

DECADE WATCH

21

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FALSE COMPARISONS, FALSE CHOICES

by John Briscoe

Today, much is being said about the impact on child survival of improved biomedical technologies such as oral rehydration therapy (ORT) and immunization. Clearly, these are powerful new tools for combatting childhood diseases, and should be vigorously and widely put to use.

But they are not enough by themselves, as some seem to suggest. To achieve sustained, long-term gains in child (and adult) health, it is also essential to ensure access to potable drinking water and adequate sanitation, and the proper functioning and use of these systems. Investments in water supply and sanitation facilities are not made for health reasons alone: there are usually compelling economic and social benefits too. Nevertheless, information on the relationship between levels and types of investments and health impacts is also often required to justify major expenditures in today's world of government austerity.

Effects on diarrhoea

Some advocates of the "Child Survival Revolution" argue that improved drinking water supply and sanitation have little impact on diarrhoeal diseases and are not "cost-effective" means of reducing infant sickness and death when compared to biomedical interventions.

However, a recent authoritative review by the World Health Organization has demonstrated that there is considerable impact (see table). It shows that improvement in water quality, or water quantity, or excreta disposal facilities typically reduce sickness among young children due to diarrhoeal diseases by about 20 per cent. If both water quality and quantity are simultaneously improved, such sicknesses are typically reduced nearly 40 per cent. Diarrhoea-related deaths appear to be reduced even more steeply than morbidity.

Indeed, as a result of this review, the Technical Advisory Group of the WHO Diarrhoeal Diseases Control Programme now recommends that water supply and sanitation improvements be an integral component of national diarrhoeal disease control programmes.

The impact of various health-related interventions can be easily misinterpreted. Unfortunately, this can result in setting up a false dichotomy between elements of "Selective Primary Health Care" such as ORT and immunization, and longer-term improvements in basic drinking water and sanitation services.

It can be argued, however, that, rather than being pitted against each other competitively, biomedical and environmental interventions should be viewed as complementary and mutually reinforcing.

ORT and immunization programmes are designed to rapidly reduce sickness and death related to specific diseases of children; water supply and sanitation improvements affect a large number of health problems in many age

groups over a longer period of time. It is obviously inappropriate to compare a programme whose sole purpose is to avert infant deaths in the near term, with one having multiple impacts over the long-term.

Multiple Causes; Multiple Responses

In comparing the effects on health of different interventions, several factors have to be taken into account. First, it is necessary to appreciate that the death of a child in a developing country is seldom the result of a simple disease episode but rather the culmination of a series of assaults of which the official "cause of death" is no more than the last straw. ORT and some vaccinations may reduce infant deaths caused by a particular agent or group of agents, only to leave the child vulnerable to other dangerous diseases. By contrast, there is evidence suggesting that other vaccinations (particularly measles) and drinking water and sanitation improvements enhance the capacity of both children and adults to withstand attacks from a variety of life-threatening diseases over the long term.

Second, in many parts of the developing world, there are several routes for transmitting faecal-oral pathogens—water being the primary one. Other routes include person-to-person contact and contaminated food. Thus, elimination of the water route alone may have little direct impact on disease. Only after similar improvements are made in personal and food hygiene will the full benefits of safe water supply be realized. In other words, under conditions prevailing in many poorer developing countries, improving water supply and sanitation is a necessary but usually not sufficient condition for immediate health improvements.

Third, as suggested above, it is inappropriate to measure the impacts of water supply and sanitation improvements purely in medical terms. Successful projects throughout the developing world demonstrate that water and sanitation initiatives provide strong opportunities for community participation in the development process, enhanced roles for women, and savings in human energy which can be put to more productive or life-bettering uses.

Comparisons between ORT and immunization and water supply/sanitation *can* be made, so long as this comparison is complete. The correct conclusion to be drawn by planners would appear to be not an "either/or" but rather a combination of biomedical, behavioural and environmental interventions.

