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RIVERS OF CHANGE



New Directions in Sanitation, Hygiene and Water Supply in Bangladesh



Department of
Public Health Engineering

1997

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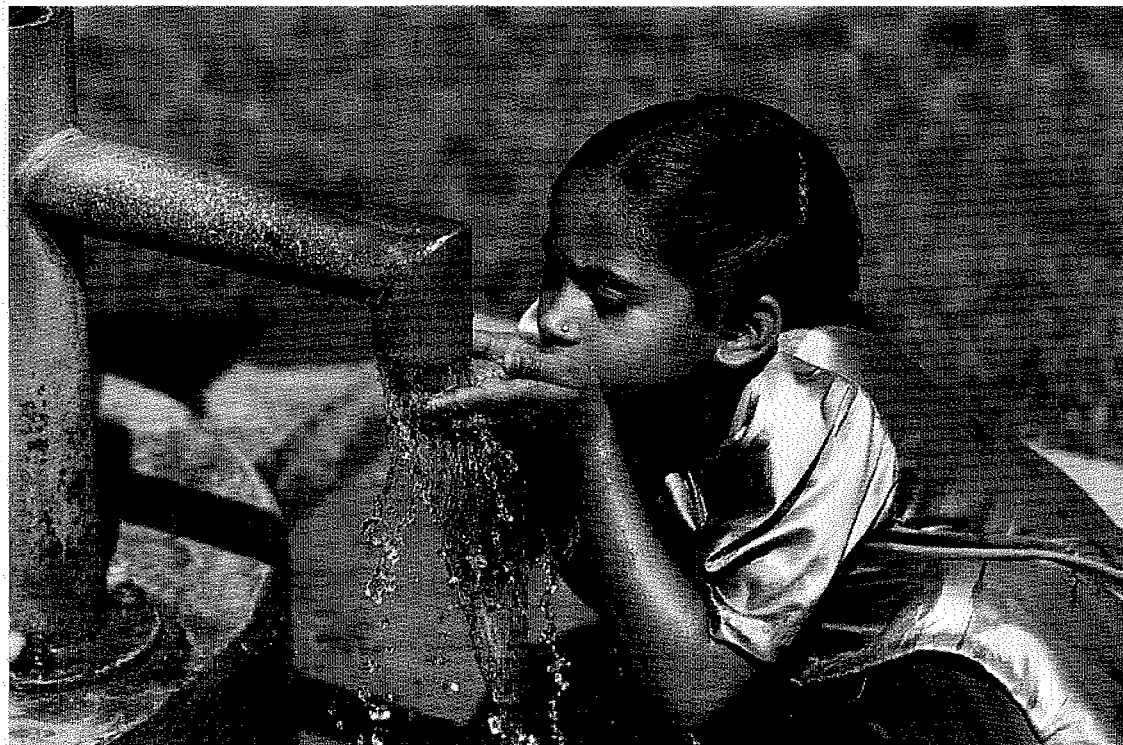
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List of acronyms

A DA	Accelerated District Approach	LW T	Low Water Table
B R A C	Bangladesh Rural Advancement Committee	M A W T S	Mirpur Agricultural Workshop & Training School
B W D B	Bangladesh Water Development Board	M L G R D & C	Ministry of Local Government, Rural Development & Cooperatives
C D P	Crop Diversification Project	N G O	Non-government Organization
C H T	Chittagong Hill Tracts	N R E C A	National Rural Electrification Cooperative Association
D A N I D A	Danish International Development Agency	O R T	Oral Rehydration Therapy
D C H	Dhaka Community Hospital	P M E D	Primary & Mass Education Division
D P H E	Department of Public Health Engineering	P V C	Polyvinyl Chloride
E E	Executive Engineer	R W S S	Rural Water Supply and Sanitation
E P C	Engineering and Planning Consultants	S A E	Sub-Assistant Engineer
E P I	Expanded Programme on Immunization	S A F E	Sanitation and Family Education
G I S	Geographic Information Systems	S D C	Swiss Agency for Development Cooperation
G N P	Gross National Product	U N D P	United Nations Development Programme
G O B	Government of Bangladesh	U N I C E F	United Nations Children's Fund
G S S	Gono Shahajya Sangstha	V H S S	Voluntary Health Services Society
I C D D R , B	International Centre for Diarrhoeal Disease Research, Bangladesh	V S S T	Very Shallow Shrouded Tubewell
I D W S S D	International Drinking Water Supply & Sanitation Decade	W A T S A N	Water and Sanitation
L G E D	Local Government Engineering Department	W E S	Water & Environmental Sanitation

FOREWORD

In Bangladesh, a country criss-crossed by endless streams, great rivers and divided by flood plains and with heavy annual rainfall recharging underground aquifers, one would assume that access to water at least is one problem it does not have to be worried about. The irony is that access to clean water as well as practices relating to hygienic behaviour on water use form part of Bangladesh's greatest development challenges.

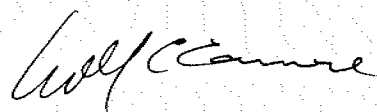
Along with the availability of safe drinking water, inadequate sanitation facilities pose great health hazards in Bangladesh particularly in the rural areas. Today, twenty thousand metric tons of excreta are disposed of daily in most unhygienic conditions. A large number of primary schools do not have basic water and sanitation facilities. There is a direct link between these and the relatively high rates of child morbidity and mortality.

The Government of Bangladesh, and recently the NGOs, with the help of the donors, have promoted the use of safe drinking water and sanitation since independence. As a result, today 97% of the

population is drinking water from a tube-well or ring-well. This is a major behavioral change, considering that most of the population drank water from unsafe ponds and rivers only 25 years ago. There are still many underserved pockets in the country and these are the areas which need the greatest attention. Access to safe water in the Chittagong Hill Tracts, for example, is way below the national average; so too are the coastal belt areas where the pumps must sink far deeper to avoid the undrinkable saline water. In the low water areas, because of the decline in the ground water for 4-5 months in a year, access to drinking water is a big problem for about half of the population living there. The Tara pump has provided relief to many but the coverage needs to be expanded. The costs also have to be sufficiently reduced to enable people to buy them. The problem of inadequate coverage can be overcome with greater technological innovation. Equally important is greater emphasis on community management, the role of manufacturers, retailers and credit facilities to make the pumps more accessible.

A greater challenge lies with sanitation and hygiene, where a similar behavioral change as in the safe drinking water is a crying need. Although there is a healthy trend, compared to say 1990, as many as 56% of the population still do not have access to sanitary latrine, 46% still use ponds and rivers for household work and only 35% use soap for washing hands after defecation. Through the use of innovative communication strategies and nation-wide campaigns, we have to strive to change the people's mindset towards hygienic living and promote a healthy environment. Where best to start than with the children whose behavioral practices are amenable to change through motivation and publicity campaign. Schools could act as resource centres where active learning with teachers moulds the children's behavior as part of their education. These children can act as communicators themselves, sharing their knowledge with families and friends.

Such campaigns must be supported by efforts to enable decision-making at the household level. The people themselves must have access to materials and masons from supply centres and credit facilities within the local community. Partnerships with the



Rolf C Carriere
UNICEF Representative
in Bangladesh

private sector and NGOs should be encouraged for accelerated implementation of the policy into action. It has been demonstrated that with the success of behavioral changes, a commercial consumer interest is generated. Publicly installed hand pumps have led to private installations while the government operated village sanitation centres are now functioning along with the private and NGO operated ones. These partnerships provide an invaluable contribution in helping to ensure safe water and sanitation to those who need them most.

This publication highlights the successes and problems that have occurred over the years as Bangladesh moves towards ensuring hygienic living and a safe environment. We believe that the necessary transformation in environmental health is within the country's grasp. We have a vision in Bangladesh, which is shared by her people, the government and development partners alike, one that sees the people living hygienically, having access to the basic, yet hygienic, sanitary facilities, and above all, access to its lifeblood, water. We are confident that the vision is being turned into reality through participatory development.



Hasnat Abdul Hye
Secretary, Local Government Division
Ministry of LGRD & Cooperatives



INTRODUCTION

**The water
gardens of
Bangladesh**

Bangladesh is a country moulded by water. Great rivers and floodplains dominate the landscape, endowing it with an extraordinary fertility. Every contour of the countryside is threaded with streams and ponds, bringing water to the threshold of almost every home.

But this source of life is also a threat to life. With over 800 people per square kilometer, the Bangladesh countryside is the most densely populated on earth. Nature's drainage system is overwhelmed and surface water is dangerously polluted with human waste. Every day, around 20,000 metric tonnes of excreta is discharged into the open, in fields, ponds and waterways. In some areas the water below ground is chemically contaminated too. The incidence of water- and excreta-related sickness is high. Diarrhoea alone accounts for one in three deaths of children under five, that is, 110,000 child deaths each year.

Key Country Data

Total Population	: 120 million (1995)
Annual Population Growth Rate	: 2.17% (1991)
Population Density	: 813 per sq. km (1995)
Rural:Urban Ratio	: 8.1:1 (1991)
GNP Per Capita	: US \$230 (1996)

Source: Bangladesh Bureau of Statistics, 1997

Today, following the success in providing safe drinking water to almost the entire population, this rather dire picture of Bangladesh is improving. In the 26 years since independence, there has been a revolution in drinking habits. A generation ago, people drank water from open ponds and streams. Today, almost everyone is able to drink water from protected tubewells.

This change in behaviour was due to a huge government drive which ensured that hand pump tubewells were installed into most communities and households. Today the hand pump tubewell has become a regular household item and now, for the 1 million publicly installed hand pumps, there are 1.5 million private installations, a remarkable success given the very low income of the average rural family. A staggering 97% of the population is now able to drink water from a safe, protected source.

Unfortunately this picture has a discouraging side as the reduction expected in water- and hygiene-related sickness has been minimal. Meagre though its health benefits so far appear to be, the revolution in drinking water habits in Bangladesh should not be seen as a disappointment, but rather, as an essential step towards the gains in disease reduction for which it paves the way. Although the public health authorities know that poor human waste disposal is even more influential in spreading disease, the sanitary latrine has yet to become as widely desired a consumer item as the hand pump tubewell.

The authorities also know that it is not the presence of a pump or a latrine which makes the critical difference in improving people's health. What counts is their understanding of these amenities; why they should be used and how they should be used. The key lies in hygienic behaviour. People need to use their safe water supply for hand-washing and food preparation. They also need to take much more care over the use of pond water for domestic purposes. The pond water at their doorsteps is usually heavily contaminated, and its careless use in cooking and washing is one of the causes of the often fatal diarrhoea.



Bringing about new revolutions in hygiene habits remains the outstanding environmental health challenge in Bangladesh. It is this challenge which is now being pursued by the public health authorities and their partners, both internal and external, non-governmental and governmental, donor and beneficiary. But new

problems are continually surfacing. Problems such as the drop in the water table, leaving increasing areas of the country seasonally water-short. In some areas this water shortage is causing hazardous chemical reactions and releasing arsenic into the groundwater.

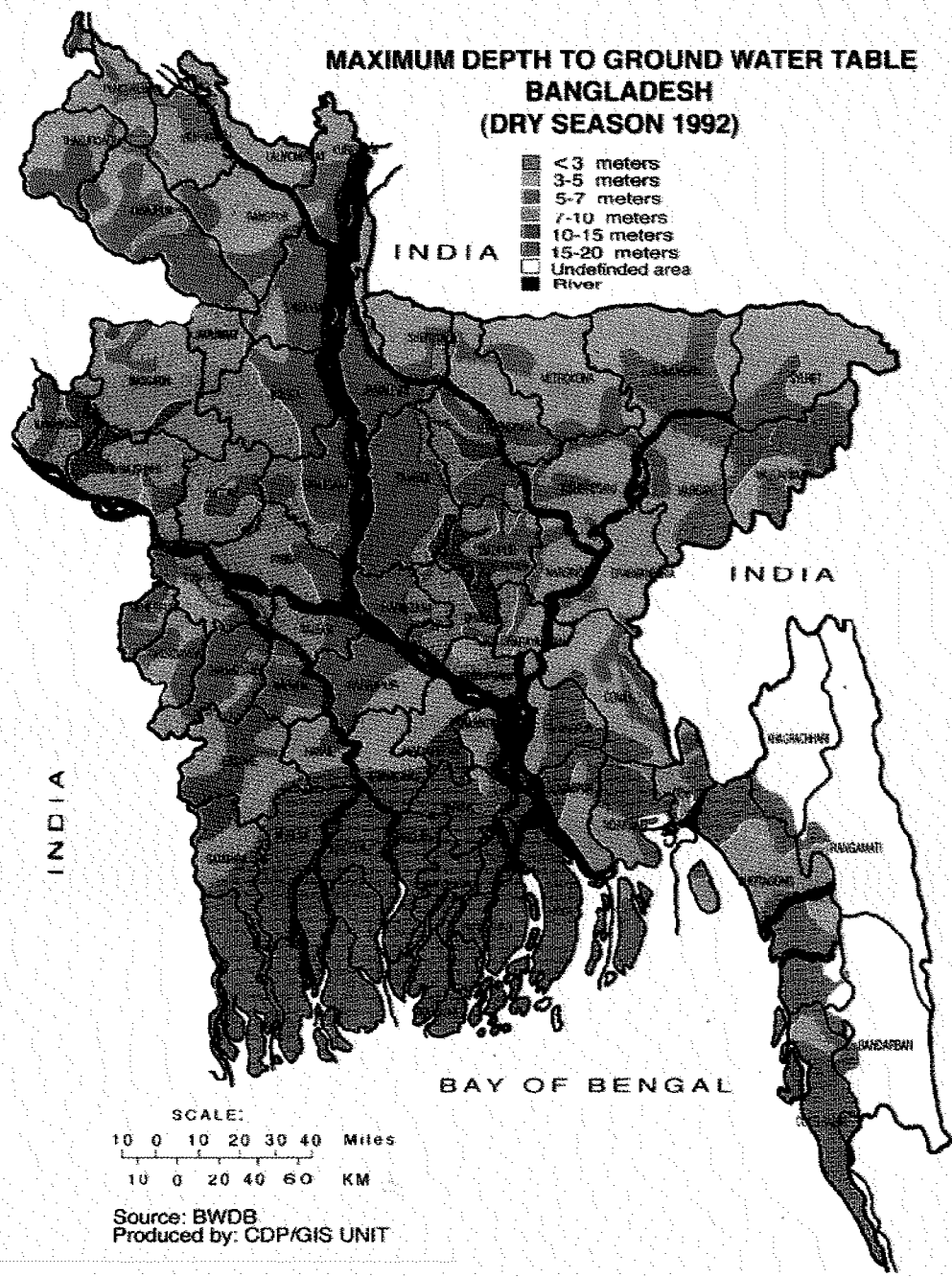
UNICEF, since the birth of Bangladesh, has led the way in promoting safe water and sanitation together with the government and its other partners. It has pump-primed new programme models, explored new technological frontiers, promoted involvement by the private sector, boosted the interest of the political establishment and the participation of civil society. More recently, it has promoted the idea of 'primary environmental care' to protect and manage the country's most important life-giving resource, water, and in such a way as to make its social and economic assets available not just to the few, but to the many.

