

## Chapter 4

### **Water, Environment, Sanitation: The Changing Agenda**

Since the hygienization of daily life that followed the Industrial Revolution, no major decline in human mortality has been thought possible without a large dose of public health engineering. Even in the heyday of the disease control campaigns of the 1950s and 1960s, it was not forgotten that dirt, especially in drinking water, was the most efficient spreader of disease. As well as cholera, typhoid and the diarrhoeas, many infections were connected to poor hygiene: scabies, trachoma, intestinal parasites; others such as guinea worm disease and schistosomiasis entered the body via a water-dwelling vector; and yet others—malaria and yellow fever—were carried by insects that bred in and around water. Inevitably, given the unsanitary character of the developing world, both WHO and Unicef began in the 1960s to become increasingly involved in disease prevention via the science of public health engineering as well as that of medicine<sup>1</sup>.

For Unicef, the water supply programme that emerged in the 1970s was arguably its most significant and influential in the years before the 'child survival revolution'. The reason was that—anomalously for an organization helping children—Unicef found itself more operationally involved in public health engineering than in virtually any other programme area, hiring hydrogeologists and master drillers and investing in 'hands-on' technical research. This was because when it became involved in providing water supplies for poor and remote rural communities, it confronted a glaring operational and technological gap. The gap was between grand, heavily engineered public works schemes and simple, low-cost installations that required neither expen-

sive supplies of fuel nor elaborate skills to operate. The pioneers of 19th-century public health had cleaned up the urban environment with pipes, sewers and treatment plants. But this solution was entirely inappropriate for almost all the rural, and many urban, inhabitants of the developing world.

Much of the early work to identify 'intermediate' water-well technology was undertaken by mechanically minded missionaries as part of their humanitarian work among the poor. But these actors had neither the resources nor the attitudinal reach to address the water supply problems of rural populations *en masse*. The size and organizational character of Unicef, together with its commitment to basic services and the poor, fitted it to play a bridging role. It drew on technologically simple, low-cost options and promoted them as the basis of a nationwide approach.

However, there were also important external influences on the development of the Unicef programme. One was the worldwide consciousness of environmental issues that began in the late 1960s. Another, not unconnected, was the increasing number of drought and famine emergencies in whose wake many water supply programmes were launched<sup>2</sup>. The setting for these was often an accumulating upset in the fragile balance between human pressure and the natural environment, which finally tipped over the edge into disaster. Such was frequently the pattern in Africa, where a continental swathe from the Sahelian zone in the west to the Horn in the east was beset by frequent drought from the early 1970s onward.

The two programmes that established Unicef's role in low-cost rural water supplies were both precipitated by emergencies; both were also on the Indian subcontinent. The first was the 1966 famine in Bihar, during which hard-rock percussion drilling was introduced into India. When the emergency was over, the Indian Government decided that since the water table was dropping all over India's central and southern hard-rock peninsula, the old, painfully slow, water-well blasting and boring methods should now be superseded. In 1970, Unicef agreed to provide 125 'down-the-hole' air hammer rigs at a cost of \$5.9 million for a nationwide rural drinking water programme for 575,000 'problem villages'—one of the largest grants the organization had ever made up to that time<sup>3</sup>.

This investment led to another important technological evolution. In 1974, surveys in the states of Tamil Nadu and Maharashtra revealed that 80 per cent of the handpumps installed on the new boreholes were out of action. The very high breakdown rate was explained by the fact that the handpump used could not withstand continuous use by a whole community. In addition, the assumption that the *panchayat* (village council) would organize maintenance and

repairs had proved misguided. This disaster led to the development by Unicef, in partnership with government and private industry, of the India Mark II deep-well handpump. This sturdy, durable and cheap pump, designed for heavy use in areas where the static water table was far below the surface, was the only one of its kind then available. Within a decade Unicef advocacy had turned it into a subcontinental best seller, the standard deep-well pump for rural and shanty-town areas not only in India but in other countries around the world. The development of the India Mark II, its institutionalization in India's national rural drinking water programme and the transfer of its technology worldwide have been some of the most important successes in Unicef's history.

