UN-HABITAT REPORT ON THE WATER AND SANITATION IN SMALL URBAN CENTRES: PAPER 3

Water Sector in Small Urban Centres




Water Supply and Sanitation Options for Small Urban Centres in Developing Countries

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1 Introduction

The size of the problem

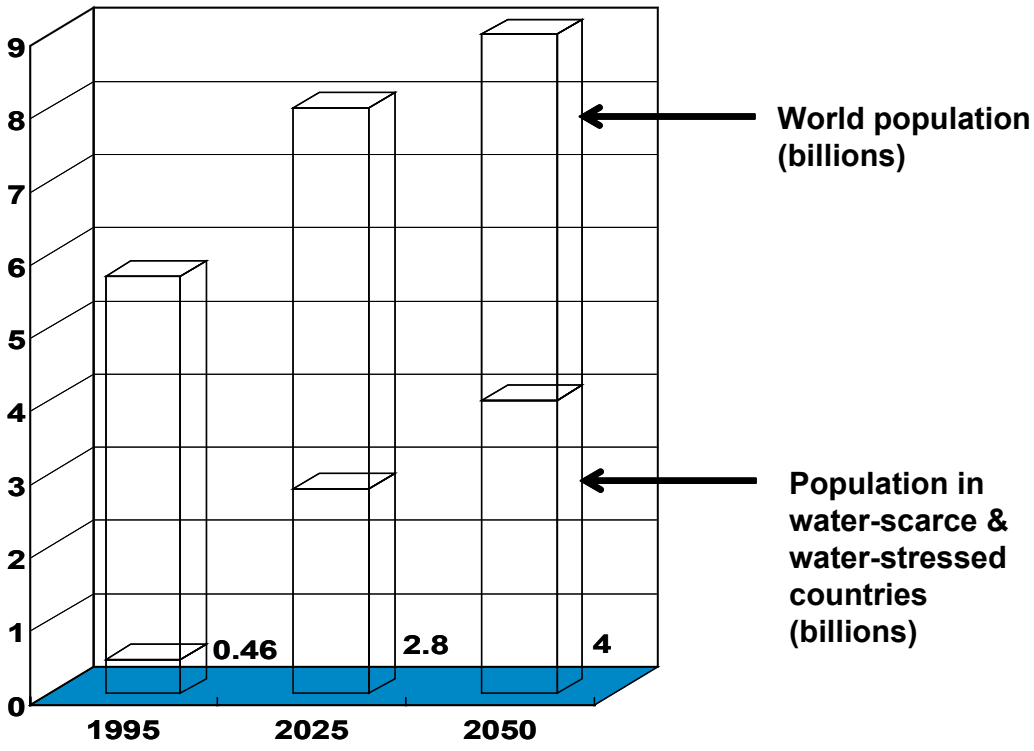
To meet the water and sanitation Millennium Development Goals some 300,000 people have to be provided with improved water supplies and 440,000 with improved sanitation every day during the period 2001–2015. This daily target for water supply was exceeded during the International Drinking Water and Sanitation Decade (1981–1990) (~370,000 people served per day), but the target for sanitation is more than twice the number of people served during the 1980s and the 1990s (~200,000 and ~210,000 people per day, respectively). Achieving the sanitation MDG is thus much more of a problem than achieving the water supply MDG, although water supply nears to be geared up again to the level of the 1980s as significantly fewer people were supplied in the 1990s (~220,000 people per day). These figures are for 'improved' water supplies and sanitation (WHO and UNICEF, 2000, 2004); however, figures for 'adequate' water supplies and sanitation are much higher (UN-Habitat, 2003): in urban areas in 2000, 680–970 million were without adequate water supplies (vs 171 million without improved water supplies) and 850–1,130 million were without adequate sanitation (vs 394 million without improved sanitation). Whichever of these descriptors, 'improved' or 'adequate', is used, the numbers are very large for both water supplies and sanitation.

Unfortunately there are no published figures for the number of people in small towns and large villages (STLV) who require improved water supplies and improved sanitation. There are only overall figures for 'urban' and 'rural' areas. However, the numbers are likely to be large and most people in STLV can be assumed to be poor or very poor. They therefore require low-cost affordable solutions.

