptual positions that inform WSS goals and subsequent approaches in measuring and monitoring progress towards these goals. This provides clear indications about how WSS priorities are set and related policies and planning approaches developed and implemented. In contrast, the subsequent sections predominantly focus on the particular context of the PUI² where alternative approaches have been emerging. The case studies used shed light on coping strategies of the peri-urban water poor in their largely unnoticed and unsupported struggle to improve access to WSS. The final section explores the link between the level of access to services and the political status of the peri-urban poor by examining different forms of involvement of peri-urban poor communities before drawing some conclusions about how their visibility and recognition can be enhanced in order to improve overall access to WSS.

1.1 Methodology

The article draws primarily on findings from a comparative research project on the governance of water and sanitation services in the PUI of metropolitan areas, with case studies from the Greater Cairo Region (GCR) (Egypt), Caracas (Venezuela), Chennai

¹ See for example WHO and UNICEF (2003), UN-Habitat (2003) and WHO and UNICEF (2010).

² The PUI captures not just the city fringe but largely refers to a context where rural and urban features coexist in physical, environmental, social, economic and institutional terms. It is inhabited by a range of socio-economic groups, with a large proportion of lower-income households, and subject to rapid change over time. In environmental terms, the PUI hosts a variety of natural, productive and urban ecosystems influenced by material and energy flows required by both rural and urban systems. For a more detailed discussion see Allen (2005), Davila (2005) and McGregor et al. (2005).

(India), Mexico City (Mexico) and Dar es Salaam (Tanzania)³. The research in each city was largely carried out by local teams in close collaboration with the London-based researchers. The metropolitan profiles, which included an overview of peri-urban areas, revealed and mapped formal and informal WSS arrangements in each city, and the local teams subsequently selected two peri-urban localities for further study. These captured a diversity of formal and informal WSS arrangements and were home to a substantial number of low-income people. Findings from the fieldwork⁴ in the chosen peri-urban localities shed light on the diverse range of WSS practices in the PUI and highlighted the importance of alternative forms of WSS access for a large proportion of peri-urban dwellers. Fieldwork in the chosen localities was followed by a number of regional workshops and a final international workshop in order to compare findings across the five cases and contrast them with other relevant case studies. Despite the comparative nature of the project, a difference in the availability of information across the cases needs to be noted, which is partially associated with the diverse types of expertise across the local research teams. This article therefore does not aim to provide a full comparison across the cases but rather tries to use the particularities and richness of each case in a complementary way to illustrate and support the issues raised.

2. Conceptualisation of the WSS problem

Progress towards meeting Target 7c of the MDGs is being closely monitored through the Joint Monitoring Programme (JMP) of the World Health Organization (WHO) and UNICEF. In 2008, approximately 884 million people lacked access to “improved sources of drinking water” and about 2.6 billion people did not use some form of “improved sanitation” (WHO and UNICEF 2010, pp. 6-7). Efforts in meeting the MDG for WSS emphasise the need to increase access to ‘improved’ WSS. Improved sources of drinking water have been classified as sources that “adequately protect the source from outside contamination, in particular with faecal matter”; an improved sanitation facility, on the other hand, “is one that hygienically separates human excreta from human contact” (WHO and UNICEF 2010, p. 34)⁵. In addition to establishing categories for ‘improved’ water sources and sanitation facilities, JMP defines ‘reasonable’ access to improved sources as “availability of at least 20 litres per person per day within 1 kilometre of the user’s dwelling” (WHO and UNICEF 2003, pp. 77-78). The recent JMP update and other sources add the element of time spent to collect water or to use a sanitation facility (WHO and UNICEF 2010; Howard and Bartram 2003). This is crucial in an urban context with densely populated informal areas where a considerable number of people have to share a certain facility.

³ This 3-year comparative study conducted at the Development Planning Unit (DPU) between 2003 and 2006 focused on WSS in the PUI of five metropolitan areas, each with different and changing service management regimes influencing the governance of basic service provision.

⁴ The fieldwork was conducted using the local teams through direct observation, transect walks and a number of participatory research tools, including focus groups, workshops and individual interviews.

⁵ For a detailed list of the facilities classified as improved, see WHO and UNICEF (2010), p.34.

2.1 Improved versus adequate access to services

JMP figures can only portray ‘improved’ rather than ‘adequate’ access to water and sanitation, as the statistics used⁶ merely capture the existence of certain types of facilities, with little information about how operational they are. Whilst a number of existing studies could shed light onto the adequacy and safety of facilities, the size of their samples is often too small to be able to extrapolate for the purpose of national or even global assessments, and therefore access to ‘adequate’ WSS can only be a rough estimate (see McGranahan and Satterthwaite 2006). Instead, the JMP global assessment operates on the basis of a universal typology that judges and pre-defines different facilities. The way in which access to WSS facilities has been conceptualised and operationalised is highly problematic, in that technology is used as a single indicator to define people’s access. The presence of a certain facility within a specified distance and/or time does not necessarily indicate effective access to the service. Moreover, coverage is often used as a proxy for accessibility and therefore claimed efforts in meeting the MDGs can often create ‘false hopes’ (Zezeza Manda 2009). This issue has been partly addressed by JMP as the assessment now largely relies on data that try to capture the use of water and sanitation facilities rather than their mere provision (WHO and UNICEF 2010).