In order to fulfill the promise of "Health for All by the Year 2000", renewed efforts must be made to demonstrate the comple-

mentarity of water supply and sanitation improvements with other types of health interventions and to give them equal technical and financial support.

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IMPACT OF SAFE WATER AND SANITATION ON DIARRHOEAL MORBIDITY*

Improvements in	Median % reduction
water quality	18
water quantity	25
quality and quantity	37
excreta disposal	22

Source: Eney, Feachem and Hughes (1982). "Interventions for the control of diarrhoeal diseases among young children: improving water supplies and excreta disposal facilities." Bull WHO, 63(4), 757-772.

U.S. GUARDS AGAINST TOXICS

A 1983 nationwide survey conducted by the U. S. Environmental Protection Agency (EPA) found that trace levels of toxic synthetic chemicals were present in nearly 30 per cent of the municipal water supplies serving more than 10,000 people. Public health experts have expressed particular concern that groundwater, the drinking water source for about half the U.S. population, has become seriously contaminated by leaking chemical wastes and other substances.

The tougher regulations will affect more than 60,000 municipal and investor-owned utilities that supply public water. Greater use will be made of the granular-activated carbon procedure of water treatment, which has the capacity to remove many potentially harmful chemicals from water.

ZAMBIANS EXPAND INVESTMENTS

Between US\$154 million and US\$343 million is needed to provide clean water and adequate sanitation throughout Zambia in the next five to fifteen years according to a plan formulated by the National Action Committee on Water. The recommendations are expected to be incorporated into Zambia's Fourth National Development Plan. Planned outlays for the sector totalled about \$59 million from both domestic and external sources during the third national plan (1979-83).

Dr. Inyambo Nyumbu, Secretary of the Committee and a UNDP water advisor with the Ministry of Agriculture and Water, says that implementation of these programmes will require some 180 professionals including engineers, chemists and biochemists, and some 2,100 skilled operators including plumbers, fitters and welders to be employed by the National Water Authority.

By mid-1985, the Government estimated that about 70 per cent of the population in large urban areas had reasonable access to safe drinking water, while some 45 per cent had individual flush latrines and 7 per cent used communal ones. A majority of people in rural areas still resort to sources of water susceptible to contamination and pollution. The Choma district has recently been plagued by a critical shortage of water forcing villagers to travel unusually long distances to draw water.

INDIA: GRAPPLING WITH URBANIZATION

There is a pattern to the slums of Bombay," according to a recent report for the International Development Research Centre in Canada. "The flimsy shacks of the one million homeless poor in this huge Indian city...always hug the water mains. Small holes, illegally and discreetly drilled into the mains, and tiny pipes hidden in the dust and rubble provide precious trickles of drinking water. Taking potable water from an illicit source in a city where the daytime temperature can rise above 40 degrees Celsius, is not a crime—it is staying alive."

To begin coping with such problems in India's cities, the National Institute of Urban Affairs (NIUA) has been charged with assessing the financial structures of local government bodies and planning a national urbanization policy. One completed study reveals that it would take upwards of \$200 million simply to upgrade sewerage treatment facilities in the 216 cities with more than 100,000 inhabitants. The new national urbanization policy is to redirect growth away from the huge centres such as Delhi and Bombay. Instead, small and medium-size towns would become "catalysts of development", and 225 have already been identified. These towns will be made more attractive by significantly improv-

ing their services infrastructure to make them preferable to a congested, polluted and underserved megapolis.

NEPAL: WATER FOR VILLAGES

His Majesty King Birendra recently inaugurated two 16.5-million rupees (US\$1 = 20.80 rupees) drinking water supply schemes in Chitwan and Bara Districts. This is in line with Nepal's goal of providing safe water to 43.3 per cent of its rural population by 1990.