UNICEF's commitment to the vision of hygienic living in Bangladesh remains strong, a commitment proven by their special role in helping to realize that vision. The people of Bangladesh also see water and sanitation as their topmost environmental concern. They too, are keen to see that vision realized. This publication sets out to assess both past and present water and sanitation activities, and argues that the necessary transformation in environmental health is now within the country's grasp.



CHAPTER 1

**Bangladesh: an
environmental
health challenge**



Bangladesh sits astride the confluence of two of the mightiest rivers in the world, the Ganges and the Brahmaputra, and is home to a third, the Meghna. Apart from the Chittagong Hill Tracts, in the south-east and upland areas in Sylhet, the country is low-lying. Its patchwork of land is distributed among the thousands of tributaries which run off these great rivers, converging and widening as they descend into the Bay of Bengal. At the delta's edge, Bangladesh becomes a skein of islands, many barely above sea level.

Every year during the monsoon months from May to September, the rains make the rivers swell high above Bangladesh. Accumulating water as they descend, the rivers travel thousands of miles through Nepal and India before arriving in the deltaic plains, where they fan out over the countryside. Every year, more than one-third of Bangladesh is flooded. The country's agricultural productivity depends on this annual inundation, which permits it to support, by the thinnest of margins, an extremely high population density. Thousands of villages become encircled by water and rice paddy fields, accessible only by boat or precarious bridges and causeways.



The monsoon can also bring tragedy. Bangladesh is subject to violent cyclones and storms sweeping in from the Bay of Bengal. In April 1991, a devastating cyclone took an estimated 138,000 lives and disrupted the homes and farms of millions of others. And, when swollen waterways rise too high, as in 1988 when nearly 60% of the country was flooded, thousands of homesteads are washed away. Even in a normal year, river banks are eroded, paddy fields lost, livestock drowned, and around 20,000 people made homeless.



at the mercy of the water.....

The way water shapes the landscape has a profound effect on every aspect of people's lifestyle and behaviour, not only economic, but social and cultural too. For the people of Bangladesh, a landscape only partially awash, appears dry. Daily life is conducted in intimate contact with the surrounding water. It waters their crops, provides plentiful fishing grounds, is a highway, a leisure zone, and a spiritual home.

But a rural environment flooded not only with water, but also with people, takes on a more sinister character. Streams and rivers flow freely through densely populated communities, collecting their residue of dirt and germs taking on the appearance of foul

In the dry season, when the water table drops, new dangers arise. Since the mid 1970s, the Farakka Barrage above Calcutta has diverted Ganges water away from Bangladesh, causing anguish about water levels and food production in the drier months of the year. But a treaty between India and Bangladesh, signed in December 1996, has opened up a new era in the sharing of the aqueous Himalayan harvest.

and rancid open drains. The constant mingling of people, their waste and surface water, constitutes a public health problem of unparalleled proportions; a problem only dimly perceived by those most at risk.

In rural Bangladesh, there is no engineered public health system to hygienically confine the water supply in pipes and faucets, and

to remove waste liquid. Nor could there be, not within any imaginable time-frame. In the cities and towns, only a relatively small proportion of inhabitants have running water, septic tanks or sewer connections in their homes.

In Bangladesh the people themselves are their own environmental engineers, shifting soil, deepening ponds, carving out platforms and steps and taming water to their domestic convenience. They have created bathing places, reservoirs, ornamental pools, shrines, livestock watering holes and laundry areas, in rural and urban areas alike. But too few appreciate their germ-laden condition.

People bathe daily in ponds and streams, carefully removing their clothes for washing. Children swim in them, emitting a stream of water from their mouths as they surface. The same ponds and streams are used for garbage disposal, or, when it rains, become a sewer for excreta deposited in surrounding bushes. Dishes and kitchen utensils are washed away on their banks, banks from which bamboo walkways lead to 'hanging latrines'. These are perched above the water's edge so that their products fall directly into the water below. Clearly, doing all these things in the same open waters poses serious risks to health. As they shrink, their pathological concentration increases. Diarrhoea rampages

through these communities, communities where people have no choice but to drink from ponds because they have no functioning tubewell.

However still villagers do not always understand the link between excreta, bacteria and disease. And even if they do, there is a limit to what they can do or are willing to do, to adapt to this reality. One thing is sure. They are no more likely to separate themselves completely from the water surrounding them, than to try to walk on air.



Key data

Incidence of diarrhoeal disease	: 75 million episodes per year in children under 5
Number of annual deaths of children under 5 due to diarrhoeal disease	: 110,000
Incidence of parasitic infestations	: 60% of children between 2-9 years of age

water and disease, a partnership for life?

The consequences of living in such an environment are self-evident. In 40 of the 50 diseases prevalent in Bangladesh, including diarrhoea, dysentery, typhoid, parasitic worm infestation, measles and polio, unsafe water and human excreta are the main elements of transmission. Every year, children under the age of five suffer 75 million bouts of diarrhoea. Apart from causing one in three child deaths, this caseload of sickness is a major contributor to malnutrition, a condition suffered by over 90% of young children. While better nutrition offers one way to reduce this toll, and medical technologies such as Oral Rehydration Therapy (ORT) and immunization offer another, hygienic behaviour provides a third line of attack. All are needed, and preferably all at once.

Safe drinking water is the first line of defense against hygiene-related sickness. And in Bangladesh, safe drinking water via the hand pump tubewell, is a potentially standard amenity for almost every inhabitant. The country sits upon a vast, spongy aquifer replenished by the annual rains and inundation. As the floods recede, streams and ponds dwindle and the water table drops. But in much of the country it remains high above the 7 metres from which water can be lifted by suction.

The proximity of the water table is not the only hydro-geological blessing Bangladesh enjoys. The groundwater lies in layers of silty clay and sand with occasional rocky obstruction defense layers which act as a sieve. The polluted surface water is then filtered as it percolates down. The soft soils and high water table mean that a tubewell can be sunk to a depth of 35 metres using human energy alone. The local technique known as 'sludging' requires no sophisticated mechanical equipment and is within the capacity of a village handyman or *mistri*. Once the tubewell has been sunk, a few extra dollars purchases a suction hand pump.

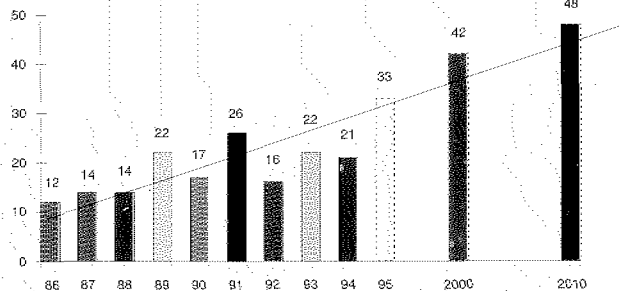
However these favourable water conditions do not apply universally. In the coastal belt, inhabited by 10% of the population, sludging cannot be used for sinking tubewells. Here the groundwater at 100 metres is saline so it is necessary to sink much deeper. Also sinking costs for these tubewells are much higher than for shallow. Two alternative technologies for saline areas have been developed. One is the Shallow or Very Shallow Shrouded Tubewell, which is very inexpensive, but suitable conditions are rare and drilling failure is very common. The

second technology, the Pond Sand Filter, uses a hand pump to deliver pond water into a small sand filter. It is simple to construct and operate, but requires a high level of user motivation to keep the filter clean.

running dry.....

In recent years, Bangladesh has been faced with a new problem. Because of the heavy extraction of water for irrigation and decreased groundwater recharge, the water table is declining. In 1986, the groundwater was below the 7 metre suction zone in only 12% of the country. In 1994, this proportion had risen to 21%. Some predictions suggest that by the year 2000, as much as 50% of the high water table areas may find their suction pumps without yield during the dry season.

Percentage of Low Water Table Area With Ground Water Below 7 Metres



Sources: DPHE Data, 1995; EPC Projections, 1994

Tara to the rescue!

Each year, more villages in Bangladesh are finding that their hand pumps are failing in the dry season. Every year, the period during which the No. 6 suction pumps are inoperable, lengthens. Every year, certain areas which used to have high water levels, are now showing low water levels. In the worst affected areas, the ratio of people to pump rises as high as 1:500 in the dry season. For many people, this water shortage is dangerously acute.

The Tara pump was developed for tubewells where the table was below the suction level of 7 metres, but no deeper than 15 metres. The pump becomes too heavy to operate if the water table is lower than this. Although the pump is inexpensive compared to other deep-set models, it still costs 5 times more than the noted No. 6. This puts it beyond the reach of most households and many other user groups. Thus the fluctuating water table precipitates communities into quite a different, unaffordable, hydro-economic environment.

The Tara technological options are therefore being constantly expanded. The 'Taradev' has been developed as a more sophisticated Tara for drawing water from lower depths. The key difference is that it has a lever handle on the pump head. Lever handles have more lifting capacity and are socially preferred, but they are also much more expensive.

Trials are still going on with these new generation Taras. Some 500 mini-Taras and 150 Tara IIs have been installed to test their performance and community acceptance. But, as with all Taras, questions of consumer affordability will ultimately be more difficult to solve than questions which require merely technological answers.



This means that more call will progressively be made on hand pumps capable of raising water from below the suction level. These 'deep-set' pumps are much more expensive than the standard 'Number 6', although the specially developed 'Tara' pump, which operates by direct action, is still a relatively modest investment.

From the Bangladeshi villager's point of view, water shortage in a lengthening dry season is cause for anxiety enough. But from a public health point of view, the declining water table has other implications. People may revert to taking water from ponds or other unhygienic sources. The problem water areas, which altogether contain 26% of the population, therefore need extra water supply attention. They also contain additional contamination problems. Salinity in the coastal belt means that 25% of tubewells produce water with high levels of chloride (600 mg/1 or above). In the hilly areas, 77% of tubewells discharge water with a high iron content (above 5ppm), as do 43% of tubewells in shallow and low water table areas¹. Water with too much iron discolours food, teeth and clothes and causes stickiness in people's hair. People hate the taste and so end up reverting back to using pond water for their cooking.

A new contamination scare is now causing deep anxiety. During 1996, arsenic poisoning in groundwater samples, was found in 34

¹ These figures come from the 1991 National Survey on Status of Rural Water Supply and Sanitation, undertaken by Mitra and Associates for DPHE/UNICEF. Since then, iron content problems have been tackled and only 10% of the population is now thought to be affected

Arsenic an emerging problem

Arsenic exists in nature in many different chemical forms. It is widely distributed geologically as a component of about 245 different minerals. In ground water, it occurs almost exclusively in the trivalent, (arsenite or arsenic III) and pentavalent (arsenate or arsenic V) forms. Although arsenic is toxic and carcinogenic, its biological effects, depend markedly on the chemical form in which the element is presented, inorganic compounds being more toxic than most organic ones. Drinking water, represents a serious hazard since the types found in ground water are predominantly more toxic inorganic forms.