The Indian rural water supply programme, especially in its early phase, focused heavily on technology, its management, installation and repair. This stemmed naturally from the complex hydrogeological problems the programme confronted. The programme that was initiated in Bangladesh, also in the 1970s, had those features in common with the Indian programme. But the geological setting, and therefore the technological complexity and expense, were entirely different. Where India's main problems centred on hard-rock areas and water shortage, Bangladesh had barely a rock at its disposal from one end of the country to the other and was water-abundant. A fertile and overcrowded country, Bangladesh is situated in the world's largest delta area. Here, too, the balance between humankind and nature had been upset by the pressure of rising numbers, but the outcome was not soil erosion and drought. The annual inundation of between one third and one half of the country's land surface swept all dirt and detritus before it, transforming the countryside into an open sewer. Endemic cholera and diarrhoeal disease were spread by the pollution of the open ponds in which people bathed, swam and fished, and from which they drank<sup>4</sup>.

In Bangladesh as in India, Unicef supported a national rural drinking water supply scheme that aimed to place a communal handpump within reach of every village household. But here, given the soft soils and the high level of the water table, the technology needed was rudimentary. Tube-wells could be sunk to a depth of around 50 metres by a traditional method requiring only a bamboo scaffold and a few lengths of galvanized iron pipe. A simple suction pump on top brought water to the surface. Initially, Unicef provided the means to construct or re-sink 160,000 shallow tube-wells and cap them with pumps. Existing technology was improved, and later a cheap and durable pump for use in water tables just below the suction level was developed. As the programme progressed, its purpose became to install enough tube-wells across the country-

side to implant in the rural Bangladeshi mind the notion that, for drinking especially, but also for cooking, washing and laundry, pond water should be abandoned in favour of tube-well water.

In the cases of both India and Bangladesh, therefore, Unicef was a partner of government public health engineering departments helping develop what amounted to a new concept: a service operating right down to village level, overseeing a system based not on underground pipeline and household connections, but on a network of detached handpump tube-wells. This required not only new technological approaches, but managerial ones that took into account the wishes and capacities of local communities. Before this time, no one had attempted to build an institutionalized water supply delivery system using low-cost, appropriate technology and applying the principles of standardization and economies of scale. Suddenly, estimated costs of providing facilities for the world's unwatered could be cut from a minimum of \$300 per head to \$30 per head or less<sup>5</sup>.

In 1977 the UN World Water Conference in Mar del Plata, Argentina, called for the declaration of an International Drinking Water Supply and Sanitation Decade (IDWSSD). The Decade's primary goal would be to achieve 'universal access' to water and sanitation by 1990. By the time it was launched in 1981, the modest handpump, the lowly latrine, the capped spring and the gravity-fed cistern were starting to attract attention and resources from the World Bank, UNDP, major donors such as DANIDA and SIDA, and other members of the international development community. By this time, Unicef had already become involved in water supply and sanitation programmes in a number of countries in Africa and Central America as well as in India, Pakistan and Bangladesh. Internationally, it saw its role as advocating and popularizing the low-cost, low-technology approaches it was helping to develop within its own programmes of cooperation, together with appropriate systems for their management.

In the field, Unicef was already beginning to address the next generation of problems associated with these pioneering public health engineering activities. All manufactured installations—even the sturdiest and the most modest—need maintenance and repair. Where water and waste disposal systems are in the hands of a central body that controls faucets and flows at a distance, management is a specialized affair. Services based on handpumps are different. They have to be managed on a day-to-day basis by the users, and if the users are not equipped technically and organizationally to do so, management and maintenance will falter. In India, the first strategy had been to depend on the *panchayats*—the village councils; when this failed, professional engineering teams were

assigned to the task. But it soon became obvious that the communities the handpumps served would have to be involved. The authorities could not watch over hundreds of thousands of separate installations day in and day out.

