

Enough is not enough

It must also be clean

IF WATER has the capacity to enhance life, its absence has the capacity to make it miserable. David Gray, a water practitioner who has served the World Bank in almost every river basin on the globe and is now a professor at Oxford, has a technique that makes the point. Every day he receives e-mails with water stories from newspapers round the world. By briefly displaying to an audience just one day's crop—including, say, drought in Australia, floods in Kenya, an empty dam in Pakistan, a toxic spill in the Yellow river and saltwater contamination in Haiti—he can soon show how water may dominate if not destroy lives, especially in poor countries.

Some of its most pernicious influences, though, never make the headlines. This is how they might read: "Over 1.2 billion people have to defecate in the open." "The biggest single cause of child deaths is diarrhoea or diseases related to it." "Nearly 1 billion people have no access to piped drinking water or safe taps or wells." Each of these statements is linked to water.

Surprisingly, some of those who have to defecate in the open do not mind. Some rural men, and even women, quite enjoy a social squat in the bushes. But for many, and certainly for those who must live with its consequences, it is a disagreeable practice. Women and, especially, girls often find it embarrassing. Many women in South Asia contain themselves by day and wait till nightfall before venturing into the shadows. Girls at African schools without latrines often drop out rather than risk the jeers of their male contemporaries. Slum-dwellers in Nairobi have to pick their way through streams of sewage and take care to avoid "flying toilets", plastic bags filled with excrement that are flung with desperate abandon into the night.

Without piped water to wash their hands with, let alone to drink, the open-air defecators and another 800m people with access only to primitive latrines are inevitably carriers of disease. If they could wash their hands with soap and water, they could block one of the main transmission routes for the spread of both diarrhoeal diseases and respiratory infections. As it is, patients with water-related diseases fill half the hospital beds in the poor-

est countries, and dirty water and poor sanitation kill 5,000 children a day.

Clean water is crucial for children with diarrhoea; they need rehydration and electrolytes to survive. Even then, they may still be at risk of malnutrition if they continue to suffer from diarrhoea, which will prevent them from absorbing their food properly. This usually has long-term consequences. Malnutrition in the womb and during the first two years of life is now seen as causing irreversible changes that lead to lifelong poor health.

Poor health, bad in itself, translates into poor economic output. A study in Guatemala followed the lives of children in four villages from their earliest years to ages between 25 and 42. In two villages the children were given a nutritious supplement for their first seven years, and in the other pair a less nutritious one. The boys who had had the more nutritious diet in their first two years were found to have larger bodies, a greater capacity for physical work, more schooling and better cognitive skills. They also grew up to earn average wages 46% higher than the other groups.

The cost to health and wealth

Studies in Ghana and Pakistan suggest that the long-term impact of malnutrition associated with diarrhoeal infections costs each country 4-5% of GDP. This can be added to a similar burden for "environmental risk", which includes malaria and poor access to water and sanitation, both water-related, as well as indoor air pollution. All in all, the World Health Organisation thinks that half the consequences of malnutrition are caused by inadequate water, sanitation and hygiene. In Ghana and Pakistan the total cost of these shortcomings may amount to 9% of GDP, and these two countries are not unique.

The problem is not strictly a matter of water scarcity. Indeed, expanding the availability of water may actually increase disease, since it may lead to stagnant pools in which mosquitoes breed, and then spread malaria or dengue fever; or perhaps excess water will run through human or toxic waste and thus contaminate the ground or a nearby stream. So hygiene and protected storage are essential.

Yet there is a shortage of safe water for drinking and sanitation in many places, not least in the cities to which so many people are now flocking. Africa is urbanising faster than any other continent, and most migrants to the towns there find themselves living in slums. In cities like Addis Ababa and Lagos a quarter to a half of the population have no access to decent sanitation, and not many more will have access to piped water. No Indian city has a 24-hour domestic water supply, though efforts are under way to provide it in Mysore and a few other places.

Delhi's story is typical. Demand for water there has been rising for years. The local utility cannot meet it. The city's pipes and other equipment have been so poorly maintained that 40% of the supply fails to reach the customers. So the utility rations it by providing water for a limited number of hours a day and, in some places, by restricting the quantity. Householders and landlords build tanks, if they can, and fill them when the water is available. Residents, or their weary employees, set their alarm clocks to turn on the tap before the flow dribbles away to nothing. Property developers, anxious to take advantage of a booming economy and a growing middle class, drill boreholes, but these now have to go deeper and deeper to reach water.

As for the Yamuna river, long the main source of the city's drinking water, it is clinically dead. Quantities of sewage are poured into it daily, 95% of which is untreated, and it is also a depository for industrial effluents, chemicals from farm runoffs and arsenic and fluoride contamination. The city's master plan proposes three new dams, but they will not be finished for several years.