The recent detection of high¹ concentration levels, of arsenic in numerous shallow and deep tubewell water, mostly across 41 south-western districts² of Bangladesh, has caused serious public health concerns. Pockets of areas in the middle and north-eastern parts, had also more recently reported cases of dangerous levels of arsenic in some tubewells³. Reported cases of high concentration levels of arsenic in tubewell water and identified cases of arsenicosis patients, remain however, fragmented and poorly documented. Very few, however, doubt the real possibility that Bangladesh may well be waking up to a potentially serious public health crisis.

The media has played a significant role in bringing recognition to this problem, especially among policy-makers, although information dissemination has mostly focused on the health effects of drinking arsenic contaminated tubewell water and not on solutions to the problem. This has often led to an undesirable response from the communities. Many communities are once again resorting back to traditional unsafe surface water sources to meet domestic water requirements.

As an initial step towards addressing the arsenic problem, UNICEF, has committed itself to providing technical assistance to DPHE. The objective is to establish the magnitude and extent of the problem, through a systematic

surveillance of tubewells, and identify appropriate measures for mitigating the effects of arsenic.

Accordingly, UNICEF has supplied arsenic field test kits and trained DPHE zonal laboratory Chemists, Executive Engineers (EEs), Sub Assistant Engineers (SAEs), and NGO field workers in their use. Information generated from these simple "Yes/No" kits, designed to detect arsenic concentration at 0.05mg/l and above, are being used in designing area specific interventions.

Bearing in mind the critical role of communication, UNICEF is working closely with various stake holders including relevant Government Agencies, NGOs, and External Support Agencies, to develop a multi-media communication strategy responsive to community concerns. A local social marketing agency has been identified and by January 1998, the message concept will be process-tested in three selected districts.

Various technology options for provision of alternative arsenic free safe water supply sources are being explored. Rainwater harvesting is one of these for household safe water supply requirements. A study currently underway, is geared to identifying effective strategies for mass mobilization of communities to construct improved storage facilities and use rainwater especially for drinking and cooking.

Involving active community participation is also essential for ensuring an effective service delivery system. UNICEF, is thus launching an integrated and self-sustaining community-based initiative, designed to lay the basis for a sustainable support. These pilot activities shall be tried out in a few selected districts to assess acceptability. Dhaka Community Hospital (DCH), Grameen Bank and Gono Shahajjo Sangstha, are the main NGOs working in collaboration with DPHE, to implement the project.

1 Maximum permissible levels for human intake in Bangladesh is 0.05mg/l


2 Ground water arsenic calamity in Bangladesh, 1996, Dhaka Community Hospital & Dept of Environmental Studies Jadavpur University, Calcutta

3 NRECA International, Ltd, 1997

districts in the west of the country. An arsenic seam straddles the border with West Bengal; it is thought that heavy extraction of groundwater exposed it to the air, triggering oxidization and consequent changes in the soil. Around 700 Bangladeshis have already been treated for serious arsenic poisoning. Understandably, people in affected areas now distrust tubewell water. Where people are once again resorting to surface water for drinking and other domestic purposes, measures to render it safe, are desperately needed.

Safe drinking water is a pre-condition for hygienic living. But it is not only the drinking water supply, but also other features of the environment and people's interaction with it, that also require attention. In such a crowded country, the capacity of the natural environment for self-regulation, is deeply impaired. Lifestyles which are increasingly becoming environmentally hazardous, now have to be changed. But the process of embedding such ideas into the people's minds has, up until now, lagged behind the provision of amenities. Value systems and the knowledge that informs them have, until recently, been given less attention than problems of engineering.

The story of water and sanitation in Bangladesh, and UNICEF's role within it, is one of success and achievement. It is also a story of discovery as lessons learned along the way, have important implications for the new challenges that lie ahead. It is to this story that we now turn.

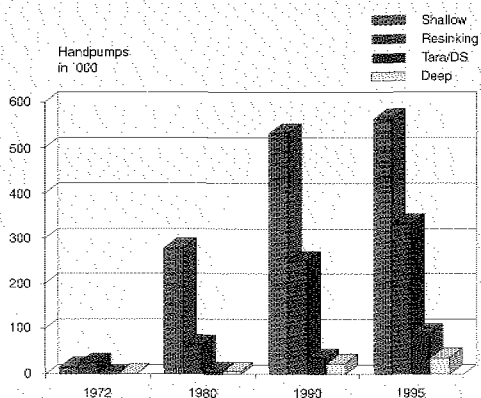


**Water and
sanitation:
a programme
evolves**

During the 26 years since independence, the coverage record of the Bangladesh rural drinking water supplies programme, has been outstanding. In spite of rapid population growth, 2.5 million public and private hand pump tubewells have been installed bringing safe drinking water to 97% of the population.

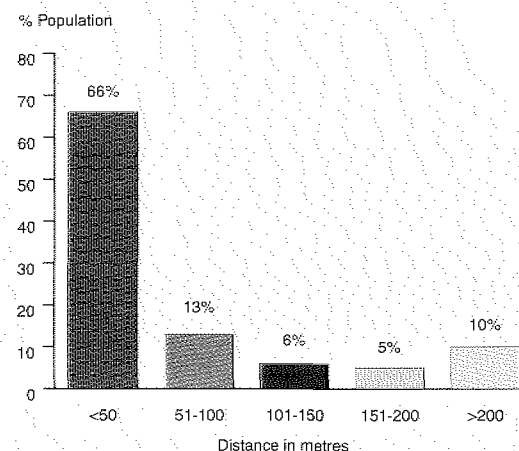
Women no longer have to walk extremely long distances to fetch their water. In the 1970s, 60% of households lived within 250 metres of a tubewell; today, the distance has been reduced to 150 metres for more than 85% of households. The average number of people per tubewell has also dropped, from 400 in 1970, to 100 in 1997.

Cumulative Hand Pump Installations:
DPHE/UNICEF Achievement, 1972-1995



Source: DPHE data, 1996

Distribution of Rural Population by
Distance to Tubewell



Source: Mitra & Associates, 1992

Improvements in sanitation coverage are also impressive, if not as complete. In 1980, only 1% of the population used latrines which safely confined human waste. By 1997, this proportion had risen to 44%. Latrines have long been in use in Bangladesh, and a high proportion of rural families have one. But if they are 'hanging latrines', and empty into waterways, or if their contents become exposed to the elements, they do nothing for environmental health. By any criterion, sanitation coverage is still far from universal.



rural drinking water supplies

The national rural drinking water supply programme was inaugurated in 1972. After the war of liberation, which caused devastation to existing installations, UNICEF offered assistance for a crash programme of hand pump tubewell rehabilitation. The Department of Public Health Engineering (DPHE), in the Ministry of Local Government, Rural Development and Cooperatives

(MLGRD&C), was rapidly built up between 1972 and 1976, to oversee the programme. Thus began the DPHE-UNICEF partnership which has continued to navigate the programme ever since. In the 1970s, the main emphasis was on hardware. Pump breakdowns, clogged tubewells, and corroded iron pipes, were the hallmarks of pre-1972 installations. While DPHE built up its human resources and developed logistics and managerial systems, UNICEF set out to identify the waterwell technologies best suited to the environment. The two key criteria were durability and low cost. And today, applying the same criteria, UNICEF remains the programme's R & D mentor and primary investor.

In the early 1970s, PVC piping was introduced for tubewell casing. Bangladesh soon set up its own PVC industry, the first of many technology transitions. A redesigned cast iron hand pump, the 'New Number 6', also began local production. This cheap and sturdy work-horse remains the country's standard suction pump. It soon entered the local economy, boosting the market in tubewell construction and creating thousands of jobs in local foundries and consumer outlets.

Having laid the technological groundwork, DPHE and UNICEF then attended to programme structure and sustainability. Key issues were maintenance and community involvement, two sides of the same coin. If the community had no notion that a DPHE-installed tubewell was a service under their control, they did not attempt to keep it in repair. Everything was left up to DPHE mechanics. As numbers of tubewells mounted into the hundreds of thousands, this became managerially unsound.

Turning points in alliance-building for water and sanitation

- 1972: UNICEF-DPHE partnership launches 'crash' handpump-tubewell programme
- 1974: Private industry involved; local manufacture of PVC pipes
- 1975: Pump manufacturers involved: local foundries produce New No. 6 pumps
- 1976: Communities involved; tubewell user contributions and caretakers introduced
- 1976: NGOs involved: UNICEF allocation to cover NGO installations
- 1978: Masons involved: first DPHE Village Sanitation Centres established
- 1982: NGO Forum created, apex body for local NGOs working in DWSS
- 1982: Partnership between World Bank, UNICEF, MAWTS to develop Tara pump
- 1984: Village *mistris* (handymen) involved: self-help tubewell sinking begins
- 1985: Grameen Bank involved: tubewells on sale or loan basis to members
- 1985: Women involved: handpump caretakers must include women
- 1986: Private masons involved: given training and latrine production start-up capital
- 1987: Tubewell mechanics involved in latrine promotion (integrated approach)
- 1988: Hydrogeological experts involved: DPHE groundwater monitoring unit
- 1990: First multi-partnership *thana*-wide sanitation campaign in Barisal
- 1992: Prime Minister involved: launches sanitation logo at national conference
- 1992: Schools involved: School Sanitation Programme launched
- 1993: Religious leaders involved: imams addressed at national conference
- 1993: First women appointed as DPHE tubewell mechanics
- 1993: Union Watsan Committees established
- 1994: Media involved in social mobilization exercise: first Sanitation Week
- 1994: Boy Scouts, Girl Guides, Village Defence Party cadres involved
- 1994: Private and public latrine producers top 4,000
- 1995: Communications experts involved: *Meena* cartoon on water and sanitation
- 1995: Bangladesh Standards Institute involved: handpump standards set
- 1995: NGO Forum membership now amounts to 560 partner NGOs
- 1996: School Management Committees take over school latrine construction
- 1996: Users take over all maintenance of No. 6 handpumps
- 1996: All stakeholder groups attend national conference to plan WS future

The key programme evolution was decentralization. The main locus of DPHE supervisory activity was placed at *thana* (sub-district) level. A system of community application for tubewells was introduced. User groups applied to their union *parishads* (councils), which then submitted a list to the *thana* (Sub-district) authorities. This allocation system remains in force today.

The community application form has to list 10 families in the user group, including one male and one female from each family, and agree to certain conditions: a cash contribution, siting the tubewell in a public place, and the nomination of a 'hand pump caretaker' family. Today, there must be both a male and a female hand pump caretaker for every tubewell. These conditions were imposed to ensure that both disadvantaged families, those with small land holdings, fewer and dirtier ponds, less local clout, and fewer resources to install tubewells of their own, did not get left out. And it has increasingly tried to expand the participation of women.

During the 1980s, many NGOs began to promote tubewells among their beneficiaries. Since NGOs almost invariably focus on the poor, this was one way of structuring water supply assistance to reach the least well off. UNICEF entered into an agreement with the Grameen Bank to enable members of their savings groups, all of whom are extremely poor and over 90% of whom are women, to take out loans for private tubewells.

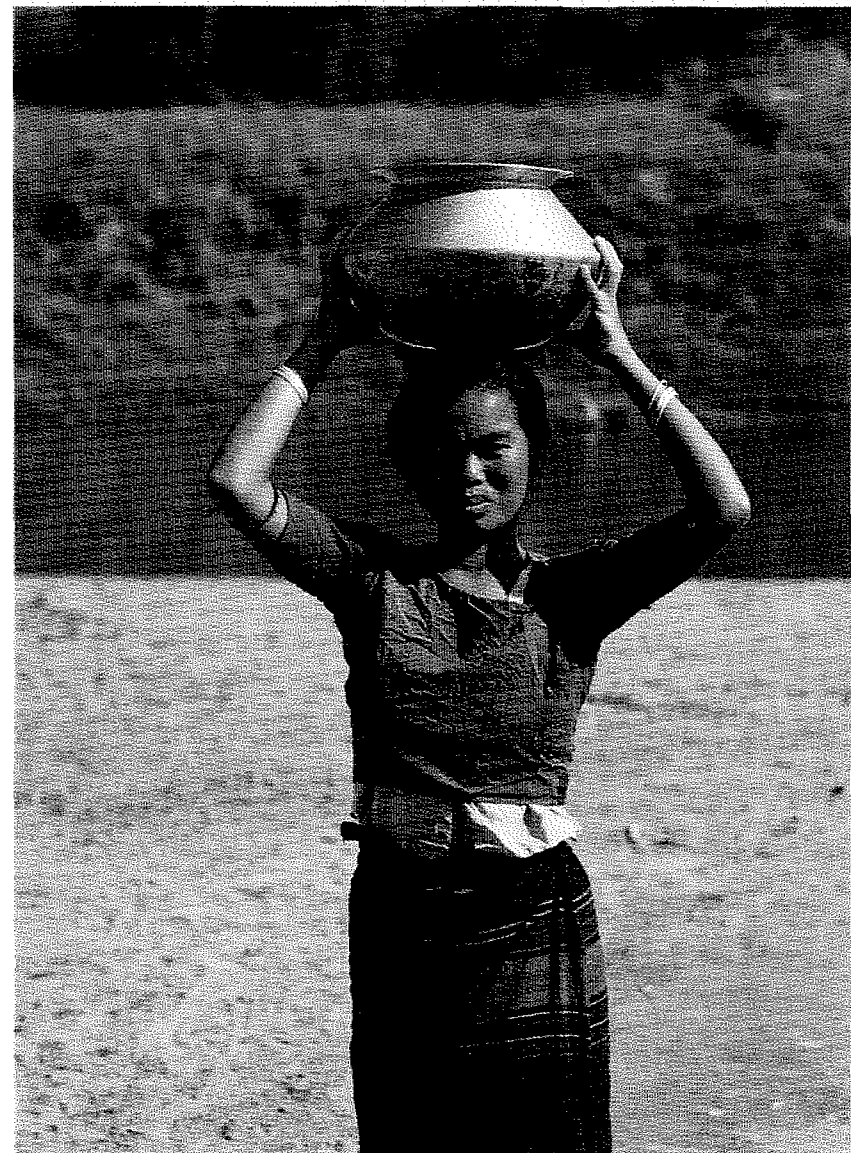
When the problem of the declining water table began to emerge in the mid 1980s, UNICEF and DPHE addressed the new



technological challenge. What was needed was a pump able to extract water from just below the suction level. Most deep-well hand pumps were designed for lower depths and were correspondingly expensive. To fit this hydro-geological niche, a new direct-action pump was developed by UNICEF together with the World Bank and the Mirpur Agricultural Workshop and Training School (MAWTS). The 'Tara' pump started production in 1987, and has since become the standard pump for low and marginal water table areas.

