

Editorial

IN THIS ISSUE we focus on water and sanitation in challenging environments. It is worth dwelling for a few moments on the range of such challenges, because they are indeed very extensive in scope.

The most obvious, perhaps, are the geographic and physical challenges. Providing water close to homes located at high altitude in hilly areas, and to people living far from roads and centres of population, can be expensive and difficult. In coastal areas and small islands, salinity poses problems for freshwater supply. In contrast, lowland areas, especially with high water tables, make latrine construction difficult. Dry environments pose their peculiar challenges for water supply: deep water tables, short rainy seasons and short-duration stream flows. At the other extreme, in flood-prone locations, water supply and sanitation infrastructure is at risk, and reconstruction and rehabilitation are regularly required. Similar remarks apply in seismically active areas. Ground conditions – rock, sand, unstable soils – can make well and borehole construction and latrine pit construction difficult or expensive. Groundwater chemistry – especially high levels of arsenic, fluoride or iron, and corrosivity – requires special measures.

The challenges of geology and geography, topography, climate, hydrology and hydrogeology can, to a greater or lesser extent, be overcome by judicious use of relevant technologies – at a price. Despite the difficulties, these are the relatively easy aspects of the problem.

The challenges posed by various human factors are less easily addressed, but equally important. Here I divide those human factors into three categories: demographic, social and institutional.

The demographic dimension of the problem may be manifested in very low or very high densities of population. Low densities, as in some parts of sub-Saharan Africa, make water supply provision difficult to achieve in a cost-effective manner – although one of the benefits of low population density is the lower risk of faecal contamination of the environment due to poor sanitation. High population densities, experienced in many south Asian slums, pose huge difficulties for sanitation, and even piped supplies of water may need to be routed over ground rather than buried. Where people live over water, the problems are exacerbated further.

Other demographic challenges relate to the fact that people and communities do not often fall neatly into the two categories of (sedentary) rural and urban dwellers. In dry environments, pastoral communities still move location according to season and pasture availability.

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In places where rural livelihoods are hard-won – and this is increasingly the case – men often migrate for seasonal or longer-term work in mines, cities or agri-businesses.

Seasonal migration, political insecurity and HIV/AIDS contribute to the significant numbers of child-headed and female-headed households in some locations – again posing challenges, particularly to the long-term sustainability of water supply and sanitation services.

Further challenges to the provision of water and sanitation services are created by extreme poverty and social exclusion. The inability or unwillingness of poor households to pay the running costs of services are seen in their extreme form among the poorest and most marginalized. The elderly, disabled, widowed and those suffering from HIV/AIDS, as well as those who are marginalized by social status, tribe or caste, present particular difficulties because of their limited ability to take part in decision-making processes, and their inability to pay for services. And yet the needs of such people are the greatest, and the duties of service providers are correspondingly great.

The final aspect of the 'operating environment' which I highlight is the political and institutional arena. In practical terms, if there is insecurity or conflict, or if political commitment to the provision of services is poor; if the capacities of the bodies responsible for providing services are compromised; if policies are not conducive to effective service provision; and if financial and human resources are inadequate; then major challenges exist.

The 'environment' in which we attempt to provide adequate and sustainable water and sanitation services is seen to be much wider than simply the natural environment. The built environment and the human environment with its many complex aspects are equally important.

In this issue of *Waterlines* we do not attempt to cover the full scope of the challenging physical and human environments described above. We merely open the discussion about some of the difficult natural and built environments in which practitioners are trying to deliver water and sanitation services. In papers on rainwater harvesting in dry and coastal locations, sanitation in marginal areas, and water and sanitation in flood-prone areas, we examine some of the technical solutions to the provision of water and sanitation in challenging environments. To deal with practical solutions to the wide range of human factors, too, would require several more issues of this journal. We invite you to contribute further practically oriented papers on this wider scope of the subject in future.

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