Increasing global water stress and scarcity

Not only are the numbers of those requiring better water supplies very large, water itself is becoming scarcer. The number of people living in water-stressed and water-scarce parts of the world is estimated to increase approximately six-fold from 1995 to 2025 to reach ~2.8 billions (or nearly a third of the world's population) (Figure 2.1). This situation must be taken into account when planning and designing water supply improvements for STLV now, otherwise their long-term sustainability is likely to be low.

Figure 2.1 Population living in water-scarce and water-stressed countries, 1995–2050



Source: Hinrichsen et al. (1998) and United Nations (2000).

2 Domestic Water Supplies

Design water consumption

In order to minimize the transmission of waster-related diseases, in particular water-washed diseases, a water use (consumption) of around 25–30 litres per person per day (lpd) is generally thought to be necessary (Cairncross and Feachem, 1993; see also Novaic, 2002). Gleick (1996) recommends a design value of 50 lpd, provided flush toilets with a high volume per flush are not used (as may be expected in STLV). This value of 50 lpd seems perfectly reasonable, but hygiene education will be generally required so that the users can maximize the health benefits from the non-wasteful use of this quantity of water.

Water supply service levels

In general there are four levels of domestic water supply:

- Unimproved water sources (for example, unprotected shallow wells, faecally contaminated surface waters),
- Public standpipes (i.e., taps connected to the town/village piped supply),
- Yard taps (i.e., one tap per household), and
- Multiple-tap in-house supplies.

Level 1 does not provide access to an improved water supply and in most households in STLV Level 4 will never, at least in the foreseeable future, be a feasible solution. The realistic options in STLV are therefore Levels 2 and 3, although in some large villages it may be possible (and the cheapest option) to improve existing unimproved supplies as a short-term measure.

Level 2 can be subdivided into two 'sublevels', as follows:

2.i. Public standpipes, and

2.ii Standpipe cooperatives.

Level 2.i represents a usually free supply for very poor households, and Level 2.ii is a supply for a defined group of households (the 'cooperative') who share a single standpipe and pay for its use. Standpipe co-operatives have been used in the Philippines since the 1970s (Middleton, 2000) and they are recommended in India's Tenth Five Year Plan 2002–2007 (Planning Commission, Government of India, 2002):

> "...the number of stand-posts [i.e., standpipes] should be adequate for the population being served. There are successful examples of community supervision of the stand-posts. Community groups should be made responsible for maintenance and hygiene around stand-posts, for maintenance including prevention of wastage, and for collection of user charges from each household attached to the stand-post" [§6.2.50].

"Community-managed standpipes" are different from standpipe cooperatives as they are community-operated water kiosks where community members come to buy water by the bucket. Often there are too few kiosks in the community and the water is expensive when the cost is expressed per m3 (however, good practice does exist: two case studies, in Port-au-Prince, Haiti and Dakar, Senegal, are described by Colin and Lockwood, 2002). Standpipes serving standpipes cooperatives, on the other hand, essentially belong to the cooperative members. The main planning task is to determine with the communities what is locally considered the maximum number of households in a cooperative; this may be 5–25, for example, but the precise number may be influenced by the water tariff structure (see below).

Condominial water supplies

Condominial water supplies are the water supply analogue of condominial (i.e., simplified) sewerage (Section 3). They were developed in Brazil in the 1990s (Rooker, 2001; Melo, 2005) and have been used in, for example, La Paz, Bolivia and Iquitos, Peru (Water and Sanitation Program, 2005, www.care.org.pe). The best example is the medium-sized city of Parauapebas in the northern Brazilian state of Pará (population ~100,000), where the cost savings achieved by the condominial water supply network were considerable: the cost per connection was only USD 45 (1997 USD) vs USD 167 for a conventional water supply network (Table 2.1), despite the basic design criteria being the same in both cases (90 percent service coverage and a design supply of 250 lpd).

Table 3.3 Comparative costs[a] of conventional and condominial water