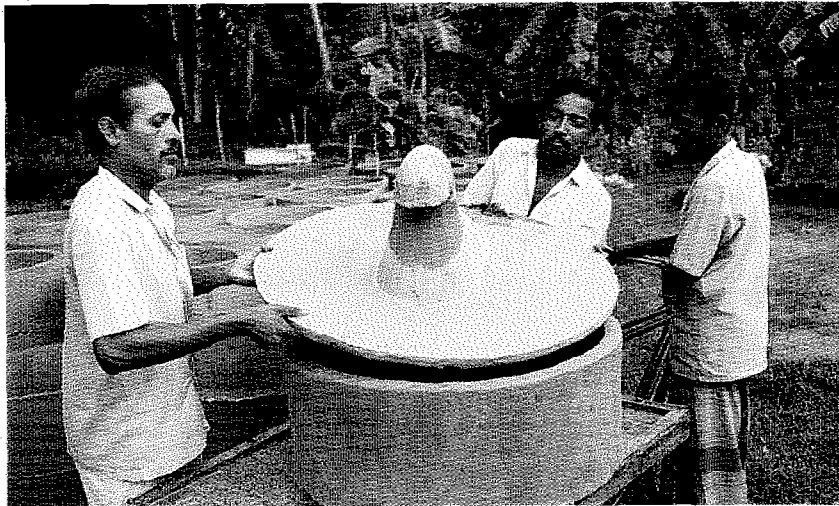
The number of public tubewells installed by the government is now close to one million. More significantly, another 1.5 million have been privately installed. People in high water table areas, are now well served, and if they want more tubewells, they can obtain them either from private suppliers out of their own pocket, or by individual or group NGO loans. As a result, UNICEF has ceased to subsidize the installation of public 'Number 6' hand pump tubewells, via the DPHE programme.

The underserved and poor water quality areas, low water table areas, the coastal belt, highlands, chemically contaminated area, city slums, now demand the lion's share of water supply attention. In some of these areas over 200 or 300 people share a source, installation costs are high, and salinity, iron or other contamination often requires filtration. Today, water supply problems which used to seem marginal because they affected only a small proportion of the population, have moved to centre stage.



rural sanitation

The story of rural sanitation in Bangladesh is very different from water supplies. The main problem for the sanitation programme is still universal coverage. The mass promotion of the sanitary latrine began much later than mass promotion of the hand pump tubewell. This was mainly because there was little demand for a *sanitary* latrine and no easily affordable technological formula awaiting mass promotion. The best-known sanitary latrine in Bangladesh was imported from Thailand by UNICEF in the early 1960s. The bowl, set in a concrete slab, is like a conventional lavatory pan with a U bend water-seal at the base. When flushed by a jug of water, the water provides a barrier between the waste below and the open air. Placed near a water source, built over a



Village Sanitation Centres

Since the first DPHE village sanitation centres were set up in 1978, there has been a major expansion in latrine production in both the private and the public sector. A review carried out in 1994, found that there were 4,152 producers of latrines in Bangladesh: 933 run by DPHE and the remaining by NGO and private producers. Around two-thirds were in rural areas.

The latrine products they supplied ranged from a simple slab with a hole, to slabs with pans and water-seals, pit lining rings of various kinds, and pipes for off set pits. Most transported their products by road, but some used boats to market their wares throughout the countryside.

Although latrine items sold through DPHE centres are subsidized, many people prefer to patronize private producers. They are more accessible, have managed to keep prices low and competitive, and provide better after-sales servicing. However, most people are too poor to afford the quality 'sanitary' model, instead they are purchasing a simple slab and lining their pits with natural materials such as branches and bamboo.

well-lined pit, surrounded by a bamboo superstructure and regularly cleaned, this latrine is secluded, hygienic and odourless. But it is not cheap.

The first comprehensive effort to promote the sanitary latrine began in 1978. Along with five concrete rings for the pit lining, the



agreed to launch an annual 'Sanitation Week' in which society would be mobilized around sanitary latrine construction and hygienic living. Coupled with expanded latrine production in both public and private sectors, this drive has raised coverage in the rural areas from 16% in 1990 to 39% in 1997, and in the Urban areas from 40% in 1990 to 87% in 1997.

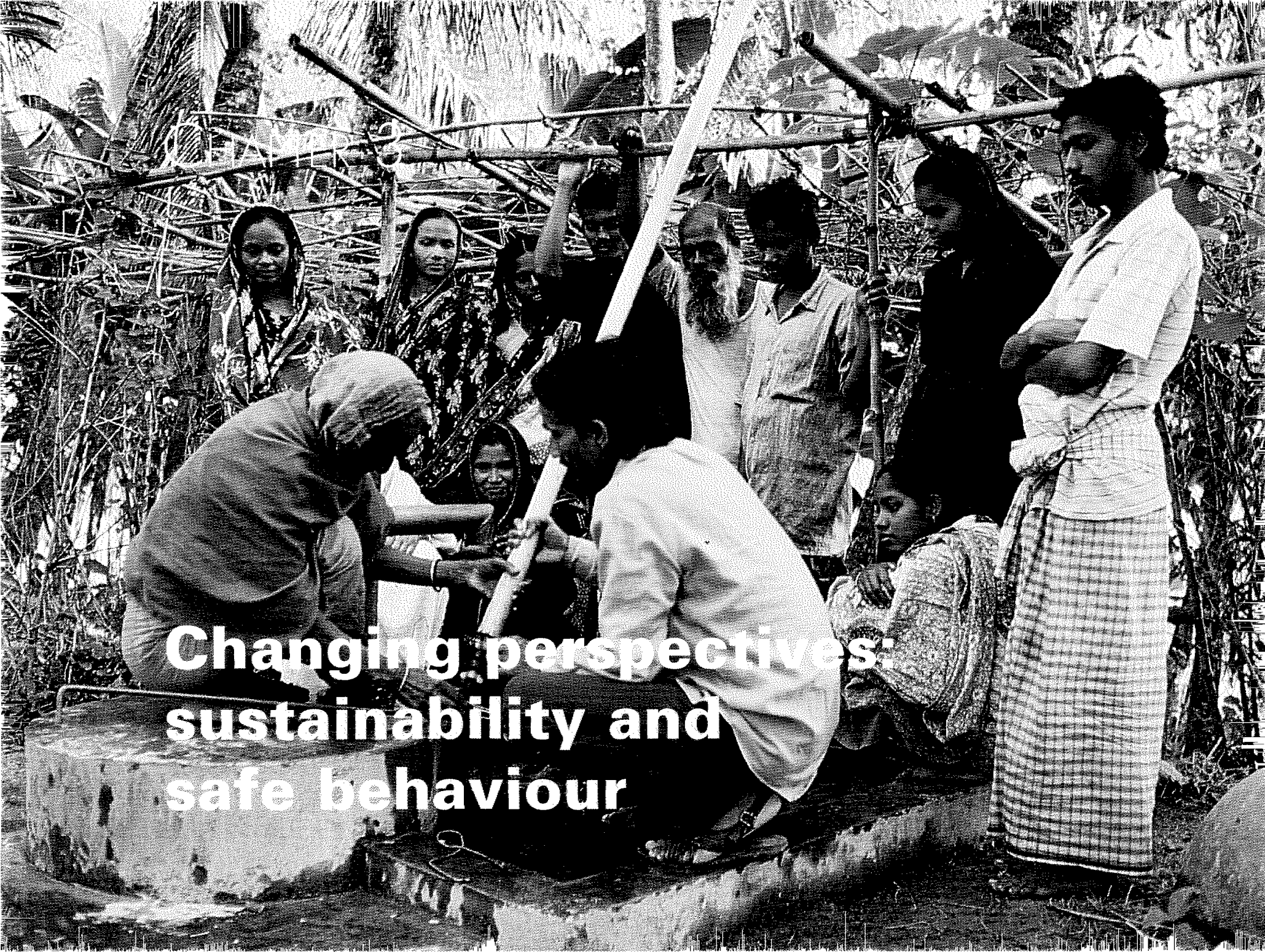
hygiene education

At every stage in the growth of water supply and sanitation coverage, the programme's accomplishments have been accompanied by the realization that installations by themselves do not transform public health. Emphasis on safe water gave way to emphasis on the sanitary latrine; but among a population uninformed of the need for hygiene, higher coverage rates still failed to produce a significant reduction of ill-health.

Although lip-service was paid to the need for health education from the late 1970s onwards, the lack of progress in educating people about the connections between water, cleanliness and disease reduction, was a constant theme of surveys and programme assessments. One of the problems was that hygiene education was not obviously the task of engineers, neither was it seen as the job of the government's health services. Today this problem is recognized and efforts are being made to address the concern.

During the 1990s, coinciding with the inauguration of the annual Sanitation Week, efforts have been concentrated on developing a comprehensive hygiene promotion agenda. Like so many earlier stages in the programme, UNICEF has acted as facilitator in developing this new evolution. Key messages and communications vehicles have been tested. Different strategies have been piloted with different audiences, schoolchildren, householders, teachers, community and religious leaders.

Hygienic living, which both helps to improve family health and reduces the pathogenic load present in the natural environment, thus remains the outstanding challenge. And a campaign for hygienic living requires a radical change in perspective about what is demanded of a water and sanitation programme, beyond the achievement of coverage targets. Nonetheless, there are grounds for hoping that Bangladesh now has the will and the way to take a great hygienic leap forward.



**Changing perspectives:
sustainability and
safe behaviour**

During the International Drinking Water Supplies and Sanitation Decade (IDWSSD) 1981-90 and around the 1992 Earth Summit, a great deal of rethinking took place concerning humankind's interaction with the natural environment. This re-thinking has been mirrored at the national level, especially in countries such as Bangladesh. With its water-dominated economy and lifestyle, Bangladesh is an environmental laboratory from which both its own water and sanitation programmes and others can learn.

Certain key principles have now come to dominate sectoral perspectives. One of these is that the environment is a reservoir of natural resources whose contents must not be depleted in an unsustainable way. Water is not 'free' any more than precious metals are free; water must be seen as a commodity with a realistic price-tag. It follows that costs must be recovered and users' energies deployed. Appropriate facilities for low-income communities mean those that are within their comprehension, technological participation and consumer reach.

Another important principle is that the environment and its resources need to be viewed holistically. Since 1993, UNICEF has been promoting the concept of 'primary environmental care', whereby efforts to improve human quality of life and livelihoods should be dovetailed with the management and conservation of natural resources. In this perspective, food production, health, and utility provision, water and energy, are all part of one environmental package.

'Primary environmental care' also places responsibility for environmental management at all levels of society. Water resources, their quality and quantity, and contamination in the environment are the concern of everyone, not just public health officials and engineers. In a country such as Bangladesh, private behaviour has a bearing on environmental management. The correct treatment of ponds and waterways, the security of pathogenic latrine contents from open exposure, and the abandonment of personal habits such as open defecation which have hazardous implications for others are an individual, household and community responsibility, as well as a responsibility of government.

The ascendancy of principles such as these has had a profound effect on the management of national water supply and sanitation programmes. If people are to become partners in service delivery instead of passive recipients, the authorities' role too must change. Instead of being omnipotent providers of services, water supply departments need to become advisors, facilitators and overseers of work carried out mainly by communities and private suppliers. Engineers must continue to be the guardians of public health, but not its sole dispensers. Certain powers and responsibilities need to be devolved to households and communities.

