

Editorial: **Water supply and sanitation: some misconceptions**

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The Third World Water Forum takes place in Kyoto, Japan, this month. It will be the first major meeting of the sector since the Johannesburg Summit on Sustainable Development, which endorsed the Millennium Development Goal of halving the number of people without access to improved water supply (estimated at 1.1 billion in 2000) and adopted the further goal of halving the 2.4 billion without sanitation. It is to be hoped that the Kyoto meeting will lay to rest three important and harmful misconceptions which have beset the water supply and sanitation sector in recent years. The first two of these are helpfully debunked in a book prepared for the Kyoto meeting (Satterthwaite & McGranahan 2003).

Misconception number one is the perception that water supply is largely constrained by water resource limitations. A number of authors have dwelt on the imbalance between available supplies of fresh water and the population's growing requirements. It has been estimated that by 2025 the share of the world's population living in regions subject to water stress will reach 35% (Hinrichsen *et al.* 1998). Some have described the issue in more dramatic terms:

'Water-related problems in [the] cities are already enormous, and further degradation is expected. Water shortage is a growing problem and delivery of safe drinking water cannot be assured ...' (Niemczynowicz 1996).

The undercurrent of this discourse is neo-Malthusian, as shown most explicitly in the definition of the Falkenmark indicator, named for the eminent Swedish hydrologist Malin Falkenmark (Falkenmark *et al.* 1989). Defined as the volume of renewable water resources per capita, it is the ratio of an effectively unalterable measure of a natural resource endowment and the size of a country's population. Advocacy about the need to limit the number of water-stressed countries is thus a veiled form of panic about population growth.

Falkenmark's indicator, like most of the discussion of the looming water crisis, takes account only of abstractable water (i.e. flows in rivers), and thus neglects the huge importance of rain-fed agriculture in the overall picture of human water requirements in arid and semiarid areas. It also looks at measured flows rather than stocks, so that a country like Malawi, with a vast freshwater lake along one

side, is counted as water-stressed. A further complication is that water is not so much 'used up' as diverted, transformed or polluted, and can be re-used (Mara & Cairncross 1989). Moreover, by trading products (particularly grain) whose production requires large quantities of water, water-stressed countries can overcome their limited resource endowments and meet their populations' needs (Bouwer 2000).

Some of the discussion of the impending water crisis is phrased as if domestic water consumption were a contributory factor. What is not so clear to all is that domestic water consumption represents only 2% of the global total (Shiklomanov 2000), as it is dwarfed by the far greater quantities required for agriculture. A flow of 1 l/s is enough to meet the domestic water requirements of roughly a thousand people, but to irrigate only one hectare of land and feed no more than a couple of families.

A causal link in the other direction – that water resource availability is constraining access to domestic water supplies – is perceived even by many who understand that domestic water supply is not a major drain on resources. Certainly there are hundreds of cities in relatively arid areas of the world where water demand is growing rapidly, and which have grown beyond the point where adequate freshwater supplies can be tapped from local or even regional sources. However, statistical analysis of data from over 100 countries shows that, after controlling for confounding by per capita income, the average proportion of the urban population of the water-stressed countries with access to improved water supplies is no less than that of other countries (McGranahan 2002). Clearly, other factors are at work, not the least of which is the extent and efficacy of investment in extending service to those who are not served, which depends to a great extent on the quality of national and local governance.

Thus, the idea that global and local water shortages are to blame for the fact that over a billion people lack water supplies turns out to be a myth. The second harmful misconception is that poor coverage and levels of service are the result of inefficient public sector management of water utilities, and could be solved by greater involvement of the private sector and the private capital this would attract. There are two main problems with this perception, which have become increasingly evident during the last

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decade as privatization has been urged upon the governments of developing countries in recent years, particularly by the World Bank.

First, in those countries where the need for improving water provision is greatest, national and local governments typically have far less experience in negotiating contracts and addressing regulatory issues than the companies they must negotiate with. Given this imbalance, it is far more difficult than it might otherwise be to establish and operate the effective regulatory systems which are essential if a natural monopoly such as water supply and sewerage is to be the prerogative of a private, usually multinational provider (Johnstone & Wood 2001). Without this, there is little incentive for the private provider to extend coverage to the low-income population who are currently unserved.