Nevertheless, the fact that people ‘somewhat’ use a facility does not automatically translate into satisfactory access, as many have to use additional facilities to meet their WSS needs. Irregular and intermittent water supply is a common problem in cities of the Global South and a frequent phenomenon in the peri-urban context. The price paid to access services is an equally important factor that can prohibit access to a facility. It is further false to assume that ‘improved’ facilities automatically provide good quality drinking water or safe sanitation. In fact, not all improved water sources do in practice provide safe drinking water⁷ (WHO and UNICEF 2010). With regard to sanitation, maintenance of facilities is a crucial issue, but in practice, the fact that pit latrines and septic tanks have to be maintained and emptied on a regular basis is often neglected, and the associated costs can place a burden, particularly on poor households’ expenses (Allen and Hofmann 2008).

Another problem is associated with the assumption that every person shares the same needs with regards to WSS. There is no agreement in the literature on the minimum requirement for water per person per day, with definitions ranging between 15 and 50 litres⁸. The adoption of a global benchmark is very problematic since people have different requirements based on their needs and gender roles with regard to productive, reproductive and other day-to-day activities. Moreover, water is used for different purposes, such as drinking, cooking and hygiene, but also for productive purposes. Water for productive uses can be crucial, particularly in the PUI, as will be further

⁶ JMP relies on existing data to produce statistics that can provide an estimate for water supply and sanitation coverage at a global scale. To that end, it mainly draws on national statistics from censuses and household surveys.

⁷ The assessment faces a number of other problems related to the definition of access, which often varies from country to country, and which JMP is currently trying to address (see WHO and UNICEF 2010).

⁸ As mentioned above, WHO and UNICEF consider a minimum of 20 litres per person per day as key indicator. The SPHERE project (1998) specifies 15 litres as the bare minimum, while Gleick (1996) argues for 50 litres per capita per day as basic requirement for domestic water supply (both cited in Howard and Bartram 2003).

reasoned below, and therefore people's needs have to be contextualised.⁹ Thus it could be argued that a less advanced facility classified as 'unimproved' might potentially provide a better service than an 'improved' facility, if all the considerations debated above and summarised in Figure 1 are closely examined. The importance of these parameters will be discussed further in the peri-urban context, but this clearly shows assumptions behind the methodology of formal WSS efforts and the intrinsic problems. Judging a sanitation facility purely on the basis of its type is not sufficient, particularly in densely populated areas where the disposal of wastewater and human excreta requires more sophisticated solutions (Ali et al. 2010). The fact that all shared sanitation facilities are now considered 'unimproved' (see WHO and UNICEF 2010) is further problematic for urban and peri-urban areas, as the increased density of informal settlements might render individual units unfeasible. While there are severe problems with public toilets that are shared by hundreds of households, this cannot be compared with a well-managed toilet facility shared by a small number of families. The distinction between improved and unimproved seems, therefore, arbitrary and can lead to false conclusions and action.

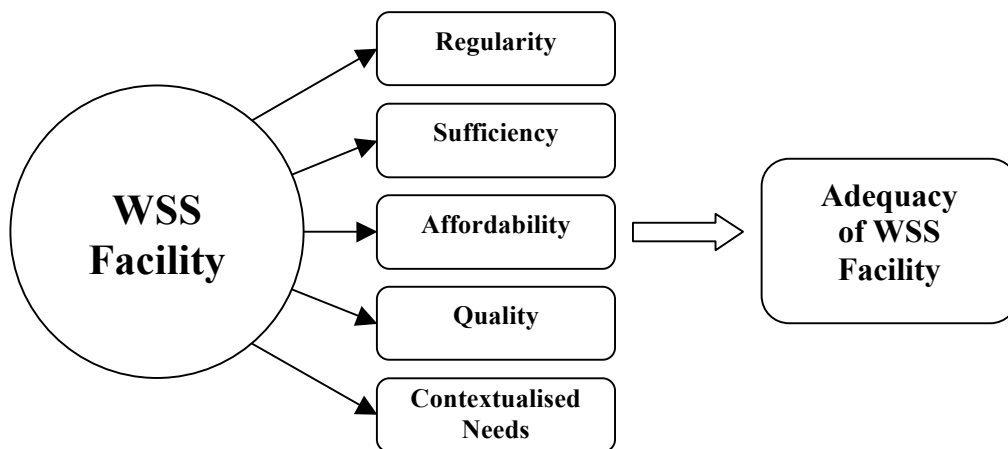


Figure 1: Key parameters to evaluate the adequacy of WSS facilities.

The difficulty, if not impossibility, for JMP to obtain better quality data has been acknowledged. As a consequence, these figures are only indicative as they cannot depict the full magnitude of the problem. Yet, formal efforts in policy and planning to combat WSS problems seem to be based on these assumptions and methodology and ignore the issues captured in Figure 1, leaving a large number of people currently lacking access to WSS out of the picture (see UN-Habitat 2003; Guardiola et al. 2010; Zeleza Manda 2009). This has fundamental implications, particularly for those living in the PUI, as will be discussed in the following sections.

⁹ A woman who is pregnant or breast-feeding usually requires larger volumes of water. Similarly, the climate conditions to which people are exposed influence the intake of water. When it comes to sanitation, women and children have different needs compared to men, and the issue of safety is much more important for them (Hofmann 2005).