In Bangladesh, the need for reorientation of DPHE towards a facilitating role has been accepted. A review carried out in 1994 also recommended that its capacity for social mobilization and behavioural change be built up, and that greater attention be given to R & D, and to the role of women, both professionally and

among service users. An extensive programme of reorientation has been put in hand to help DPHE personnel understand the 'primary environmental care' approach. No longer do they need to feel uniquely responsible for hygiene progress in the Bangladesh countryside. They can catalyze others, building alliances with NGOs, union *parishads*, and local government officers employed in departments such as Health Services, Primary Education, and Women and Family Welfare.

Meanwhile, the process of handing over to the private sector the manufacture and installation of tubewells and latrines has been strongly promoted as well as attention to underserved communities, are duly maintained. Standards for hand pumps and other ingredients of the water-well industry, have been established with the aid of the Bangladesh Standards and Testing Institute. Other monitoring mechanisms are being put in place. But ultimately, the real control must rest with the users. In turn, they need to be sufficiently informed and knowledgeable to demand quality items and service at realistic prices.

tackling the behavioural issues

Information and knowledge interact with beliefs and practice. Alongside institutional change in the sector has come a determined effort to develop a much clearer picture of people's



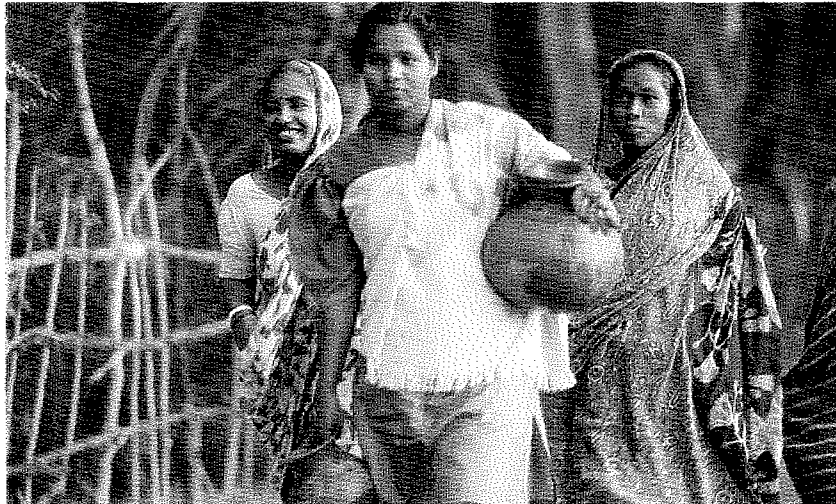
hygienic understanding. Those planning and providing services needed to know why people continue to live unhygienically and how the health-protection potential of safe tubewell water comes to be nullified between pump, spout and lip.

Anthropological studies have been commissioned to explore uses of tubewell water and pondwater, defecation practices, hand-washing habits, and household water storage methods. Results have been highly revealing.

Although over 90% of Bangladeshis know of a link between safe drinking water and good health, it seems that less than 20% of rural households use tubewell water for all domestic needs. For bathing, laundry and cooking, pondwater is preferred. This is

partly because of longstanding custom, as well as taste and convenience: the tubewell is further away than the pond and women want to save themselves the effort of carrying home large quantities of water. But it also reflects different value systems. Some people believe tubewell water is too 'cooling' to be healthy. And many rural people feel that pondwater immersion is more purifying for the body than washing with tubewell water.

Researchers have boldly questioned people about their most intimate personal habits. As far as defecation is concerned, the main users of latrines are women, for reasons of privacy and convenience rather than disease prevention. Although the connection between diarrhoea and drinking water is appreciated, the faecal-oral, hand-to-mouth route of diarrhoeal infection is not. Young children are not usually expected to use the latrine, their



faeces not thought polluting, and soiled napkins and bedding are rinsed in ponds without a thought.

Hand-washing practices owe more to notions of ritual depollution than to personal health. After defecation, most Bangladeshis wash their hands using some form of rubbing agent, be it soil, ash, or soap. But many only wash their left hand. They

Women: Chief water haulers and water users

Women's key role in the collection, management and use of household water supplies makes them the primary beneficiaries of services. Research shows that girls start water-carrying as young as five, and that women aged 21-25 spend between 1 and 5 hours a day fetching water. Their water-related behaviour is decisive in terms of family hygiene and health.

But women operate under constraints in Bangladesh. Their mobility outside the home is restricted by cultural tradition. They tend to eat less well than men. And their educational standard, and therefore their knowledge about how to protect health, is much lower. Consequently, it is necessary to make special efforts to reach out to women to involve them in issues of access and water and sanitation usage.

The introduction of the hand pump caretaker system, and insistence on female participation, was the first step in this context. Since the 1980s, many initiatives in the sector have singled out women for special attention. But they cannot do what their menfolk disapprove. So men, too, need to be targeted to reach women effectively.

think the right hand is clean. Tests show that both remain highly contaminated unless rubbed thoroughly together. Many people also dry their hands unhygienically, on their clothes or a soiled rag. And mothers do not wash their hands properly after cleaning their child's bottom. Very few people understand the need to wash hands *before* eating rather than afterwards.

Water storage practices also leave open all sorts of possibilities for pathogens to wreak their havoc. In many households, both tubewell and pondwater are stored, and children use the pots indiscriminately. Dirty hands come into contact with the water, and containers are often heavily contaminated. Women often do not wash the pot thoroughly before filling it and within two hours of collection, the stored water's bacterial count can be dangerously high.

Interestingly, people living further from a tubewell seem to suffer less from diarrhoea. They take more care of their stored water supply, using a container with a lid instead of an open jar, and have not got into the habit of cupping their dirty hands under the pump to take a drink.

Many of these studies show varying patterns and different levels of knowledge. It is difficult to draw definitive conclusions about the elusive software 'fix' which would finally unlock the Bangladeshi environmental health puzzle. The answer may be that there is no one single approach; elements need to be interwoven.



This certainly seems to be indicated by the results of a Sanitation and Family Education (SAFE) project run by CARE Bangladesh among 9,000 households in the coastal belt. Here, hygiene education activities were designed to reinforce existing beneficial behaviours and specific, appropriate alternatives to harmful ones were developed; this was intended as an opposite strategy to that of promoting a set of pre-determined 'perfect' water and hygiene behaviours. This approach, which embraced clean water, latrine use, environmental cleanliness, hand-washing, food hygiene and diarrhoea management, succeed in reducing diarrhoea by two-thirds in the intervention areas. Perhaps the element of sensitivity and adaptability to local practice is the closest it is possible to get to a universal 'key'.

Barisal: a sanitation success story

In 1990-91, an intensive sanitation campaign was conducted in three thanas of Barisal district: Banaripara, Gournadi and Agoiljhara. The success of this campaign has had a lasting impact on the whole strategy to promote hygienic living in Bangladesh.

The keynote of the campaign was alliance-building. It was conducted by local DPHE engineers with the involvement of thana and union officials, fieldworkers from the departments of family planning, social services, agriculture, public health and education, NGOs, Ansars and Village Defense Party cadres. Special importance was attached to participation by teachers and students in secondary schools and madrassas.

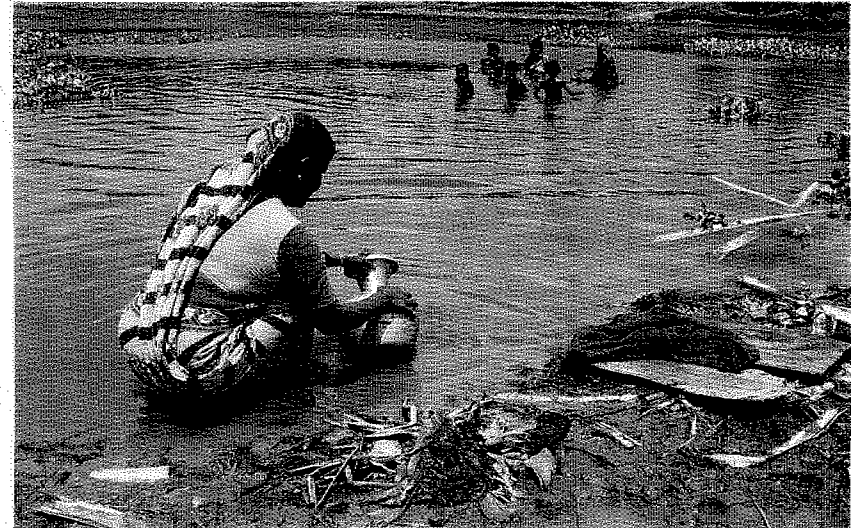
In Banaripara, the Sub-Assistant Engineer and the thana development officer were determined to 'do something different'. They divided each union into 20 areas, and on a given day, groups consisting of 12 different people went to a designated area and held courtyard meetings. The whole population was covered in a single day.

The campaign consisted of strong injunctions to destroy unsanitary latrines and construct sanitary ones in their place. Senior officials made it clear that other types of development input would not be forthcoming without latrine construction, and public health regulations were rigorously enforced. Demonstration latrines were built, processions held, and leaflets distributed. School students instigated latrine building at home and in neighbouring compounds, and prizes for high achievement were awarded. In Banaripara, 80% coverage with sanitary latrines was achieved. The two other thanas managed to reach 60%. But questions still remain about people's commitment over the longer term to their proper maintenance and hygienic usage.

What is crystal clear is that, almost universally in Bangladesh, there is a vital knowledge gap about faecal hazard in the environment, in surface water and on hands, bodies and clothing. Without tackling that knowledge gap, behavioural change will be slow in coming. A 1994 survey in Barisal district undertaken by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) bears this out. Here, a highly effective 1990-91 campaign in three *thanas* integrating latrine construction with tubewell installation resulted in 60% sanitary latrine coverage in two *thanas* and 80% in the third (*see box*).

Three years on at the time of the study, high rates of latrine use were still being maintained in Barisal. But relatively few households sufficiently understood the connection between faecal matter and disease and that using their latrines would secure themselves from contamination. Around 80% of children's faeces were not put in the latrine; high faecal coliform counts were found on people's hands (both right and left) and in water storage jars; and many latrines were too poorly maintained to be environmentally safe.

Clearly, it is not enough to say in rural Bangladesh: 'Build a sanitary latrine', or even 'Use the latrine'. People's hygienic ignorance and bad habits demand a new evolution in programme thinking, an evolution towards which the SAFE experience is a pointer. Hygienic understanding and its interrelationship with good and bad water and sanitation behaviours has to be at the centre of any programme strategy, alongside the creation of supply and demand for facilities. The sustainability of services



needs not only sound and cost-effective technology and management; it needs user knowledge and attitudinal endorsement too.

Today's water and sanitation programme in Bangladesh is now grappling with the profound behavioural challenges which have impaired its past child health impact record.



CHAPTER 4



দায়িত্ব
বোঝে
অন্যতম
কারণ
থাক
ও
বুলন্ত প্রায়খানা
জ.স্ব.প্র.

খাবার আগে
হিউব ওয়ালের
পান দিয়ে
হাত মুখ
ভালোভার
ধুয়ে নি

কঙ্কুর মল
মুদে মলের
ইতে বো
বাগ
হুডায়
মবিলা
সবার দানি
খাবেনা
দায়িত্ব
মবো না

Building momentum
behind thinking clean

পাত্তার পূর্বকর্ত
হুদে অসুত

আজই
আপনার
আপনার
না ও
প্রায়খানা

During the 1980s, the strategy of 'social mobilization' was developed by UNICEF to build momentum behind the goal of universal immunization. During the 1990s, UNICEF has fostered the incorporation of social mobilization techniques into the drive for sanitation in Bangladesh. People in Bangladesh are great enthusiasts for grand events, national 'Days' and rallies. There is a huge resource of popular energy to be tapped behind the cause of good health. On annual National Immunization Days, volunteers turn out in their thousands to sing, march, carry banners and see that mothers deliver their unimmunized babies to the vaccination posts. The idea of tapping the same kind of energy behind thinking clean was the underpinning rationale for the inauguration of 'Sanitation Week' in 1994.

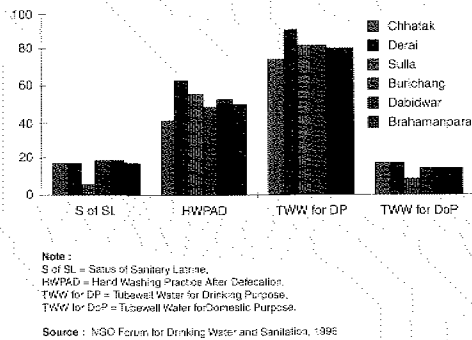


However, the story of social mobilization for sanitation goes further back and is broader in scope. In 1992, a national conference on social mobilization for sanitation was inaugurated by the then Prime Minister, heralding a new political willingness to tackle the sensitive subject of environmental pollution by human wastes. A national sanitation logo was launched, with three messages for health: use a latrine, wash hands, and use tubewell water for all domestic purposes.