Chitwan

a 12.3-million rupees system—one of the largest in the country—will provide 2.2 million litres of water per day for the inhabitants of Pithuwa, Jutpani and Ratnanagan Village Panchayats.

Bara

a 6.2-million rupees scheme has a capacity to supply 183,000 litres of water per day for people in Nijgadh Panchayat.

Construction of water schemes is complemented by the work of the national NGO consortium, the Social Service National Co-ordination Council (SSNCC), which, through its Decade and Training Cells, trains and deploys volunteers and field workers. These, in turn, provide information and health education to the community people, including women, to ensure acceptability, proper use and maintenance of systems.

The SSNCC receives assistance from UNDP, UNICEF, PACT (USA) and Water Aid (UK).

MID-TERM REVIEW

Some 300 engineers, scholars, communicators and business people from approximately 30 countries met in Calcutta, India, 6-9 January 1986. Purpose: review the water and sanitation Decade programme at mid-point and recommend measures for accelerated progress in the next several years.

The conference noted achievements made to date but pointed out that the remaining tasks are far greater. Unfortunately, many countries have had to scale down their targets. For example, India now aims to provide safe water to 85 per cent and waste disposal facilities to 5 per cent of its rural population, instead of the original 100 and 25 per cent, respectively.

Limited financial and human resources, the many competing demands in other development sectors, and natural disasters like droughts, floods and cyclones were cited as major constraints in the attainment of countries' Decade goals. To overcome such constraints and improve and increase coverage, the following measures were recommended:

- evolve and adopt simple, inexpensive appropriate technology;
- involve community end-users — especially women — in all aspects of water/sanitation development for optimal self-help;
- devise innovative resource mobilization approaches to supplement funds from regular budgetary sources;
- expand hygiene education to ensure maximum health impact;
- establish reliable systems for proper use and maintenance of schemes; and,
- facilitate exchanges of experience to stimulate replication of successful methods.

The conference was co-sponsored by the Institute of Public Health Engineers, India; the British High Commission, the British Council Division, Calcutta; and the UK-based Water Engineering for Developing Countries (WEDC).

For information, contact Prof. John Pickford, WEDC, University of Technology, Loughborough, Leics, LE11 3TU, United Kingdom.

Ideas & Actions

"POUSSE POUSSE"

Since proclaiming 1984 the National Year of Village Hydraulics, Burkina Faso has been accelerating efforts to provide its people with clean water. Given the great number of new installations required, however, all villages are unlikely to be reached for several years.

New technologies being introduced, however, promise immediate relief for two problems associated with existing water supply — pollution of traditional wells and women's burden of water portage.

Assisted by UNDP, Burkina's Ministry of Water is testing a simple means of improving water quality in traditional wells, which are frequently polluted by dead leaves, sticks, insects and other debris. The new method of protection first entails slightly widening and deepening the well after a good cleaning. Next, gravel is poured in, and a polyvinyl chloride pipe—in the bottom portion of which several slits have been made—is wedged into place vertically. Together, the gravel and pipe create a double water filter. As a final step, the rim of the well is covered with cement, to limit further fall-in. The entire procedure is well within local capabilities.

Carrying water can consume up to six hours of the day of a Burkinabé woman. But now, this time can be considerably reduced by pushing a "pousse-pousse"—a kind of wheelbarrow for water. The "pousse-pousse" has one wheel, two handles, and four or six



metal rings built to hold water jugs. Some 400 of these carriers are being provided for testing in villages throughout the country so that the impact on the situation of village women can be evaluated. They are built by APICOMA, the Pilot Workshop for Construction of Agricultural Equipment in Ouagadougou, with financing from the United Nations Development Fund for Women.

Initial observations are that:

- women unanimously recognize the "pousse-pousse" is easy to use and saves them energy as well as time;
- use of the technology enables boys as well as girls to help with water portage (tradition precludes boys from carrying water on their heads);
- villagers share the carriers, and themselves ensure they are maintained and their number is increased;
- from one to five devices can serve all users at a water point, depending on distances, number of people served, etc.