2.2 Rural–urban disparities and the overlooked peri-urban interface (PUI)

Whilst the level of access to WSS in rural areas is generally much lower than in urban areas, rapid urban growth is having a detrimental effect on progress towards improving access to WSS. Efforts to increase access in urban areas need to be enhanced in order to keep up with the speed of urban population growth, particularly regarding sanitation but also for water. The PUI is an area that has and will continue to absorb large portions of the increasing urban population, with a high percentage of lower-income groups settling in these areas. They have “fewer opportunities to secure essential goods and services outside of the market” compared to their rural counterparts (Grant 2010, p.2). Population growth rates in peri-urban localities are often higher than those for the city overall. In the case of Chennai, this was more than twice as high in 2004 compared to the growth rate for the metropolitan area as a whole, and peri-urban locations in some of the other case studies have been experiencing similar trends (Allen et al. 2006a). This peri-urban population influx is down to both urban and rural migration, where the former is largely associated with lower-income groups being pushed out of the city due to increased competition over land while the latter can be associated with rural migrants moving to the city in search for more lucrative livelihood opportunities. Current land regulations have turned the PUI into a buffer zone for migratory processes, offering a home to a large proportion of the poorer sections of society (Ruet et al. 2007).

As mentioned earlier, the PUI is both rural and urban in character. In many instances pockets of agricultural land are converted for residential, industrial and commercial purposes. Even though many poor communities living in informal settlements in inner urban areas still lack adequate access to WSS, the distress faced by communities living in the PUI due to inadequate WSS provisions is of great magnitude and is increasing. While there are no representative statistics on service provision in emerging peri-urban areas, a growing body of case study evidence (see Allen et al. 2006a) suggests that this peri-urbanisation is happening without the provision of services. The weak physical connection and remoteness of peri-urban areas from economic and political centres is strongly linked to the socio-political status of the peri-urban poor who are politically disadvantaged, and this is manifested in their lack of services (Grant 2010). Millions of poor women and men settling in these areas have to spend a considerable amount of time and money trying to access WSS or fighting diseases related to deficient water supply and poor or non-existent sanitation. How the peri-urban water poor cope with their lack of access to adequate WSS will be discussed in more detail below as formal efforts and commitments at national and international level have so far largely neglected the reality faced by the peri-urban poor. Over 60% of aid commitments towards WSS are allocated to large-scale systems that are not operational in the PUI (WHO 2010).

In administrative terms, the jurisdiction over peri-urban areas is often unclear and thus the “remit of overlapping authorities becomes the responsibility of none” (Grant 2010, p. 17). As the distinction between rural and urban is becoming more and more blurred, it is often difficult to identify whether peri-urban communities are included in urban or rural statistics. There is a tendency that “recently populated districts” where lack of WSS is high are still accounted for in rural statistics, and as such the categories of urban and rural become meaningless and confusing (Ali et al. 2010). Access rates that only take into account the city limits are misleading as they hide existing deficits in the PUI. Moreover, it is very likely that poor peri-urban communities are not captured at all in

urban or rural statistics since they tend to live in informal settlements that are not acknowledged in censuses and surveys. It is these communities that predominantly comprise the peri-urban water poor and the research this article draws on confirms that the deficit of WSS is largely located in the PUI.

While the peri-urban poor largely fall through the net in formal efforts to improve access to WSS, it is also a location that contains assets of city-wide or even regional importance. Ironically, the PUI is often rich in water and other natural resources, with many peri-urban areas having their own freshwater reservoirs, but at the same time they suffer from insufficient water supply as continuous urban growth increases competition over environmental resources, with large amounts of water being exported to the central areas of a city. As argued by Gopakumar (2009), “[t]he urban cores of cities are actively and consciously appropriating finite resources available in their peripheries for their use. By doing so, they are not just taking away resources needed by residents but also condemning urban peripheries to a sustained socioeconomic [and environmental] disadvantage” (Gopakumar 2009 p. 112). In other words, the socio-environmental burdens closely associated with current dynamics of urban growth are intimately linked to a wider set of social and economic implications. This is particularly evident in the case of Mexico, where an estimated 80% of water from Milpa Alta, a peri-urban district of Mexico City with the lowest level of piped household connections, is transported to the city (Torregrosa et al. 2004). In Chennai, this amounts to approximately 60%, and in Cairo and Caracas 50% of water from the periphery is ‘exported’ to the centre (SUSTAIN 2004; El-Hefnawi and Gahary 2004; Cariola and Lacabana 2004).

In Milpa Alta, increased population growth, coupled with deforestation for industrial and agricultural purposes, threatens the area’s environmental capacity to replenish water sources, with implications that could eventually affect the whole city. In the case of Chennai, there are three different mechanisms through which water is depleted in peri-urban areas and transported to the city. Two of these are private initiatives, including the water bottling and vending market as well as bulk water supply, while the third mechanism, initiated and implemented by Metrowater – the parastatal company in charge of providing water to the city – encompasses water purchase agreements with peri-urban farmers (Gopakumar 2009). Instead of the city providing services to the PUI, the city frequently extracts resources from its surrounding peri-urban areas in support of its economy (Ruet et al. 2007). The continuous extraction from underground sources has increased the risk of groundwater salination in Chennai, particularly in areas in close proximity to the coast. The situation in Dar es Salaam is slightly different in that the water extracted in the PUI largely serves local needs (Kombe and Lupala 2004). Nevertheless, since water-mining happens without any consideration for rules and regulations regarding water abstraction, this can equally lead to the drying up of aquifers. The inconsiderate exploitation of peri-urban resources driven by economic motives clearly undermines the ability to deal with demographic pressures in the future, which are most likely to occur in the PUI (Ruet et al. 2007).