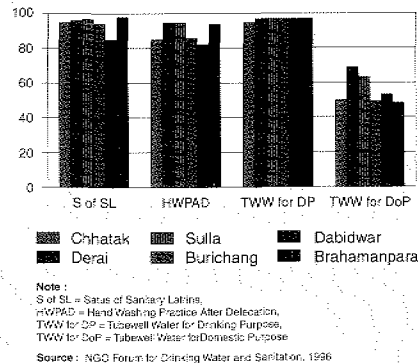
From this point onwards, UNICEF and DPHE systematically set out to implant the cause among all possible partners. Social mobilization involves building a movement at all levels of society whose purpose is to reach a common goal. Each motivated partner from government, civil society, religious and professional institutions brings their own skills and knowledge, their network of contacts, and mobilizes their group resources to reach their target audience. Each feels a sense of reward from contributing to a mass, joint effort which also gains momentum from publicity since the media are also important partners.

One of the most important groups to put their weight behind hygienic living at an early stage were the country's imams. In 1993, at a special imams' conference inaugurated by the Prime Minister, stress was placed on the religious virtues of cleanliness. At subsequent workshops, imams were invited to take the lead in promoting latrine coverage in their communities. Many responded vigorously to the call and have since sustained their involvement, with special drives during 'Sanitation Week'.

Sanitation and Hygiene Status
Before NGO Forum's Intervention



Sanitation and Hygiene Status
After NGO Forum's Intervention



NGOs involved in water and sanitation have played a leading part in the social mobilization movement. An NGO Forum for Drinking Water and Sanitation was created in Bangladesh in 1982. It has a well-developed infrastructure for supporting NGOs at community level, helping them to promote tubewells and latrines to their beneficiaries. The Forum is ideally placed to promote hygienic behavioural change. Its 560 NGO members have a greater proximity to households than any government service.

In 1993, the NGO Forum embarked on a special three year social mobilization project in 20 *thanas* with UNICEF assistance. Orientation workshops with local NGOs and discussion forums with local imams paved the way. Motivational activities ranged from latrine construction demonstrations, household visits and courtyard meetings, to discussions with *Ansars* and Village Defence Party cadres, health and family planning workers, film shows and rallies.

In promoting latrine installation and hand-washing, the programme achieved near universal coverage. Only in promoting the use of tubewell water for domestic purposes were results less dramatic. This pattern is beginning to become familiar, and is prompting re-consideration as to whether efforts should instead be devoted to promoting pond cleanliness. Expecting women to shift over entirely, and permanently, to tubewell water for all domestic use, may simply be unrealistic.

From 1993 onwards, DPHE began to develop its own capacity for social mobilization and communication. This was not an easy



transition: not only was a body devoted primarily to engineering trying to become a force for communication of sanitation messages; it was being asked to motivate and recruit others to join in a multi-faceted sanitation movement, not simply spearhead its 'own' sanitation campaign.

A core communications package for use in all social mobilization activities was developed with UNICEF assistance. Based upon it, training packages were also developed for all sorts of audiences with influence among householders: community leaders, teachers, imams, field workers, tubewell mechanics and masons. District teams were set up to carry out a programme of training sessions. Their participants were expected to set an example in their own communities by building, using and maintaining sani-

tary latrines. They are also supposed to spread correct messages about hand-washing with soap or ash and hygienic defecation.

Since the first 'Sanitation Week' in 1994, this event has grown both in types of activities and in the scale of local participation. Many NGOs are actively involved, not only those who are members of the NGO Forum for Drinking Water and Sanitation, but also organizations with a national spread such as Bangladesh Rural Advancement Committee (BRAC), Grameen Bank and Proshika. Together with the NGOs, the Ansar and Village Defence Party, many cadres of people ranging from the Boy Scouts, Girl Guides, and religious groups, conduct their own activities, marches, rallies, poster campaigns, as well as joining forces with those organized at *thana* and union level.

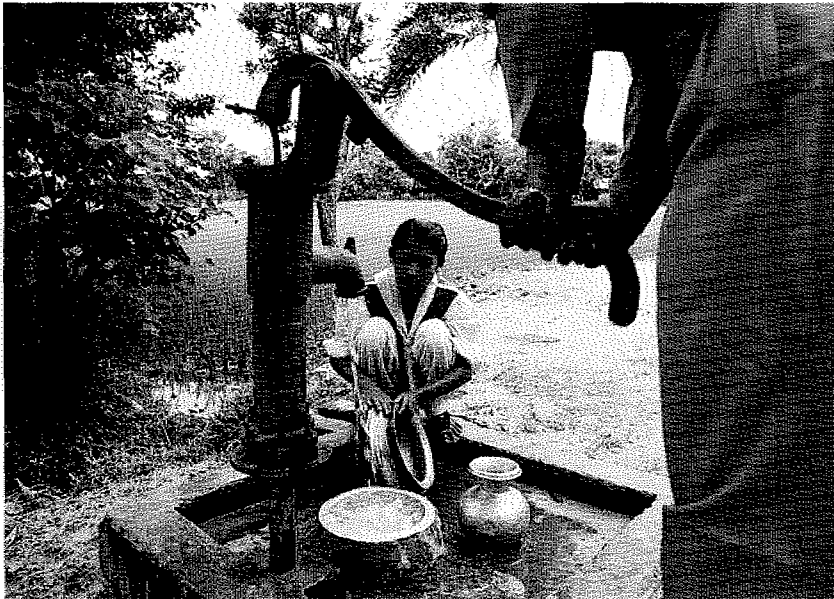
The 'Sanitation Week' acts as a climax to the year's social mobilization activity. Schools run essay competitions. Boy scouts build latrines in hospital compounds and market places. Bill boards are erected, TV spots are broadcast and theatre performances given. Every year, more emphasis is placed on practical activity. Union *parishads* set targets: each village to construct five sanitary latrines during the week. Awards are made to high-performing unions, one per *thana*, and their achievements blazoned by the media.

Although no formal evaluation of the impact of Sanitation Weeks has been undertaken, they are regarded as a great success. These events have undoubtedly contributed to the mounting coverage of latrine construction. But legitimate questions remain about lasting

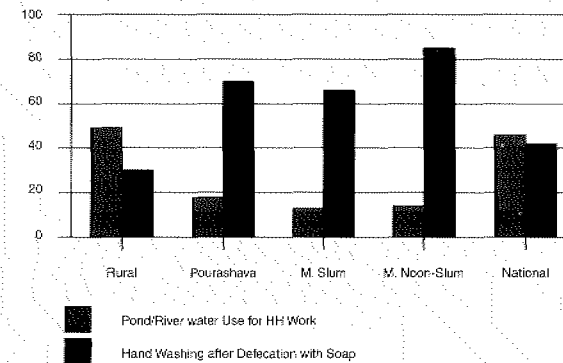
changes in behaviour and whether, without them, improvements in coverage will translate into lower rates of diarrhoeal disease.

hygiene education: a drip-drip affair

Social mobilization has made its mark on latrine coverage. It has yet to make as decisive a mark on hygienic behaviour. Rallies are fine for instant behavioural action. But only long-term reinforcement will contribute to permanent behavioural change.



Unhygienic Practices
in Rural and Urban Areas



Source: Pragati Pathey, 1997

Hygiene education on a continuous basis, household by household, village by village, still remains the poor relation in the DPHE-led water and sanitation programme. For people to keep their latrines environmentally secure, for household members to change their defecation and hand-washing habits definitively, this will have to change. What is needed is a thorough educational process, not occasional village meetings or one-off campaigns. The 'Union Watsan Committee', the community mechanism intended to oversee ongoing sanitary activity in the villages, has not yet managed to become functional in more than a handful of places.

NGO experiences, such as that of SAFE, bear out the need for an intensive, long-term approach to hygiene education, especially regarding faecal risk. Between 1992-93, an NGO called PRISM ran

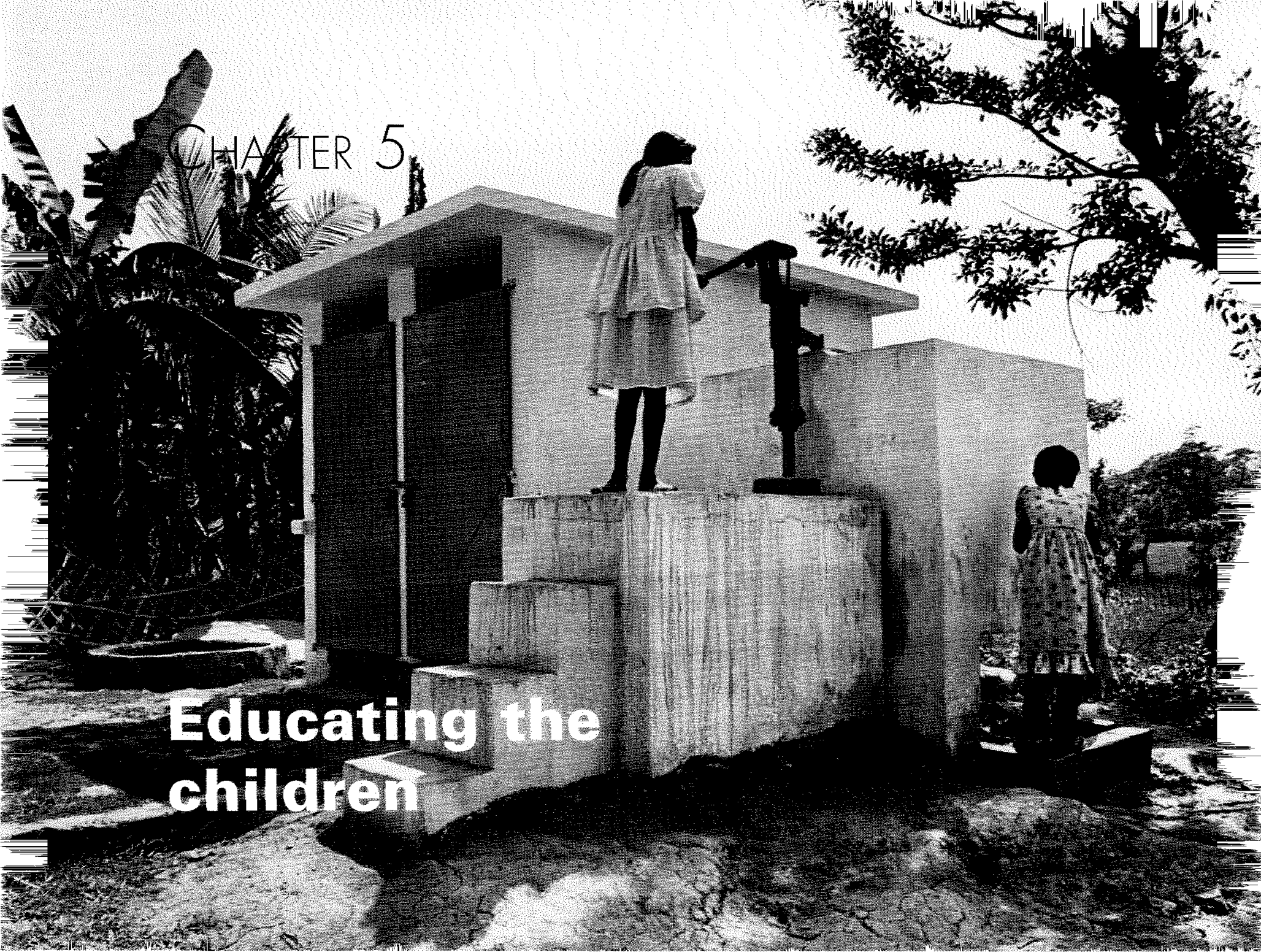
a UNICEF-assisted 'social mobilization for sanitation' project in Ramgoti *thana* in Laxmipur district. From this experience, many useful lessons were gleaned.

The project strategy was to conduct a process of interpersonal communication with the entire population of 56,500 households. This was undertaken by 133, mostly female, Village Sanitation Motivators. Each visited around 425 households at least four times and held numerous community meetings, including with the village men. The continuous process of dialogue allowed problems and misconceptions to be ironed out as the project continued. Results were impressive. After 15 months, sanitary latrine coverage had risen from 3% to 59%. But for solid behavioural change, PRISM believed that 15 months was not long enough. Without some system of continuing visits, project leaders were sure that good hygiene practice would not yet be sustained.

Embedding new convictions in seasoned minds is the main obstacle to behavioural change everywhere in the world. This is why, increasingly, UNICEF and DPHE are looking to the younger generation, children in school, to lead the cleanliness revolution Bangladesh so badly needs.

CHAPTER 5

Educating the children



Since social mobilization became a key strategy for sanitation promotion in Bangladesh, teachers have been very actively enlisted. The influence of teachers extends beyond their students, to the community as a whole. What the teacher promotes, and children demand, can represent a status symbol with which leading village families want to identify themselves.

Among adults, the health arguments in favour of hygienic behaviour have yet to take a strong hold. Most Bangladeshi women are motivated to use a latrine by the desire for privacy, a privacy ever more elusive as bushes increasingly disappear. For men, a latrine is a household status symbol. Thus, after building a sanitary latrine, adults may gradually revert to their old defecation habits, especially if it fills up and needs to be emptied or replaced, or becomes dirty, dilapidated or flooded in the rains.

Accordingly, more attention is today being focused on children via the schools. Not only must they be encouraged to use latrines and wash their hands, but promote this behaviour at home. The expectation is that, if they absorb new habits and an appreciation of the health consequences, they will maintain them for the rest of their lives. Teachers and children are therefore becoming the country's sanitation pioneers and reformers.