This led to the idea of the 'village handpump caretaker'. In the era of 'basic services', which sought outreach and community ownership of services by enlisting local volunteers, it was a small step from the 'barefoot doctor' to the 'barefoot mechanic'. At an early stage it was also proposed that some 'handpump caretakers' be women. This was the first deliberate attempt to ensure the involvement of women in decisions about a service that, because they were both the haulers of the household water supply and its managers and main users, affected them deeply.

The idea of community, and female, involvement in handpump maintenance, later synthesized by World Bank technicians as 'village-level operation and maintenance', or VLOM, was another major contribution to the evolving pattern of water supply programmes. In due course, ease and simplicity of parts replacement with a minimum of tools became an important design criteria for new or improved versions of handpumps—including a later version of the India Mark II. Some VLOM enthusiasts even believed that sturdiness was a less important handpump design criterion than VLOM potential—especially VLOM by women caretakers. In the 1980s, the unlikely image of the village woman with a spanner in her hand became the latest water and sanitation trademark; the twin themes of women's involvement and VLOM as essential components of new-style rural water supplies management dominated the second half of the Water Decade. In a number of programmes, for example in Kordofan, the Sudan, in Imo state, Nigeria, and in Bangladesh, community levies for pump maintenance—spare parts, tools and occasionally labour—were introduced so as to ensure a sense of community ownership for the water supply system<sup>6</sup>.

When the Water Decade had been launched, much emphasis had been placed by WHO and others on the public health advantages of safe water and sanitation. Between 10 million and 25 million deaths each year, and 80 per cent of all bouts of sickness, were attributed in some degree to inadequate water or waste disposal<sup>7</sup>. Five million of the 14 million annual deaths among children under five were attributed to diarrhoea, in which impure water and poor hygiene were undoubtedly complicit<sup>8</sup>. This was the underpinning rationale for a drive to provide facilities for that half of the developing world's population without a water supply, and the three out of four people with no method of sanitation other than a bucket or a walk in the fields<sup>9</sup>. But the reason why water supply—less so sanitation—schemes had proved so popular

with rural communities had little to do with health considerations obscure to those who knew nothing of the germ theory of disease. To its customers—especially women, who had to haul the water—the new water supply was a convenience, and a wonderful relief from hours of drudgery<sup>10</sup>. But extra water use as a sanitary aid did not necessarily follow the installation of handpump or standpipe, especially where collection was still a burdensome affair requiring heavy pots and lengthy portage.

Gradually it became clear that low-tech public health engineering could not in itself eliminate dirt- and water-related disease. Here was a familiar lesson: technology, however appropriate, was not a ‘fix’, especially if what it was supposed to fix was a different problem from that experienced by the community. Handpumps and standpipes only provided the environmental preconditions for improving health; such improvements might be non-existent unless other things happened as well. That they did drastically improve quality of life, reducing time spent by women on water collection and easing their domestic and child-rearing burden, was sometimes overlooked in the obsession with water as the bedrock of public health.

One of the other things that had to happen was an improvement in sanitation—comparatively much neglected<sup>11</sup>. Sewerage was unaffordable for most of the citizens of the rural and poor urban developing world. Meanwhile, excreta is not a popular subject in any culture, and the practitioners of ‘appropriate’ public health found that there were few places in the world whose inhabitants could be easily persuaded to attach social cachet to a latrine. In the early 1980s, efforts began—and again, Unicef was a keen supporter—to improve latrine technology. For water-short areas, the odourless ‘ventilated improved pit’ or VIP latrine was developed; for water-abundant areas, the ‘pour-flush’ latrine with a water-sealed pan<sup>12</sup>.