3. Access to WSS by the peri-urban poor

Peri-urban lower-income groups hardly benefit from facilities inside the household and are rarely served by WSS facilities connected to existing water mains and trunk sewers.

The latter factor is partly linked to their geographical location but also because of jurisdictional arrangements and existing regulations. In Milpa Alta, the introduction of the ‘Zero Growth Pact’¹⁰ is one reason that prevents the area from benefitting from an extension of the network and a clear indication of the government’s efforts to suppress certain types of urban growth and expansion. In Chennai, the physical inaccessibility of some peri-urban neighbourhoods makes an extension technically difficult. In addition, many peri-urban areas are not part of the administrative boundaries of Metrowater and the local bodies left in charge lack the necessary resources to improve WSS in their constituencies. Supply-led or policy-driven WSS practices initiated and supported by the state, such as large scale privatisation schemes or private–public partnerships, hardly target peri-urban realities, particularly settlements of an informal nature (Allen et al. 2006a). Instead, peri-urban communities rely on a variety of alternative arrangements for water and sanitation, as illustrated below. This involves individual but also collective efforts in which women often play a crucial role.

3.1 Access to water

The peri-urban poor currently access water through a multitude of practices and usually rely on more than a single source to meet their water needs. As argued before, the way in which access to water is currently being conceptualized means that the peri-urban water poor are largely invisible to most formal policy-driven approaches supported by the state. Where the peri-urban poor do have access to the formal system, this is in many cases complemented by other practices, as there are serious issues regarding the regularity and sufficiency of the service (see Figure 1). In Mexico and Chennai the state¹¹ implements a scheme of supplying free water to poorer members of the community, but the formal system is frequently distorted by bribery practices, slum landlord politics and an inability of the state to identify those who are eligible (Torregrosa et al. 2004; Ruet et al. 2007). In all the cases studied, the piped network system is unable to meet peri-urban demand. As a consequence, the peri-urban poor try to satisfy their water requirements using a variety of practices driven by their needs (see Table 1). These are much more localised and need to be “examined and understood from the perspective of access” rather than the one of distribution and coverage, as commonly applied (Allen et al. 2006b, p. 338-339). Many needs-driven practices classified as informal and ‘unimproved’ represent the only reliable way for these communities to gain some form of access. During the water crisis in Chennai in 2003–04, even middle class peri-urban residents relied heavily on water provided through unimproved sources, such as public and/or private water tankers. Most policy-driven efforts are generally directed towards inner city areas, largely drawing from peri-urban water sources with little consideration for peri-urban residents¹². Needless to say, however, peri-urban middle-income residents are in a much better position than lower-income households to access sources that provide water of an acceptable quality (e.g.

¹⁰ The Zero Growth Pact has been introduced as a mechanism to deal with urban expansion in Milpa Alta, one of the peri-urban districts in the Federal District of Mexico City. Only the population that had been registered until 1997 has the official right to water through public provision from water tankers.

¹¹ In Mexico and Chennai the private sector is contracted by the state to accomplish certain tasks, such as water provision through tankers.

¹² In Chennai, after providing water to inner city areas, settlements classified as ‘Adjacent Urban Areas’, which only applies to a small number of peri-urban settlements, might be supplied if sufficient amounts are available (SUSTAIN 2004).

bottled water). As the peri-urban poor lack the necessary visibility and recognition to combat social exclusion and inequality they lose out, since they have to compete over limited resources with higher-income residents and commercial enterprises that have more political clout.

Table 1: Access to water supply in the PUI in the five case studies¹³ (source: Allen et al. 2006a).

Provider	Policy-driven Water Supply Practices	Needs-driven Water Supply Practices
Public (state) sector	<ul style="list-style-type: none"> • Piped network (household connections and public standpipes) • Wells and bore-wells (not Mexico City) • Provision by tankers (not GCR) 	<ul style="list-style-type: none"> • Public provision distorted by bribery practices (Chennai and Mexico) • Water kiosks (Dar es Salaam) • Negotiation with communities through ‘technical water fora’ (TWF) (Caracas)
Private sector	<ul style="list-style-type: none"> • Buying from licensed tankers (not in GCR) • Buying packaged water (cans, bottles, sachets) 	<ul style="list-style-type: none"> • Buying from informal tankers • Private vendors drawing from own site piped connections/own boreholes or wells sold directly by bucket or through push carts and bicycle vendors (Dar es Salaam) • Sales from private boreholes or wells (GCR)
Community		<ul style="list-style-type: none"> • Rainwater harvesting (not Caracas or GCR) • Water theft • Gifts or paid provision from neighbours • Clandestine connections • Own individual wells and boreholes (not Mexico City or Caracas) • Piped network (community organisation agreement with local authority (Mexico City) or public water company (Caracas)) • Piped network kiosks and taps run by the community with NGO and public sector support (Dar es Salaam) • Boreholes and kiosks run by the community (Dar es Salaam) • Horizontal condominiums (Caracas)