The cost of an APICOMA-made "pousse-pousse" is from \$35 to \$45, depending on the type of wheel used. Compared with the cost of a well (\$7,175) and a handpump (\$715) this is negligible. Even so, for a small, impoverished village, this sum could be prohibitive. Including the financing of "pousse-pousse" in village hydraulic programmes, along with wells and pumps, would therefore be desirable.

TRAINING NETWORK

Extending drinking water and sanitation services to the unserved millions in rural and peri-urban areas requires adoption of low-cost and socially-acceptable technology. If progress remains slow, this is partly because decision-makers lack knowledge of or commitment to the options available, and partly because engineers continue to be trained only in conventional approaches which favour sophisticated expensive hardware.

To try to correct this anomaly, an International Training Network for Water and Waste Management has been established by the World Bank in collaboration with UNDP, CIDA and other bilateral and multilateral agencies. Comprising 15 centres located in existing training institutions in the developing world, the Network will undertake the following activities:

- train sector staff in appropriate technologies and related issues to enable agencies to plan, implement and maintain facilities more effectively;
- promote a multi-disciplinary approach which emphasizes equally, socio-cultural, health, economic and engineering considerations;
- support the collection and dissemination of information on experience gained at national, regional and international levels.

For information, contact the Co-ordinator, International Training Network, Water Supply and Urban Development Department, The World Bank, 1818 H Street, N.W., Washington, D.C. 20243, USA.


SAFE WATER FROM SEEDS

People who rely on surface waters such as rivers, ponds and water holes assess water quality by its appearance, taste and smell. A method which clarifies turbid and discoloured waters and does not affect taste, therefore, appeals to their basic aesthetic demands. If the clarification process at the same time achieves remarkable improvements in microbiological water quality, it is a valuable tool for safe, low-cost water supplies.

Sudanese women have long used the seeds from the tree *Moringa oleifera* in clarifying turbid Nile River waters during flood season. Recent experiments undertaken by the Federal Republic of Germany aid agency, GTZ, reveal that the seeds can be utilized for clarifying water of low and medium turbidities with a 98-99 per cent reduction in faecal coliforms. When the seeds are stirred vigorously into the water, the dangerous microbes are not killed but rather settle to the bottom with the precipitate in one to two hours.


Water treatment with *Moringa* seeds can be carried out in the home using standard clay vessels or plastic containers provided with an outlet for the treated water and a drainage outlet for sludge removal. Trained villagers can monitor dosage changes in relation to turbidity fluctuations. The tree itself is easy to grow in suitable climates, but proper attention to sowing time, transplantation, light, soil and watering conditions are essential to ensure maximum seed yields.

Kenya Water for Health Organization (KWAHO) is the first NGO in Africa to actively produce seedlings of *Moringa oleifera*




Basic Indicators

- Population: 7.6 million
- GNP per capita: US\$550
- Infant mortality/1,000 births: 130
- Life expectancy: 44




Access to Drinking Water Supply (percentage)

	urban	rural
1980	100	18
1990	100	100



Access to Adequate Sanitation (percentage)

	urban	rural
1980	60	18
1990	100	30



Decade Institutions

- Decade plan: No
- Decade strategy: No
- Cost of plan: N/A
- Percentage of Plan requiring external assistance: N/A

UPHILL STRUGGLE

A rugged mountainous country located in the western corner of the Arabian peninsula, Yemen is among those named by the United Nations as "least-developed." The first census, taken in 1975, revealed that fully 90 per cent of the people lived in rural areas in some 30,000 small and widely scattered villages.

During the short annual rainy season, water is traditionally collected and stored in open reservoirs. At other times, it is drawn from deep hand-dug wells—often long distances from villages—putting a heavy burden on the water bearers, women and children. Many Yemenis use no more than 20 litres per day, while 50 litres daily is considered the bare minimum for basic hygiene.