Many other cities have problems like Delhi's, though mostly in less extreme forms. Nearly two-fifths of the United States' 25,000 sewer systems illegally discharged raw sewage or other nasty stuff into rivers or lakes in 2007-09, and over 40% of the country's waters are considered dangerously polluted. Contaminated water lays low almost 20m Americans a year.

Pollution, however, is not the reason that people in rich countries have taken to drinking bottled water. In the developing ►►

▶ world they do it because that is often the only water fit to drink, and for the poor it is usually a significant expense. Not only are their incomes small, but they often pay a lot more for drinking water than do their richer compatriots. A litre of bottled water in India costs about 15 rupees (35 cents).

Bottled water often comes from the same source as tap water, where that is available (sometimes at a hundredth of the price), though it should at least be clean. It is often indistinguishable from tap water. In rich countries, it may have come from exotic sources like Fiji or Lapland, packed in glass or plastic destined to become rubbish, devouring energy on its travels and thus making it one of the least green and least defensible rip-offs on the market.

A concerted international effort is now under way to improve sanitation and the supply of drinking water. One of the development goals set by the United Nations at the millennium was to halve the proportion of people without basic sanitation and a decent source of fresh water by 2015. Progress is slow, especially for sanitation, and particularly in Africa, and increasingly policymakers are finding that heavily subsidised projects are failing.

Sexy loos

Outfits like the World Toilet Organisation, based in Singapore, now believe you have to make lavatories “as sexy as mobile phones” if you are to get people to accept them, and that means literally selling them. Once people have invested some of their own money in a loo, they will use it. The World Bank confirms that the most successful sanitation projects involve only a small subsidy.

Where building a fixed latrine is not possible—slum-dwellers seldom own the



Not the place for a chat, though

land they live on, or have much incentive to improve a site to which they have no legal rights—entrepreneurs may help out. The Peepoo is a personal, single-use bag that the Swedish founder of the company, Anders Wilhelmsen, describes as the hygienic version of Nairobi’s flying toilet, intended, to begin with, for the same Kenyan users. Sealed by knotting, it acts as a micro treatment plant to break down the excreta. Since the bag is made of degradable bioplastic, when it has served its primary purpose it can be sold with its contents as fertiliser. Indeed, the hope is that a market will develop in which the same people will trade in the bags before and after use. Each will sell for 5-7 cents, about the same as a conventional plastic bag, and though a subsidy will be needed at first, the operation is meant to become self-sustaining, and indeed profitable.

Private enterprise also has a role in the provision of safe drinking water. A large market in home water-purifiers now exists all over the world. But a typical one, using reverse osmosis, may cost at least \$170 in a

country like India. Kevin McGovern, a self-described pro bono capitalist from New York, wants to bring cheaper purifiers to the poor. His company, the Water Initiative, has developed a filtering device that takes all the nasties out of water in the home and needs to be replaced only once a year. Unlike osmosis, it consumes no energy, and every drop of incoming water can be used for drinking.

The first country Mr McGovern has in his sights is Mexico, the second-biggest consumer of bottled water in the world because of the high incidence of arsenic, fluoride and pathogens in the water. Mr McGovern hopes to put in place a distribution system with a commercial interest in providing the machines and selling the filters. Volunteers and NGOs, he says, tend to set things up and then move on; a local commercial incentive is needed to sustain the operation, even if subsidies are required to get it started. Fortunately, two Mexican organisations have already promised grants, and the project is backed by the country’s popular first lady, Margarita Zavala. ■

Business begins to stir

But many water providers still have a long way to go

ALTHOUGH water is a universal human requirement, the use people make of it varies hugely. The average Malian draws 4 cubic metres a year for domestic use, the average American 215. Include all uses, and the figures range from 20 cubic metres for the average Ugandan to over 5,000 for his Turkmenistani counterpart. The statistics can be misleading: in places where rain falls copiously and evenly from

the skies, withdrawals will be small. Moreover, water-blessed countries have much less reason to be careful with their resources than the water-starved. Yet high use of water is not necessarily bad. It depends how it is employed, and whether it is naturally replaced.

However essential, farming is not the most lucrative use of water. Industry generates about 70 times as much value from a

litre of water as agriculture, which helps to explain why industry takes the lion’s share in most rich countries. Yet the ratio of water use to GDP has declined dramatically in many rich and middle-income countries in recent decades, which suggests that industry can use water much more productively if it tries.

Unilever, a seller of soaps to soups in 170 countries, boasts that its Medusa pro- ▶▶