Women are largely in charge of procuring water for the household, and peri-urban poor women need to spend substantial amounts of time retrieving water. In peri-urban Chennai, 2 h per day are spent on fetching water, losing precious time needed to accomplish household duties or earn an income (SUSTAIN 2004). Additionally, the peri-urban poor spend significant amounts of their household income on water, as informal means are often more expensive than formal ones. In Dar es Salaam, the peri-urban poor use up to one-quarter of their household income for water (Kombe and Lupala 2004). Often, the very poor cannot afford to buy water and have to rely on informal support from neighbours and water providers or obtain water from unsafe sources. Since intermittent water supply is a regular occurrence in the PUI, peri-urban communities in Caracas, Chennai and Mexico City organise their lives around slots when water is available. Those subject to the most severe rationing have to spend substantial amounts of time for transport and storage, and rely heavily on collaboration and solidarity between neighbours (Cariola and Lacabana 2004; Torregrosa et al. 2004). Reusing water for different purposes is common practice in many peri-urban localities but particularly widespread among those that face extreme water supply shortages. To make matters worse, the PUI is frequently populated by young nuclear families or female single heads of households who lack the support from large family and social

¹³ As discussed below, practices such as the kiosks in Dar es Salaam and the piped network agreements between the community and the state in Caracas are supported by and incorporated into the public system. They have been listed under needs-driven practices as this is how they initially emerged.

networks (Allen et al. 2006a; McLennan 2000). In Chennai and Caracas, up to 60% of the peri-urban population is composed of households with no more than four members, while in Cairo nearly half of the peri-urban residents are newcomers without their extended families in the close vicinity (SUSTAIN 2004; Cariola and Lacabana 2004; El-Hefnawi and Gahary 2004). In Cairo and Mexico City, the formal WSS system particularly disregards these ‘newcomers’, even though they might have been settled in the area for several years.

Peri-urban dwellers in Caracas and Cairo have to cope with various degrees of intermittent supply from the public network, while peri-urban households in Mexico City registered under the Zero Growth Pact have access to two 200-litre water barrels located on the street and filled once a week or every fortnight¹⁴ (Allen et al. 2006a). Irregular supply, as well as reliance on facilities outside the house, which can imply a distance of several hundred metres or more, is a frequent phenomenon across the studied cases and noticeably impacts on the quantity of water available. Previous studies highlight that the volume of water is, in many cases, more significant than its quality in preventing disease (see McGranahan et al. 2001; Howard and Bartram 2003). While the quantity of water is crucial, recent findings suggest that the significance of the quality of water has been underestimated and plays an equally important role in the prevention of disease (Prüss-Üstün et al. 2008). Inappropriate storage facilities and infrastructure¹⁵ has a detrimental effect on the quality of water and subsequently on people’s health. As illustrated in Table 3, most water-related diseases across the five cases are related to the poor quality of water available. However, since most facilities would fall under the category of ‘improved’ water sources, there is officially no need to take action. Consequently, the peri-urban poor try to access better quality water from other sources for their own consumption. In Dar es Salaam, those that can afford it buy a small amount of water from vendors for drinking purposes, relying on cheaper facilities for cooking, cleaning and hygiene (Kombe and Lupala 2004).

In peri-urban Chennai the water supplied through the public system (which can drop to 10 litres per capita per day or less) is only meant for drinking and cooking, and households are forced to complement their water needs through other sources (SUSTAIN 2004). In a peri-urban context, water is not only important for domestic purposes but also constitutes one of the main sources of employment and income generation opportunities. Several livelihood activities of the peri-urban poor are heavily dependent on water, as illustrated for Dar es Salaam (Table 2). Although peri-urban agricultural activities are becoming less prominent in all five cases, they still constitute an important source of food and income, particularly for lower-income groups.

Table 2: Water-based income and employment generation activities in peri-urban Dar es Salaam.

Activity	Units	Employment generated	Estimated water requirement per unit per day
Local beer brewing	30-50	2 persons per unit	160-200 litres

¹⁴ Each location provides the barrels for a certain number of families. While these points are strategically positioned for the tankers to reach, they are in many cases several hundred metres away from the individual households and are transported through hoses, buckets or plastic jugs.

¹⁵ The paint used for the barrels in Mexico City, as well as the material of pipes both in Caracas and Cairo are not suitable to carry/store water.

Batik making	>100	2 persons per unit	160-200 litres
Food vending	35-50	1 person per unit	100-200 litres
Bar operators	10	3-5 persons per unit	200-300 litres
Livestock keeper	6-10	1-2 person per unit	120-200 litres
Water vendors	>50	1 person per unit	dependent on client demand

Source: Kombe and Lupala (2004)

Water vending through small-scale private operators comprises a significant source of access to water, particularly in peri-urban Africa, and has been an important income-earning opportunity for the peri-urban poor in Dar es Salaam, where most residents who have invested in a well to increase their income are fairly poor (Kombe and Lupala 2004). This illustrates the strong ties between access to water and livelihoods of the peri-urban poor. In Chennai, the water-purchasing agreement with Metrowater mentioned above led to the creation of “a public-system-constructed scarcity”, whereby the richest farmers are integrated into the city economy leaving the poorest farmers struggling to find sufficient water for their crops, leading to drastic drops in an already meagre income (Ruet et al. 2007, p. 119).