Inadequate water supply and the problems of open reservoirs and poor personal and food hygiene are the main causes of major diseases—schistosomiasis, tuberculosis, malaria, gastroenteritis, amoebic dysentery and infectious hepatitis. Infant mortality in some regions ranges as high as 190 per thousand births. According to a 1983 report of the Economic Commission for West Asia, "In the rural areas, there are no known sanitation projects... The sanitation conditions are probably the worst possible, with the absence of any kind of sewerage system or garbage collection."

Yemen's first and second Five-Year Plans (1976-1986) gave very high priority to construction of new or improved rural water supply systems, and the drilling of new wells. But the per capita costs of delivering water supplies are among the highest in the world because water often has to be either pumped or trucked up mountains to settlements.

Despite significant progress on water supply, and the prospect of becoming a significant oil exporter with greater spending power, Yemen still faces formidable challenges and a number of unknowns in its future water supply and sanitation equation.

While Yemenis are well aware that survival is dependent on supplies of underground water, experts concur that the water table is being overtapped and current usage rates cannot be sustained beyond the year 2000. New data indicate that the basin around the capital city of Sana'a has fallen by as much as 50 metres in the past six years and continues to drop by four to six metres annually. In the Tihama Basin, which is the current focus of an ambitious plan to boost irrigated agricultural production along the Red Sea,

at least 20 per cent of the farmers sought help last year to deepen their wells. Increasing salinity has forced drilling teams inland as much as 20 kilometres in search of fresh water which used to be found within one kilometre of the shore. Overall, there is reason to doubt whether water supplies can last beyond the year 2000 at present usage rates.

According to Dragoslav Zdravkovic, former UNDP Resident Representative in Yemen, "We have reached a point where almost any topic of conversation other than water is secondary... You can talk about oil; you can talk about industrialization and you can talk about social development. But without an assured water supply, there isn't a lot to be said."

Until recently, little was known about underground water resources either in terms of sources or rates of recharge. During the past few years, teams of foreign engineers have been plumbing Yemen's underground basins to determine the rates of drawdown and recharge. But thus far, none have records over a wide enough area or long enough time and only this year did they begin to share their data. Most reports and experts confirm the need for drastic controls on future usage.

Major international donors involved in Yemen's water resources development have agreed to share and co-ordinate their information through the U.N. Development Programme which is supporting establishment of a technical office within the newly established High Council for Water. The World Health Organization is providing technical advice for a National Conference on Water and Sanitation for the Ministry of Public Works. Among conservation measures already proposed are:

- Permits for all new well drilling;
- Registration of all wells;
- The metering of water drawn from wells, and regulations on volume.

Another important contribution to water resources planning is the training—under UNDP sponsorship—of Yemeni meteorologists and field station personnel.

Reinforcement of local weather data is essential to the successful planning of development programmes in agriculture, road-building, drainage and sewerage.

SAFE WATER FROM SEEDS. Continued from page 3.

and a related variety, *M. stenopetala*, on a large scale in preparation for domestic water treatment programmes. In Asia, the Indonesian NGO Dian Desa has undertaken plantation cultivation of *Moringa* following successful experiments in local water purification projects.

With proper attention and a suitable climate, satisfactory seed production is usually achieved within 10 to 12 months after sowing. The commercial viability of *Moringa* cultivation is enhanced by its wide variety of uses as a fence or honey tree, an occasional medicinal plant, and its leaves can be eaten as vegetable.

Further references to articles and a forthcoming manual on the production and uses of *Moringa* can be provided on request from KWAHO offices, P.O. Box 61470, Nairobi, Kenya.

The views expressed in this publication do not necessarily reflect those of the United Nations Development Programme, Steering Committee members or Governments.

TO OUR READERS

For more information write to the organizations listed in the articles. Addresses for the four organizations most frequently mentioned are:

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