Secondly, the prospect of large amounts of private sector capital flowing into the water and sanitation utilities of developing countries upon their privatization has turned out to be largely a mirage. Most of the investment in the water and sanitation services of developing countries, even in the cities where privatization has been concentrated, continues to come from international agencies and the public sector, with comparatively little from private companies (Gutierrez 2001). Indeed, development loans from the World Bank and regional banks have often been made conditional on private sector involvement. The World Bank proclaims the substantial amounts of investment which have accompanied the involvement of the private water companies (Silva *et al.* 1998), particularly the big four which control more than 80% of the privatized market. It does not distinguish, however, between public and private sources of this investment, and apparently has proved unable to do so despite requests from interested researchers. This is regrettable.

There is an irony in the enthusiasm of international agency officials, mainly natives of Europe and North America, for private enterprise and market mechanisms as means to improve the service of urban water supplies. They are forgetful of the experience of their own countries, where market failures led those advocating sanitary reform to call for public intervention to improve conditions. In nineteenth century London, it was private water companies which failed for decades to meet their legal obligation to provide a constant water supply; and in the USA still today, more than half the water utilities are publicly operated.

The recent experience of South Africa, where more than 10 million people have been supplied with water since 1994 and it is aimed to provide water for all by 2008, is instructive. The South African Government has accepted that while many are willing to pay for water supplies, the

poor cannot. Public finance has therefore been employed to end the apartheid in water services.

The third misconception is an old one which seemed for a time to have been laid to rest, but has recently been revived. This is that most life-threatening diarrhoeal disease is waterborne, so that improving water quality is the most important contribution of improved water supply to public health. Ever since the sanitary reforms of nineteenth century England, water supply has been acknowledged as an essential component of public health, because of its impact on diarrhoeal diseases. Two other facts are less widely known:

- The impact at that time was largely on epidemics, particularly of cholera, and resulted largely from water quality improvements.
- However, the impact on the overall incidence of (and mortality from) endemic diarrhoeal disease was marginal.

In fact, child mortality rates in urban England throughout the nineteenth century were higher than in most developing countries today (Woods & Woodward 1984). The pattern of diarrhoeal disease and death changed between the first and second World Wars, when increased access to in-house water supply and excreta disposal resulted in improved domestic hygiene.

More recently, a number of studies from low-income countries have pointed to the importance of ready access to water, and resulting increases in the quantity used for hygiene, rather than water quality improvements, in determining the health benefit. Several studies in the last few decades failed to find any health benefit when water quality alone was improved (Levine *et al.* 1976; Feachem *et al.* 1978; Kirchoff *et al.* 1982; Lindskog 1986; Baltazar *et al.* 1988; Young & Briscoe 1988), while a large proportion of the classical studies which detected significant health benefits compared groups using in-house piped water with others using public taps or wells (Wagner & Lanoix 1959). The negative studies usually surprised their authors, but the results were quite comprehensible when it came to be understood that most endemic diarrhoeal disease is not waterborne, but transmitted from person to person on hands, food and other fomites because of poor hygiene practices. Valerie Curtis and I recently completed a systematic review of the impact on diarrhoea of a single hygiene practice – washing one's hands with soap – and found it to be associated with a reduction in morbidity of 43%. This is far greater than those associated with typical water supply improvements for low-income groups (Prüss *et al.* 2002).

The old misconception of waterborne transmission seems to have been revived by the emphasis placed in the

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latest World Health Report (WHO 2002) on the apparent cost-effectiveness of disinfecting drinking water in the home as a diarrhoea prevention method. This follows a number of community trials conducted in various developing countries by a group from the Centers for Disease Control in Atlanta, involving the social marketing of chlorine and closed water storage vessels. The apparent contradiction is explained by the fact that the studies on which it is based all involved a component of 'hygiene education' (WHO 2002, p. 127). The evidence mentioned above would suggest that the impact on diarrhoea was mainly caused by this hygiene promotion, rather than water disinfection.

Hopefully the Kyoto forum will follow the Johannesburg summit in underlining the importance of hygiene and sanitation. An understanding of their importance, however, is not the same as a strategy to deliver them. The conventional approaches, of lecturing people about hygiene, compelling them to install sanitation, or even providing them with subsidized sanitation which they do not want and will not use, have proved unsuccessful. Painful experience has taught us that people will not practise hygiene or install and use sanitation facilities unless they want to do so. A marketing approach, building on what people already want and generating and responding to demand, is required (Cairncross 1992; Curtis 2002). But the public sector in general, and local government in particular, is notoriously short on marketing skill and capacity. Here is a far more appropriate role for partnership with the private sector.

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