Examples exist where needs-driven practices, and more importantly the peri-urban poor themselves, have been acknowledged by the state and incorporated into the formal WSS system. In one of the peri-urban areas of Dar es Salaam community-managed water kiosks started off as an informal needs-driven practice and are now part of the state’s Community Water Supply and Sanitation Programme. The introduction of the community-managed system has lowered the price for water, with charges to cover operation and maintenance (Kombe and Lupala 2004). In Caracas, a close collaboration between the state water company (Hidrocapital) and communities is fostered by a newly created water culture instigated through the 2001 Drinking Water and Sanitation Act and the establishment of Technical Water Fora (TWF). This institutionalised structure builds on the very precarious WSS system, with illegal connections suffering from intermittent supply put in place informally by communities in need. A number of TWF, which are largely led by community women, have been established in the PUI to manage and control the quality of services in collaboration with Hidrocapital (Allen et al. 2006a). The fieldwork in 2003 and 2004 also shows that the intended shift from representative to participatory democracy can be a lengthy process. Until 2004, the TWF had only been established in one of the two localities examined. Efforts in the other settlement were thus far hindered by the community’s distrust of the government and themselves in getting together as a group and participating actively in the process (Cariola and Lacabana 2004).

3.2 Access to sanitation

The situation with regard to sanitation in the PUI paints a picture that is even more worrying than that for water. Access to sanitation among peri-urban households is very low and the practices to cope with a deficient sanitation system are far less diverse. It is again mainly through a number of needs-driven practices that the peri-urban poor gain access to sanitation. In all the cases studied, sanitation is given less priority, both by the communities and public bodies, even though the impacts of inadequate sanitation on the quality of water and subsequent occurrence of diarrhoeal and other diseases are well known (UN Economic and Social Council 2003; Prüss-Üstün et al. 2008; Cariola and

Lacabana 2004). The PUI is frequently the locus for solid and liquid waste disposal systems, either in the form of illegal dumping or in formal disposal sites, and this aggravates the health implications linked to inadequate sanitation facilities, as these are not only sources of water contamination but further provide an ideal breeding ground for disease-transmitting vectors (Table 3). The peri-urban poor are thus overall more exposed to diseases such as malaria, filariasis and dengue compared to their urban and rural counterparts (Birley and Lock 1998).

Table 3: Water and sanitation-related diseases and infections in the five case studies.

City	Faecal and oral (water-washed and water-borne)*	Water-washed*	Vector-borne*
Cairo	Diarrhoeal diseases Hepatitis A Typhoid		Infections, intestinal worms, kidney and liver diseases
Caracas	Diarrhoeal diseases Hepatitis A Amoebiasis Gastroenteritis	Skin infections	
Chennai	Diarrhoeal diseases Cholera	Skin infections	Malaria
Dar es Salaam	Diarrhoeal diseases Cholera Intestinal worms		Malaria
Mexico City	Diarrhoeal diseases Cholera		

* Water-washed: person-to-person transmission due to inadequate personal and domestic hygiene; water-borne: transmission through consumption of contaminated water and food; vector-borne: transmission by insects that breed in or bite near water

Connections to the underground sewer system are non-existent in most peri-urban settlements across the five cases, with no formal provision for wastewater treatment (Cariola and Lacabana 2004; Kombe and Lupala 2004). Official figures for peri-urban Cairo regarding connection to the underground sewer paint a much better picture compared to the reality on the ground. The vast majority of households use trenches to discharge liquid waste, and overflows are a regular occurrence (El-Hefnawi and Gahary 2004). Pit latrines and septic tanks are common features in the PUI where the informal private sector fills in a crucial gap. In peri-urban Cairo, more than 75% of all latrine-emptying services are carried out by the informal sector, as the public sector is unable to cope (*ibid.*). Yet, the formal sector is trying to eradicate the informal sector through their reluctance to accept them as legitimate players, with the poor suffering the consequences. While septic tanks and most pit latrines are considered ‘improved’ facilities, the inability to pay for maintenance and emptying services, particularly among the poor, puts such classification into question. Even where emptying services are used, the largely informal operators discharge the wastewater without prior treatment into the environment, leading to contamination of water sources. In peri-urban Mexico City and Caracas the untreated discharge of wastewater causes high levels of river pollution (Allen et al. 2006a). A considerable amount of peri-urban dwellers still lack access to any kind of sanitary facility. In Chennai, the few public toilets available in the PUI are not properly maintained and therefore largely non-operational. As a

consequence, people (up to 60% of residents for certain settlements in peri-urban Chennai) are constrained to open defecation (SUSTAIN 2004).

Formal efforts to improve sanitation are spread thinly, and have largely failed to consider contextualised needs. The above-mentioned TWF in Caracas, who are supposedly also in charge of sanitation, have so far limited their efforts to improve access to water (Cariola and Lacabana 2004). In Dar es Salaam, one peri-urban settlement experimented with composting toilets as an alternative way to deal with human excreta. However, the project is no longer operational since people did not adhere to the principle of maintaining separate chambers for urine and faeces (Kombe and Lupala 2004). Other official initiatives to improve sanitation across the different cases have equally failed to take the local context into account, and thus remain largely ineffective. A sanitation project in Chennai funded by the World Bank proposed to extend the underground sewage network, but without provision for more water (SUSTAIN 2004). Since the conventional system is heavily dependent on water, an extension into peri-urban areas is not feasible unless more water becomes readily available (see Kombe and Lupala 2004; Torregrosa et al. 2004; SUSTAIN 2004).