In the end, however, the only sure way that major advances in public health could accompany technologically cheap and simple engineering systems was by a transformation in human behaviour. If villagers used the new borehole supply only in the dry season; if they failed to clean their water pots; if they never washed their hands before meals; if they bathed in polluted ponds and their children went barefoot, then the best intentions of the engineers could not reduce the diarrhoeal infections and parasites that invaded their well-being. By the 1980s, research was showing that it helped to supply water in quantity to every household, thus encouraging much greater use for washing and bathing<sup>13</sup>. By definition, a handpump for 200, 300 or 500 people several hundred yards away did not achieve this. The focus on quality—on *safe* water—had obscured the need for easily accessible volume. And quality was

unappreciated by users: no one had convincingly explained its health-related virtues and the need to protect them all the way from pump head to mouth.

The Water Decade was barely under way before Unicef had shifted its attention away from the 'basic services' strategy in which water supplies, and increasingly sanitation, were central components, towards GOBI and the 'child survival revolution'. With its strong emphasis on the immediate saving of child lives, the message to the engineers was that they—for the moment—had become sidelined. Water and sanitation might be important over the longer term; but in terms of dramatic and demonstrable reductions in infant deaths, they had no primacy. Although both were necessary, more could be done, much faster, and much more cheaply to save diarrhoeal deaths with cure—oral rehydration therapy—than by the preventive strategy of installing handpumps and latrines. Over the next few years, the financial assistance provided by Unicef to water and sanitation as compared with child health was significantly reduced: in 1982, Unicef spent \$60 million on 'Watsan' compared with \$51 million on 'basic health'; in 1987, the corresponding figures were \$64 million and \$152 million<sup>14</sup>.

But the engineers were not deterred. If their technology did not 'fix' health, they would reset their sights. They would produce the missing link between handpumps and standpipes and the health benefits they were supposed to confer. Unicef's water and sanitation team would set about establishing themselves firmly on the side of child survival and health, as well as on the side of women's and community convenience. The time of exclusive concentration on 'hardware'—drilling rigs, handpump design and coverage targets—had ended. The time for 'software'—for health education and behavioural change—had begun.

For much of the 1980s, Unicef's primary attention to the millions of cases of diarrhoea threatening young children's lives continued to take the form of promoting oral rehydration therapy.

The campaign on behalf of ORT was coordinated by WHO's programme for the control of diarrhoeal diseases, which set an ambitious target of 50 per cent ORT use in diarrhoeal treatment by 1989<sup>15</sup>. The achievements of the campaign paled into insignificance beside the drive for UCI; nonetheless, there were some considerable gains. By 1990, 350 million packets of ORS were being manufactured annually compared with 40 million in 1980<sup>16</sup>. Unicef had helped establish local manufacture in a number of countries, 62 of which now produced their own supplies. With improved availability came improved ac-

cess: 61 per cent of the world's people could now obtain ORS to treat diarrhoeal dehydration from their local health centre or pharmacy. In fact, only 32 per cent did so; but this compared with the 1980 figure of less than 1 per cent<sup>17</sup>. WHO estimated that the increased use of ORT was saving around 1 million child lives annually—an impressive statistic but for the fact that 3 million more were there for the saving<sup>18</sup>.

These achievements were mainly due to the push provided by the 'O' in GOBI and the 'child survival revolution'. In particular they were due to Jim Grant's unflinching promotion of a remedy to a condition not normally discussed in polite society. Grant was prepared to take out the sachet of ORS he always carried in his breast pocket in almost any setting, however prestigious. Whether he was on a podium, at a state banquet or in the receiving room at Government House, he promoted diarrhoeal rehydration with a lack of self-consciousness that frequently left his entourage blushing. His salesman's techniques worked. As important, the enlistment of USAID and the Task Force for Child Survival under the ORT banner created professional and technical momentum<sup>19</sup>.

By the late 1980s, from the growing number of national programmes for the control of diarrhoeal disease (90 by 1988<sup>20</sup>) had emerged a wide variety of strategies for overcoming obstacles to the spread of ORT. Both in the clinic and in the household these were more numerous than anticipated. ORT's simplicity and effectiveness as a remedy for diarrhoeal dehydration had led its protagonists to expect that the operational ramifications of getting ORS onto every pharmacist's shelf and into every home medicine chest would be less complex than turned out to be the case. The obstacles ranged from professional resistance in the medical establishment, to the contrariness of human nature in preferring fancy drugs, to technical disagreements about the correct mix, to the lack of training and familiarity with ORT among health workers, as well as a host of other issues<sup>21</sup>. As a consumer product ORS did not win converts in the same way as aspirin or cough mixture because, while it solved the problem of dehydration, it did not stop the diarrhoea itself.

