

Disease and the environment

More than 13 million deaths annually – amounting to nearly one-third of death and disease in the least developed regions – are due to environmental causes. The World Health Organization (WHO) has published *Preventing Disease Through Healthy Environments – towards an estimate of the environmental burden of disease*, which is the most comprehensive and systematic study yet undertaken on how preventable environmental hazards contribute to a wide range of diseases and injuries. By focusing on the environmental causes of disease, and how various diseases are influenced by environmental factors, the analysis breaks new ground in understanding the interactions between environment and health.

Waterlines readers would be unsurprised to learn that diarrhoea attributable to environmental causes accounts for the greatest health burden. In fact, over 40 per cent of deaths from malaria and an estimated 94 per cent of deaths from diarrhoeal diseases, two of the world's biggest childhood killers, could be prevented through better environmental management.

Preventing Disease through Healthy Environments can be downloaded from http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

Can India be free from open defecation by 2012?

South Asia has sanitation coverage of just 37 per cent. In the focus countries within the region – Bangladesh, India, and Pakistan – millions of people are still without access to safe water or adequate sanitation, and rapid population growth only contributes to the problem.

In the 1980s, the Indian Government initiated the Central Rural Sanitation Programme (CRSP) to encourage the development of safe sanitation in village communities. It promoted one design – the twin-pits, pour-flush latrine with a brick superstructure,

which costs Rs2,500. The programme became untenable, however, because the government gave a subsidy of Rs2,000 (US\$43) for every latrine, making the project unaffordable on a large scale. The project was restructured, but it did raise the coverage of sanitation facility to 11 per cent in the 1990s from almost zero in the 1980s. But a recent government study¹ shows that hardly 3 per cent of the latrines built by the project were used; most were converted into storerooms while others were damaged because of poor construction.

At the same time, in 1996, WaterAid India started its sanitation programme in 1,750 villages in Tamil Nadu. The main features of the programme were varying options for the construction of latrines, and raising people's awareness and participation in constructing and maintaining latrines. By 2000, all the villages where the programme was implemented were moving towards full coverage and a few had achieved 100 per cent sanitation coverage, sustained primarily by collaboration between local government and people.

WaterAid, along with other players such as the ISP programme initiated in Mednipore in West Bengal by UNICEF, Ramakrishna Mission and Indian Institute of Mass Communication (IIMC), contributed to restructuring CRSP and launching the Total Sanitation Campaign (TSC), which was demand driven and more participatory. A strong educational component for changing behaviour for the effective use of the sanitation facilities was added. It moved from high subsidy to low subsidy and a range of technology options for sanitation were offered. The field experiences proved that hygiene education and motivation can generate demand for sanitation. The district model, as initiated in Cuddalore District by the Soozhal Network of NGOs working with the district authorities, has demonstrated that, with adequate credit facilities and engagement with community-based organizations (CBOs), sanitation can be a people-led movement.

After the launch of TSC in 1999, there has been substantial increase in

the rural sanitation coverage from 22 per cent in 2001 to about 38 per cent in March 2006.² TSC is currently operational in 559 districts out of 604 districts in the country and adequate focus on software components like communication and capacity development have contributed to its success.

The Government of India is committed to making India open-defecation free by 2012. The National Common Minimum Programme, adopted by the present Government of India, has also given highest priority to providing water and sanitation to all, especially in rural areas. The President of India has distributed prizes to villages that have remained open-defecation free for two consecutive years, and this has fuelled the campaign.

Efforts are currently being made to achieve the Millennium Development Goal by halving the number of people without access to sanitation by the end of 2010 and making India open-defecation free by 2012. For this, the budgetary support has been increased for rural sanitation considerably from Rs950 million (in 1999) to Rs8000 million (\$170 million) in 2006. Since there are large numbers of households to be reached, disbursement of the subsidy is still a challenge. In some areas, efforts need to be made to move out from individual to group subsidy and to target village level institutions such as self-help groups, village water and sanitation committees and *gram panchayats*. Administrative structures must be prepared to scale up these efforts; in addition, the sanitation programme must have linkages with the education sector, health sector, women and child sector and the tribal development sector. This could turn the dream of open defecation-free rural India into a reality by 2012.