4. Improving access to water and sanitation for the peri-urban water poor

The previous sections examined the WSS struggles of the peri-urban water poor and demonstrated the implications of the peri-urban context in any attempt to tackle the lack of access to WSS. At the same time, the case studies demonstrate the continuous disregard for the peri-urban water poor. Local governments in charge of WSS are generally weak and driven by more influential agendas, while the formal private sector often prioritises different target groups. As a result of the inefficient formal WSS sector, a number of informal rules and mechanisms are being applied in the PUI to deal with the persistent problems in relation to water supply and sanitation. These manifest in a variety of practices that emerge out of people's needs and are largely, but not exclusively, informal means through which the poor gain access. Even in the few examples where community practices are supported by formal institutional arrangements, as in Dar es Salaam and Caracas, it should be noted that the solutions arose out of "poor people's efforts to gain access to what the formal system is unable to supply" (Allen et al. 2006b, p. 341).

The variety of stakeholders currently involved in provision of WSS is as diverse as the array of practices that have emerged in the PUI, including government agencies, the private sector (both formal and informal), NGOs and communities. Evidently, the composition of actors and their approaches considerably influence the potential to meet the needs of the peri-urban water poor, and it is therefore important to explore in more detail what the above-mentioned coping strategies of the peri-urban water poor are telling us in this respect. Findings from the five case studies show a clear association between the political status of the peri-urban poor, in terms of visibility, engagement and recognition, and their level of access to WSS. This section explores this link further by focusing on different levels of involvement of the peri-urban poor in the improvement and provision of WSS. Table 4 distinguishes between treating the peri-urban poor as recipients versus acknowledging them as active contributors in the quest

to improve WSS. The following sections will scrutinise these two categories in more detail in the light of the above case study findings.

Table 4: Forms of participation in the improvement and provision of WSS.

The peri-urban poor as recipients of services	
Passive participation	Poor communities are told about planned or scheduled water and sanitation initiatives without any attempt to stimulate local opinion or knowledge.
Participation through information (giving)	Poor communities are asked about their water and sanitation situation or needs through surveys and similar instruments. The information is fed anonymously into the decision-making process without feedback.
Participation through consultation	Poor communities are consulted as to how the local water and sanitation situation should be improved. Many discuss different options proposed by sector professionals, but the professionals are not obliged to take local views into account.
The peri-urban poor as contributors to service provision	
Participation through contribution	Poor communities are asked to make labour or financial contributions towards the provision of water and sanitation utilities, and ‘the poor’ agree to take primary responsibility for some well-defined components of a negotiated water and sanitation improvement.
Participation through partnership	Poor communities and other key actors share resources, knowledge and risks in pursuing commonly agreed water and sanitation improvements. ‘Partnership’ can be taken to imply a long-term, equitable relationship.
Participation through self-mobilisation	Poor communities work together to demand and/or implement water and sanitation improvements. They develop contacts with external actors, some of whom may contribute organisational as well as technical skills, but community groups retain control over how the resources are used.

Source : Adapted from UN-Habitat (2003, p.215)

4.1 The peri-urban poor as recipients of services

Treating the peri-urban poor largely as recipients of services, as illustrated through the first three types of participation in Table 4, is very much in line with the formal conceptualisation of and approach to the WSS problem examined in section 2. This provides no guarantee that the experience, perception and needs of the peri-urban poor are considered in the decision-making process. All three approaches lead to conventional top-down solutions that are chosen without active user participation and would qualify as practices based on and driven by policy rather than people’s needs (see Table 1). As illustrated in section 3, these address at best the poor’s practical or material needs (e.g. water, food, shelter, etc.) and do little to deal with more strategic needs (the power and influence to advocate their own needs and take advantage of arising opportunities). Official solutions have a tendency to focus on minimising the consequences by improving the distribution or coverage of services, with very little consideration for the structural conditions that place people in the position of not having access. As illustrated above, formal efforts tend to focus on infrastructural projects, with very little consideration for the operation and maintenance of services. As in the case of Cairo, where fieldwork confirmed the willingness of local communities to participate in WSS initiatives through a variety of means, the government bases community involvement purely on financial contributions, without any involvement in the actual planning and implementation of services. Such approaches are unlikely to be sustainable since they do little to reflect the needs, interests and capacities of the community.

Peri-urban settlements that lie outside the municipal boundary or are nonexistent in master plans are automatically considered as informal, and their inhabitants rendered invisible. The case studies demonstrate the challenge for those communities to be recognised by the formal sector, which has led to the emergence of two parallel WSS systems: formal or policy-driven service provision supplied by the municipality and/or formal private sector, and the largely informal provision through a variety of needs-driven practices. The peri-urban water poor do not only lack access to services but, more importantly, are politically marginalised. When examining their coping strategies it becomes clear that their existence in the city and their needs with regard to services are not acknowledged. Treating the peri-urban poor simply as recipients of services symbolises and reproduces their lack of recognition. Limited communication with and understanding of the end users hinders more active participation and increases the risk of ignoring local circumstances. This is evident in one of the peri-urban localities of Caracas where by 2004 the implementation of TWF had not yet been successful. The largely unorganised local community in that locality needs more time and support to fully embrace the new water culture that the state is trying to implement:

“Neither have they (Hidrocapital) taken measures to explain to the people what the importance of a [TWF] is, that you are going to pay for the service and you can complain if you don’t have water.....” (Schoolteacher, Bachaquero, 2003, cited in Cariola and Lacabana 2004, p. 27).