A special School Sanitation Project was launched in 1992. The first object was to ensure that sanitation facilities existed in schools: without the possibility of usage, no progress could be made. Through co-operation with Primary and Mass Education Division (PMED), DPHE and UNICEF developed a plan for constructing

water and sanitation facilities in primary schools where they did not exist. Criteria were established so that the most needy schools received priority.

Experience showed that school latrines frequently became noxious and were soon abandoned by their users. So great care was taken with the design of the facility. Its core is a tubewell whose hand-pumped water enters a 500 litre tank equipped with a drinking water tap. The tank is raised so that water pipes from it, lead directly to other taps in the latrine compartments. Two compartments, back to back, provide a 'girls' and a 'boys' lavatory. The taps allow the pans to be flushed clean on every occasion. Soap or ash is provided in each compartment for hand-washing.

During the first phase of the project, over 1,000 school sanitation facilities were constructed. The facilities were welcomed, not least because their presence was an incentive for girls to stay at school. In the past, if girls needed to relieve themselves they tended to go home and not reappear. The programme was counted a success. However, an evaluation uncovered various flaws: construction delays, use of poor quality materials, and lack of maintenance by the users. Some facilities were quickly abandoned.

Lack of community involvement and ownership seemed to be the problem. Accordingly the UNICEF Chittagong Divisional Office undertook an experiment in five government schools in Moulvibazaar District. Instead of counting on DPHE to organize construction using local contractors, responsibility was vested in the School Management Committees. Sub-Assistant Engineers

and *thana* Education Officers provided technical support. The necessary funds, materials and the design of the facilities was given directly to the Committees, who employed masons to do the work according to the specifications.

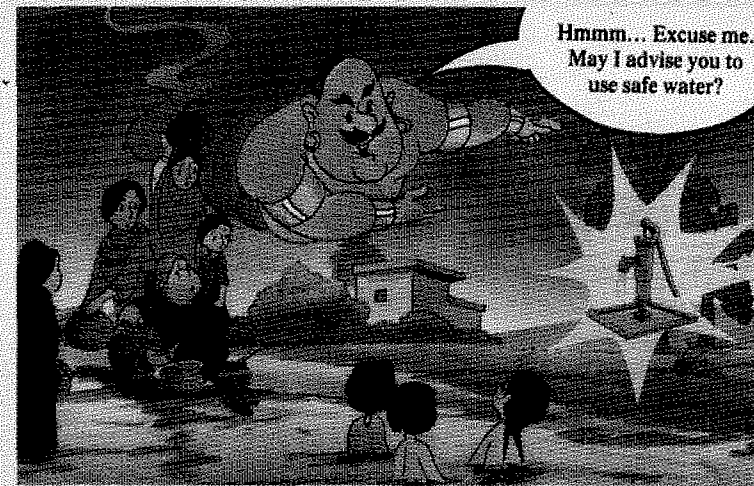
The upshot was that the water and sanitation facilities were built much more quickly and the quality of the work was higher. In some cases, materials such as paint, locks, taps, and doors were of a far superior quality than those specified because the School Management Committees preferred it that way. More attention was also subsequently given to maintenance and cleanliness of both water tanks and latrines. As a result, the construction of Water & Sanitation facilities has now been devolved to School Management Committees in more than 1500 schools in seven districts, under the supervision of the *thana* authorities. Coordination committees with membership from DPHE, the Division of Primary Education, the Division of Health Services, and NGOs, have been set up at both *thana* and district level.

Altogether, in five years, over 4,000 primary schools received facilities, and 32,000 teachers and members of School Management Committees were given training or orientation. Recent evaluations have found that the standard of cleanliness has improved, with over 80% of facilities well-maintained. Over half the schools now provide soap or ash for hand-washing, and far fewer taps go missing or get broken. Spot checks today show that staff and pupils alike demonstrate enthusiasm for the latrines as a matter of course.

Meena's three wishes

Meena and her parrot, Mithu, have become firm favourites among Bangladeshi children since the first Meena cartoon was launched in 1993. The cartoons are shown all over the country for entertainment — and education.

In 'Meena's Three Wishes' Meena becomes an advocate for a safe and healthy environment. The genie of the lamp gives her three wishes, and instead of opting for gold, jewels and a handsome prince, Meena asks for the power to persuade people to use latrines, use tubewell water for all domestic purposes, and wash their hands with soap or ash after defecation and before eating.



Clean school and clean environment in Dashchira

The government school in Dashchira village, Manikganj district has become an engine for the local campaign for clean living under the influence of dynamic *thana* officers and the school's headmistress.

The starting-point was a meeting attended by the whole village at the school in December 1995. The school then became the focal point for a communitywide health and sanitation drive under the head teacher's direction. Scouts and guides formed units to promote different topics with songs and demonstrations on EPI, nutrition, sanitation, tree planting and preventive health care.

The school has also formed a 'diarrhoea brigade'. The group of 14 students, boys and girls, keeps a monthly register of all diarrhoea cases in the village. Under the supervision of the local health office, they give out ORS sachets and demonstrate how to use them. They use the relevant Meena storybook as a visual aid.

The Dashchira cadets also monitor progress towards universal sanitation in the community. Out of 241 households, 201 now have sanitary latrines. The other families are very poor, so the idea of a 50% subsidy for them from the *thana* budget is being explored.

The enthusiasm of the school for its role in community health will hopefully soon be replicated. Ten other local schools have been to visit. Once momentum builds the ideas can be spread *thana*-wide.

In the early days of the School Sanitation Project, emphasis was focused on the construction of water and sanitation facilities. As time goes on, more emphasis is being placed on ensuring that personal hygiene and clean living become integral to the school children's lifestyle. Where education officials are supportive and head teachers are keen, school children can become a force for environmental health in the community (*see box*).

Some of Bangladesh's non-formal educational programmes have also begun to incorporate hygiene learning into the curriculum. An example is the primary education programme run by Gono Shahajya Sangstha (GSS). Students take up cleanliness as a class project, conducting community surveys, discussing the topic with people in their neighbourhood, and reporting back to school. At the end of the project, the children write a play demonstrating their new knowledge and perform it for the rest of the school and in the community at large.

The latest concept in school sanitation, building on the GSS experience, is 'safe learning environment'. This approach emphasizes both the incorporation of water and sanitation activities into the learning process, and the use of the school as a resource centre for community behavioural change. In an experiment in 10 schools in Noakhali district, teachers carry out an inspection of their pupils once a week. They check the state of their dress, hair and sandals, cut the nails of the younger children, and issue nail-clippers to older ones. Deworming tablets are administered once a year.

These activities, which are also being carried out in the schools where water and sanitation facilities are being constructed under the new School Sanitation Project phase, are intended as a starting point for study into issues such as waste disposal and protected water supplies. UNICEF is developing a resource pack for schools which explains how to run school gardens, conduct environmental projects and carry out disease surveillance in ways which are instructive and fun. Hopefully, teachers can be persuaded that, with minor adaptations, a hygiene and environmental dimension can be incorporated into the existing curriculum.

Around 55% of the 57,600 government primary schools in Bangladesh still have no sanitation facilities. The goal of the School Sanitation Project is to ensure that all these, and all non-formal primary schools run by NGOs, both have sanitation facilities and are promoting a 'safe learning environment' by the year 2000.

CHAPTER 6

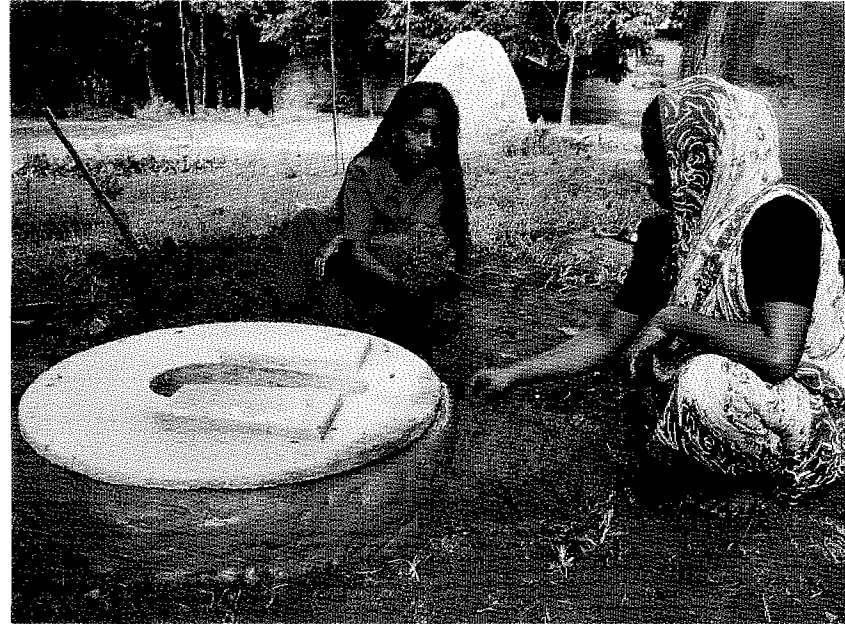
Reaching the unreached: equity and vulnerability



maintained. In iron-excess areas, water is similarly pumped into a simple plant which removes iron by aeration and filtration. This, too, depends on motivated consumers to keep it clean. In most of the low water table areas, the key technology is the sludged tubewell capped by a Tara hand pump. Since the Tara was first developed, over 100,000 of the regular model have been installed. Two adaptations of the Tara, the Tara II and the mini-Tara, are now being tried out on an experimental basis.

In sanitation, equity and vulnerability are socio-economic issues. The water-seal latrine favoured by DPHE remains far outside the financial reach of most rural households, and for this reason the home-made pit latrine continues to be heavily promoted. At present, the ratio of water-seal latrines with concrete linings to home-made pit latrines is one to four. However, efforts are being made to reduce the costs of sanitary latrine components. Tests have shown that it is possible to reduce the thickness, and therefore the price, of the concrete rings sold for pit lining. And in 1995, plastic pans (without water-seals) started manufacture and sale.

The balance between what is equitable, what is affordable and what is truly 'sanitary' in such an over-crowded, easily polluted, and frequently flooded environment is difficult to strike. DPHE still tends to believe in latrine promotion by subsidies and supplies of better-quality items. NGOs tend to believe in creation of consumer demand for adequate home-made facilities even at short-term environmental health risk. They assume that once the latrine habit is entrenched, families will upgrade to the 'sanitary' model when they can afford to. Unless people have a sound



appreciation of a latrine's health benefits it will not be used properly, and 'sanitary' objectives will be defeated.

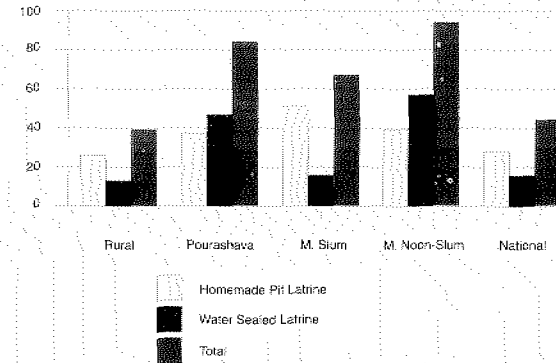
New cost-saving technologies and their promotion are one way to redress disparities. But attention is also constantly given to other types of affirmative action on behalf of disadvantaged groups. The participation of local NGOs is one way of ensuring a focus on the marginalized and most vulnerable. For example, between 1995-96, an NGO called Otkrom in Moulvibazaar district conducted a house-to-house intensive sanitation and hygiene programme in over 2,000 villages and in 60 tea gardens, with support from UNICEF. Without this kind of grass-roots effort, groups outside

the mainstream such as the tea garden workers could not be reached.

The promotion of women in NGO programmes and within the water and sanitation profession, as sanitation motivators, mechanics and engineers, helps ensure that women's needs are better catered for and their perspectives better understood. Where it has been evaluated, women employees' performance in social mobilization and hygiene education tends to outclass men's. Although it is difficult to find women candidates in the engineering profession, gender barriers are gradually breaking down. A disadvantaged group whose situation need more attention is slum and shantytown dwellers. During the recent past, Bangladesh has experienced rapid and unplanned urbanization; Dhaka, already with a population over 8 million, is one of the fastest growing cities in the world. Although poverty in Bangladesh is thought of as a rural phenomenon, over 50% of urban inhabitants live below the poverty line, and 30% qualify as 'very poor'.

In the slums, occupied by 22% of urban inhabitants, less than one-third of people have access to a public water supply and less than one-fifth to proper sanitation. There is one operating tubewell per 527 persons, and each latrine serves 13 users. Not surprisingly, diarrhoea and other hygiene-related diseases, flourish. The Infant Mortality Rate in urban slums is higher than that in the countryside: a UNICEF analysis of 1991 figures showed that there were 142 deaths per 1,000 live births in poor urban areas compared to the rural rate of 93 or the national rate of 90.

Sanitary Latrine Distribution in Urban and Rural Areas



In spite of the difficulties of service installation in densely-crowded and irregularly occupied settlements, urban-rural disparity in water supply and sanitation service provision needs to be addressed. If no environmental action is taken, the Bangladeshi urban habitat will become a by-word for pollution and a major threat to public health.