In some minds, OR'T' was a product: sachets of ORS. The challenge was to ensure their distribution to the consuming public. Typical issues in this context were pricing—keeping the price low enough for the purchasers, yet high enough not to drive commercial interests away; standardization of mixes and messages on the packet; marketing and communications to create demand. Others saw the spread of ORT primarily as a behavioural matter: maternal knowledge, motivation and the skills to mix the ingredients from household items confidently and correctly were the key issues in this context. Some

medical practitioners saw ORS as a medicine to be applied strictly to cases of diarrhoeal dehydration that were presented at the clinic; others saw it as the equivalent of a typical home remedy. The basic difference was between those who wanted to keep the treatment of childhood diarrhoea mainly in the hands of the professionals—medical and pharmaceutical—and those who saw ORT as a technique that could be demedicalized and taken over entirely by well-informed mothers, with support from the local community-based health volunteer. On such differences of view hinged important questions of strategy for ORT promotion.

The much-lauded Egyptian programme (see Chapter 2) was heavily based on ORS in packets, gaining the cooperation of manufacturers and pharmacists and saturating television and radio with clever marketing messages. This led to a rapid increase in the use of ORS, covering around 50 per cent of diarrhoea episodes throughout the country<sup>22</sup>. This approach was well suited to countries where family incomes were reasonable—or at least not at the very edge of survival—as was the case in much of the Middle East and Latin America. In such settings most people live urbanized lives and are within reach of health centres and pharmacies, and purchasing a commercial medical remedy is a standard response to illness.

However, in settings where poverty and squalor were a greater problem, as in South Asia, where 40 per cent of the world's under-five mortality occurred, the product approach could run into problems. In Pakistan, the Government began its anti-diarrhoeal push with a massive free distribution of millions of ORS sachets. The EPI programme vaccinators (many programmes piggybacked ORT on the back of immunization) gave two packets to each mother and taught her how to mix and use the solution. But when it came to their replacement, the Ministry of Health could not afford such high recurrent costs. The programme had to restart using home-mixed solutions.

The first country in which a mass outreach ORT programme was based on a home-mixed solution was Bangladesh, the original home of ORS and of much of the most important clinical and field-based research into diarrhoeal treatment. In 1980, a prominent NGO, the Bangladesh Rural Advancement Committee (BRAC), launched an ORT campaign intended to reach all 13 million homes in the country within a decade. ORS was seen as too expensive for the typical Bangladeshi family. So teams of trained women workers—900 were recruited in the first phase—went from house to house, showing mothers how to mix a solution known as *lobon-gur*: a handful of molasses and a pinch of salt in half a litre of tube-well water. Using flip charts, the workers put across the seven messages that every mother needed to know about how to handle a

case of childhood diarrhoea. An incentive system of payment meant that workers were remunerated according to their results: a monitoring team would follow in their wake and test mothers' knowledge and mixing skills<sup>23</sup>.

Early surveys revealed that while 80 per cent of mothers had retained the messages and mixed *lobon-gur* correctly, the solution was being used in only 10 per cent of diarrhoeal bouts<sup>24</sup>. Then the programme managers discovered that even the trainers were not using the solution, but preferred pills and tablets. Part of the problem was that the programme had targeted only women. Men were important decision makers in the home, and women would not take a major action concerning the illness of a child without their menfolk's concurrence. Accordingly, the programme revised its strategy, training a number of male teachers whose job was to talk to the village men in market-places and in mosques. Gradually the ORT usage rate rose to 20 per cent and by 1988, to 40 per cent<sup>25</sup>. In 1987, the worst floods that Bangladesh had endured for 25 years led to an outbreak of diarrhoeal disease and cholera. In the past, a death rate of 10 per cent would have been expected. But because ORT and ORS were used, the death rate was held to less than 1 per cent<sup>26</sup>.