4.2 The peri-urban poor as contributors to service provision

When the peri-urban poor are acknowledged as contributors to service provision (see last three categories in Table 4), they not only take an active part in the definition of problems and solutions, but as they gain political status they also start taking responsibility. All three forms of participation are noticeably bottom-up approaches to addressing the problem, because they allow the poor to assess their own effective demand and ability in terms of technology, level of service and price. In peri-urban Dar es Salaam, the community itself identified access to water through a water kiosk as most appropriate. The community-managed water kiosks are different to other practices in that the peri-urban poor engage with the Water Users Associations (WUA) that manage the kiosks and are involved in implementation and operation of the kiosks. However, the hierarchical nature of the state–community relationship, lack of collaboration between different service providers, e.g. the private suppliers and the community system, as well as limited support from non-participating communities still constitute problems (see Allen 2011 for a more detailed discussion). It is very important that support is not only limited to financial inputs but also allows other contributions to avoid excluding low-income earners (Gutierrez et al. 2003). Even more significant is an active involvement of peri-urban poor communities in the initial needs assessment. The consideration of contextualised needs, and therefore the disaggregation of ‘the poor’, are essential throughout to focus particular attention on women and children.

The different case studies confirm that an organised community can considerably influence and improve service provision but, more importantly, target the poor’s structural needs (Cariola and Lacabana 2004; Kombe and Lupala 2004; Torregrosa et al. 2004). Attempts to enhance access to WSS in low-income areas in Latin America have traditionally involved active community participation. In Milpa Alta, community

representatives play an important political role in access to services and in the resolution of conflicts around water. “Communal organization continues to be a political and cultural reference of primary importance in the regions” (Torregrosa et al. 2004, p. 6). While existing forms of community engagement in Milpa Alta are not in any way institutionalised, and access to WSS remains inadequate, better access in the area is evidently associated with the existence of community representatives (voted for by their neighbours) who play an important role in organising and mobilising the community. In comparison, settlements with low levels of social capital and collective action result in lower levels of access (Torregrosa et al. 2004). In Caracas, this is now formally embedded in and institutionalised through the legal and policy framework. Because the poor take an active part in decision-making, the process facilitates the creation of ownership and social mobilisation in the community, as has started to happen with the TWF in Caracas. The government is only dedicated to the development of permanent water supply solutions if the community forms an organisation and demonstrates awareness of their rights and responsibilities in pursuit of transforming their illegal status into that of recognised citizens (Cariola and Lacabana 2004). The communities become part of decision-making processes and service management to execute not only their right to WSS but also to realise associated duties. This is essential to secure maintenance of these services in the future. Furthermore, and most importantly, low-income groups are able to gain financial and administrative power to help them improve their structural conditions so as to contest social exclusion and inequality.

5. Conclusions

Official figures presented at the beginning of the paper, and more importantly formal approaches to policy and planning for WSS, currently miss a large proportion of the world’s population. Many of those living in the so-called PUI, an area that has and is going to absorb large proportions of the urban influx, lack improved, let alone adequate, access to WSS. The rigid application of formal standards and regulations, combined with the exclusion of potential beneficiaries from the process, can result in very costly but ineffective solutions, as they tend to neglect specific local circumstances. Developing solutions on the basis of people’s requirements is not only important during the construction, but also with regard to maintenance of WSS. Yet, many alternative and needs-driven practices remain largely unrecognised, even though they often provide the only form of access in the PUI and tend to respond better to individual needs and circumstances. There is an urgent need to start assessing the level of access to water by considering more than just the technology used (see Figure 1). By actively engaging with the peri-urban water poor it will be possible to identify and record their current practices and coping strategies so as to then understand specific WSS needs. This is also the only way to address the underlying structural conditions, but that would require recognising peri-urban poor communities as legitimate citizens with rights. Due to the spatial and social conditions that characterise the peri-urban poor they continue to face serious political obstacles to challenging, among other things, the government’s reluctance to engage with the increasing problem of rapid urbanisation that has been exacerbating the WSS problem. Continuous urbanisation has increased competition over land and led to the commodification of common land and resources (see Ruet 2007), which further contributes to marginalisation of the peri-urban poor.

WSS can only be enhanced if current efforts of the peri-urban water poor are acknowledged and supported, which first of all requires them becoming visible to and recognised by the formal system. Tackling the WSS challenge will be impossible unless the problems faced by the peri-urban poor are acknowledged at national and international level in the context of increasing urbanisation and population growth. JMP and other international agendas can potentially play an important role in bringing peri-urbanisation and the struggles of the peri-urban water poor to the attention of governments and the international community. The water kiosks in Dar es Salaam and the TWF in Caracas are good examples of needs-driven practices that have become visible to and supported by the formal system. As a consequence, it is imperative to find ways to raise the political status of the peri-urban water poor as a way forward to reconcile the two parallel WSS systems. Accordingly, WSS policies and formal planning approaches need to build upon reality on the ground and aim for adequate rather than 'improved' access. Only then can access to WSS improve in the PUI as a considerable contribution to addressing WSS at scale.

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