CHAPTER 7

Working together

The network of actors and stakeholders in safe water and sanitation in Bangladesh has grown substantially in recent years. This is a reflection of the importance attached throughout official and civil society, from the top echelons of the political establishment to humble citizens in tea gardens and village schools, to better standards of environmental health. It is also a reflection of the increasing recognition within the public health establishment that infrastructural development and engineering prowess is only one side of the public health coin.

The statutory responsibility for services is vested in the Ministry of Local Government, Rural Development and Co-operatives (MLGRD&C). Within the Ministry, the Department of Public Health Engineering (DPHE) carries the functional responsibility in all rural and urban areas except in the cities of Dhaka and Chittagong, which have their own water and sewerage authorities. In all administrative, technical, infrastructural and management questions, these actors take the lead.

From the inception of the DPHE-administered rural water supplies and sanitation programme in 1972, UNICEF has been its key external donor and source of supplementary expertise. The programme's evolution has provided a remarkable model for donor agency-government sector relationships with all their hazards of donor dependency and donor interference, all their need for sensitivity and mutual respect in reconciling national with international objectives, ideas and sectoral practice. At each phase of programme growth, UNICEF has played the role of advocate, experimenter and underwriter, with technologies, with

the introduction of innovations such as user contributions and hand pump caretakers, with emphasis on women's involvement, and with social mobilization. Whenever an experimental phase has been followed by mainstream adoption of a new technology or idea, UNICEF has moved on to tackle the next generation of issues. Its close relationship with DPHE has helped smooth transitions, especially the acceptance of software ingredients alongside engineering hardware, and the conceptual shift from a 'do-it-all' to a facilitating role.

In turn, UNICEF has itself been faithfully supported by certain key bilateral donors, notably DANIDA and the Swiss Agency for Development and Cooperation (SDC). These partners have acted as stimulators, watch-dogs, colleagues and evaluators. Their insights have helped in the past to promote such issues as equity in tubewell siting, gender dimensions, and the need for close monitoring and accountability; today they are emphasizing such issues as sustainability, community participation, the involvement of the private sector, and the role of government as facilitator. During the International Water Decade, the World Bank, the United Nations Development Programme (UNDP), and other international agencies began to participate, and now attach great importance to inter-agency coordination.

The growing participation of NGOs in all aspects of water and sanitation, is another hallmark of the programme. Right at the start UNICEF recognized the capacity of national NGOs such as BRAC, Proshika and the Grameen Bank to reach out to thousands of village communities and groups with tubewell loans and



sanitation messages. The role of the NGO Forum as the apex body for water and sanitation efforts by smaller NGOs which touch the lives of users and householders, endows the programme with a huge extra momentum. NGOs have expanded informal partnerships at *thana* and union level, as well as contributed to the spread of services.

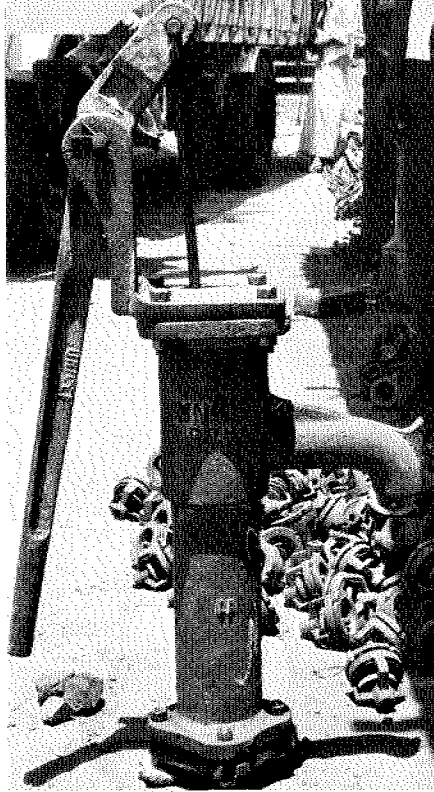
Because of the demand for facilities stimulated by the water and sanitation programme, the private sector has become an increasingly important partner. Funds have been provided for the training and capitalization of private masons and handymen. Technical assistance has been offered to companies bringing new items onto the market such as plastic latrine pans. Such innovations can help reduce prices and make facilities affordable for customers with very low incomes. Promotional partnership with manufacturers of soap is also envisaged.

Another important group of stakeholders are the users of water and sanitation services. So far, efforts to create effective Union Watsan Committees in which they can be properly represented

have not been productive. But the example of successful organization of school sanitation by School Management Committees indicates that when a clear goal is in view, community leaders are more than willing to join in. The annual Sanitation Week provides an opportunity for building new partnerships. Many district and *thana* -level government officials lend their weight to this process.

Personnel in the Ministry of Health and the Division of Primary Education are also allies with great potential as some local campaigns and activities in schools have shown. Their respective spheres of work have an important influence over the spread of knowledge and its impact on behaviour where health is concerned. Disease control programmes, notably that to control diarrhoeal disease, have important overlapping objectives with the drive for clean living. At present, the degree to which district and *thana* health and education personnel lend their support to the sanitation movement varies widely; a more systematic process of linkages at all levels is needed.

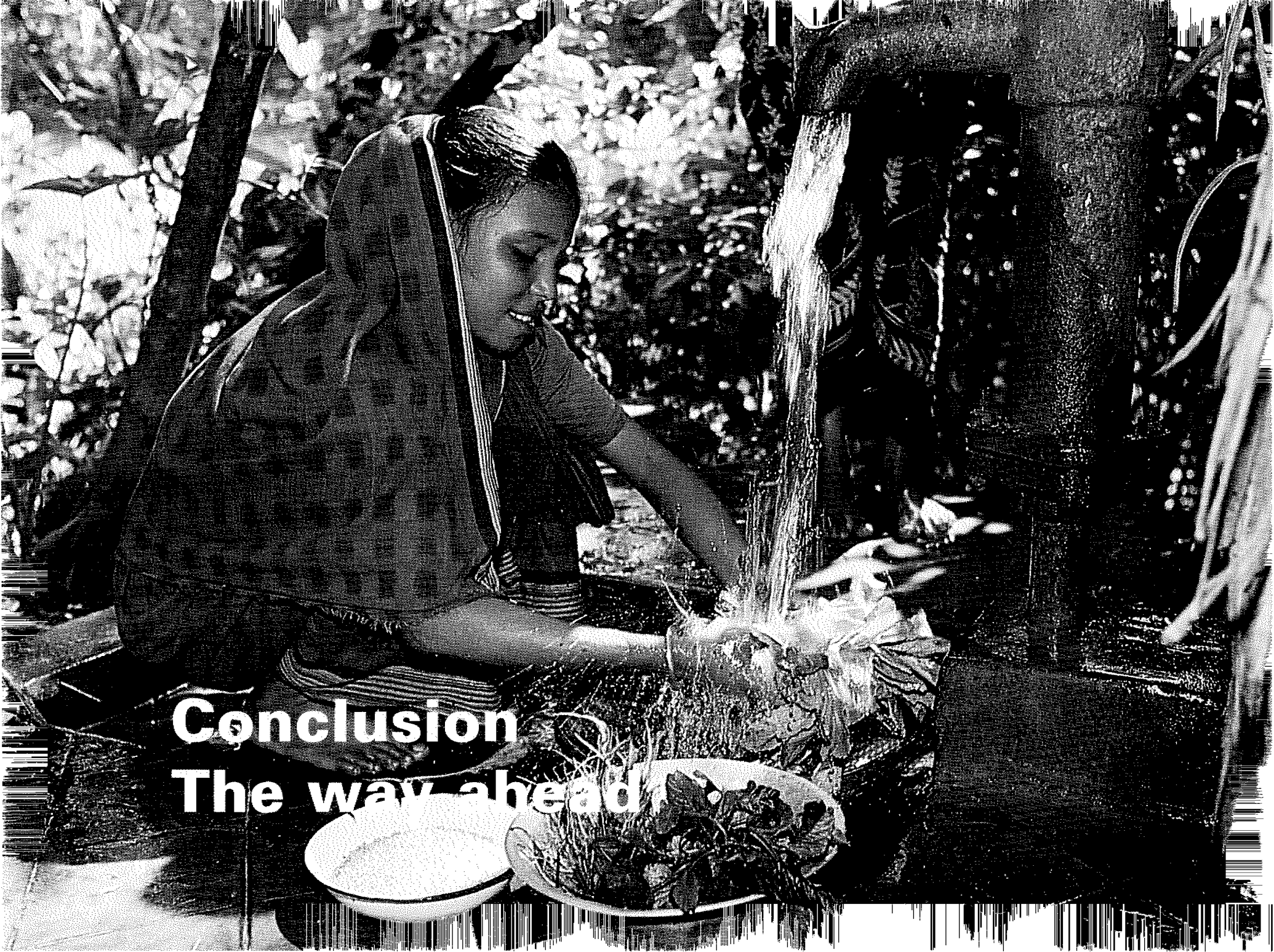
A new set of partners to come on the scene since the advent of social mobilization and a partnership strategy for water and sanitation, is those professionally involved with mass communications. The 'Meena' animated video series is only the most prominent way in which allies from the media and the Ministry of Information are helping promote hygienic living throughout the length and breadth of Bangladesh. Cinema shows, microphone vans, folk songs, traditional plays and entertainments are all being used. The success of Sanitation Weeks owes much to these allies.



Although many actors, governmental and NGO, share the credit for the major advances in water supply and sanitation which have taken place in Bangladesh during the past 25 years, UNICEF has continuously played a special facilitating role. It has been an investor and underwriter; a technical innovator; a philosopher and thinker, but one grounded in practical realities; it has helped to build up DPHE and lent support to its changing role; it has acted as catalyst, getting things started and then moving on.



UNICEF remains a linchpin which helps the interlocking parts of the water supply and sanitation movement fit smoothly together. Through its many other programmes of co-operation, spread of child health services, spread of immunization, spread of oral rehydration therapy, support to nutrition, support to education, support to women and girls, UNICEF is also uniquely placed to fit water, sanitation and environmental health into the large picture of child and family well-being.



Conclusion
The way ahead

In the 26 years since Bangladesh's independence, a concerted effort has been made to tackle the need, and right, of every Bangladeshi citizen to an accessible supply of clean drinking water. More recently, this effort has been extended to tackle their need, perceived or unperceived, for adequate means of sanitary human waste disposal. But for all these efforts, outstanding challenges still remain.

Diarrhoeal disease still takes a very high toll on the health of Bangladeshi citizens, causing 110,000 young child deaths every year. This clearly means that something more is needed to match the increasing availability of safe water and human waste disposal facilities with a truly effective behavioural revolution. Meeting coverage goals set for the end of the century is one thing. Translating that into fewer young child bouts of illness, parasitic infestations, lower levels of malnutrition, and, ultimately fewer young child deaths is something else.

but that something should happen and can happen

If it is possible to effect a major change in drinking habits, it must also be possible to effect changes in other hygiene-related parts of people's lives. In parts of the country where intensive hygiene

education has accompanied the installation of latrines, observers believe that there is an impact on disease. Villagers notice a difference. They do not feel so threatened by the demon of diarrhoea. Mothers are more sanguine that their children will recover and thrive. The evidence may be more often anecdotal than scientifically valid, but nonetheless local officials and prominent community members are convinced that the message is getting through.

Today, one of the great differences compared to a few years ago is the volume of knowledge available to programme planners about people's attitudes towards water and human waste. This knowledge has sent the water and sanitation movement off in new directions. Assumptions which used to be taken for granted — that few people could be persuaded to purchase or build a sanitary latrine, that the connection of human excreta to disease was self-evident, that owning a latrine was tantamount to using it — have been discarded.

More emphasis is being placed on reaching right into the household and community so as to create the consumer demand and bring about the behavioural change that makes the difference. *Interconnecting messages about different aspects of child health, about good diet and food hygiene, about disease control and immunization, about treatment for diarrhoea and prevention of diarrhoea, go hand in hand.*

There is no other way to promote 'primary environmental care' than by persuading people to change. Despite many grand



hydraulic schemes and dreams, there is no way in the foreseeable future that any engineering fix could tidy up and sanitize the great rivers and floodplains of Bangladesh. Equally, it is vain to imagine that people for whom water plays such an integral part in economic, social and cultural life can be persuaded to separate themselves entirely from it. But there are ways in which they can reduce its level of pollution; and there are changes in hand-washing, latrine- and water-use behaviour which would reduce their contact with potential contamination at critical daily-life moments.

It is a common feature of public health campaigns that as the goal becomes closer, the task becomes increasingly complex. With the accumulated experience of the past and present, UNICEF in Bangladesh stands ready to help the sanitation movement master the many complexities which still confront it. Many other partners, governmental, intergovernmental and non-governmental, are similarly geared up. All depend to a greater or lesser extent on external assistance to take the mission forward.

The groundwork has been laid. The opportunities are there. The strategy is in place. With renewed commitment and support, it must be possible to turn the corner towards better environmental health decisively by the end of the century.

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