References

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Pollution-source tracking

When sources of drinking water are grossly polluted by faecal matter, the potential risk to human health is obvious. In many cases the source of this pollution is well recognized locally. This prior knowledge supplemented by a more thorough survey will often highlight the potential impact of grazing cattle or pit latrines that have been constructed too close to a water source. However, in other cases, the source of the pollution is not so easily identified.

Since the 1970s, considerable investment has been made into developing ways to distinguish sources of faecal water pollution in order to facilitate more effective remediation. For example, the problem of municipal sewage overflows to bathing beaches requires a different approach to that needed for dealing with agricultural runoff.

In many less-developed countries, water-borne diseases clearly constitute a significantly greater human health burden than in the 'industrialized world'. The clear link between poor sanitation and contaminated sources of drinking water is well documented. Where the cause of contamination is not clear, current source-tracking techniques have been found to be beyond the reach of local laboratory facilities.

Researchers at the University of Brighton (UK) have recently been trying to adapt novel source tracking techniques so that the running costs and equipment requirements are more compatible with the facilities and expertise available beyond the specialist research laboratories in which they were developed.

The group is working in close collaboration with the University of Barcelona (Spain) to identify viruses that attack a group of common gut bacteria (*Bacteroides* spp.). These bacteria are found in the faeces of all warm-blooded mammals and although they die off quickly in the environment, the viruses that infect them survive for longer and at higher numbers. These viruses (bacteriophages) can be detected by isolating suitable bacteroides host strains that are specific to human or animal sources.

This approach does not require the facilities and expertise associated with molecular techniques and should allow faecal source tracking to be used in those parts of the world where water-borne disease is an obvious cause of human suffering and a barrier to economic development.

The researchers are seeking collaborators to test out their approach in the developing world. *To discuss potential applications of this work, please contact Dr Huw Taylor (h.d.taylor@brighton.ac.uk) or Dr James Ebdon (je3@brighton.ac.uk).*

Household water treatment

Treating water at home is more effective in reducing diarrhoea in poor countries than interventions at wells, and much less expensive than piped water, says a review by The Cochrane Collaboration.¹

Authors, led by Thomas Clasen of the London School of Hygiene and Tropical Medicine, reviewed 30 field trials involving more than 53,000 people to compare the effectiveness of different water treatments. These treatments included conventional improvements at the water source (e.g. protected wells, boreholes, and standposts) and point-of-use interventions at the household level (e.g. chlorination, filtration, solar disinfection, and combined flocculation and disinfection). In general, such interventions were effective in reducing episodes of diarrhoea. Household interventions were more effective in preventing diarrhoea than those at the source.

However, differences in the interventions and the settings in which they were introduced, as well as the methods and measurements of effect, limit the extent to which generalizations can be made. Further research, including blinded trials and longer-term assessments, is necessary to understand the full impact of these interventions.

Reference

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South-South co-operation in the water sector

Co-operation between developing countries is growing, as evidenced by the UNDP's Special Unit for South-South Cooperation (<http://tcdc.undp.org/>). In addition, ActionAid claims that western technical assistance is often too expensive or ineffective.¹ Instead, countries such as China, Thailand, India and Brazil are increasingly active in south-south development co-operation.²

Here are several recent examples of south-south co-operation in the water sector:

- Iran and Afghanistan have signed a memorandum of understanding (MoU) on co-operation in water and energy sectors.³
- Morocco and Mexico have signed an agreement on the exchange of technology in various areas of water planning and administration.⁴
- India is planning a major research collaboration with Mexico to study ways to tackle water issues in both urban and semi-urban areas, comparing water scenarios in Mexico City and New Delhi.⁵
- In reply to requests from Ministers of water from Ethiopia, Congo and Lesotho, Egypt said it was ready to provide its water expertise to African states.⁶

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