The experience in Bangladesh, and increasingly elsewhere, illustrated how important it was for programme design to take into account entrenched patterns of human behaviour and belief. The idea that food and liquids should be withheld from infants with diarrhoea had been very difficult to dispel; the most important message for the prevention of dehydration—that children should be given more to drink—did not seem to have penetrated maternal consciousness on a sufficiently wide scale. Many parents still thought that an anti-diarrhoeal drug that they purchased in the market or obtained from the doctor was a superior treatment. As the 1980s gave way to the 1990s, the battle to have ORT recognized throughout the world—in the US as much as in Bangladesh—as the first-class scientific remedy that it is, both by the medical profession and by parents, was still far from won. There was still a pronounced tendency to see it as a second-class remedy for the poor, or to ignore its use altogether.

By the early 1990s, according to WHO, 3 million children under the age of five were still dying from diarrhoea annually as an outcome of 1.3 billion diarrhoeal episodes<sup>27</sup>. Despite the progress in spreading both information about and sachets of ORS, ORT was still being used in only 38 per cent of diarrhoeal episodes<sup>28</sup>. In the hope of renewing the momentum of the global anti-diarrhoeal campaign, the World Summit for Children set a goal of reduction by half of diarrhoeal deaths during the forthcoming decade, and a further goal of reduction by a quarter of diarrhoeal incidence. Meeting these goals would require a

new push for ORT and vigorous commitment to all aspects of diarrhoeal disease control strategies.

A country that took up the challenge with alacrity was Mexico. The Mexican Ministry of Health had launched a national CDD programme in 1983-84<sup>29</sup>. In its early years the programme concentrated on training physicians in oral rehydration, both so that they would set up oral rehydration units in hospitals for clinical case management and so that they would instruct outpatients correctly in the use of ORT. The programme managers also reassessed their marketing strategy for ORS, then known as oral electrolytes. It turned out that mothers thought the name had something to do with electricity. The metaphor of the child returning to life as rain revivifies a tree was adopted instead, with a new packet and name: *viva suero oral*. The revamped programme led to a speedy decline in the number of cases of diarrhoea hospitalized. But somehow, by 1987, still only 17 per cent of mothers knew how to administer ORT at home. Efforts were made to increase ORS distribution and to step up the training of medical personnel in correct diarrhoeal case management including the use of ORT: doctors were still perceived as the vital interface with mothers.

The Mexican CDD programme would have continued along these lines but for the intrusion of the World Summit for Children. President Carlos Salinas de Gortari, one of its six co-sponsors, decided to identify himself with the children's cause and make a major attempt to reduce infant mortality before his term of office ended in 1994. Given Mexico's existing infrastructure and level of development, its diarrhoeal disease rates were disproportionately—even shamefully—high. With a larger CDD programme it ought to be possible to make major inroads on diarrhoeal deaths, thereby helping to achieve the main task—reduction of young child mortality—by the quickest route.

A new and expanded strategy for CDD was drawn up, among whose targets was an increase in ORT use to 80 per cent. Partly at Unicef's suggestion, the new strategy was designed along radical, demedicalizing lines to shift the programme's centre of gravity away from total dependence on health personnel and involve mothers themselves. The Ministry of Health was reviewing this proposal at a time in 1992 when Jim Grant was visiting Mexico to attend a post-Summit national programme of action (NPA) review. Grant was therefore able to intercede with President Salinas on the proposal's behalf. The mobilization of political will behind the strategy was central to the acceleration of the CDD programme that then took place. This was exactly the sort of situation in which Grant's cultivation of contacts with Heads of State paid spectacular dividends for children.

The main organizational change in the strategy was that for the first time a range of other institutions and sectors—educational, water and sanitation, indigenous peoples, as well as the entire health system—was brought into the programme. A National Council for CDD was set up, and counterpart councils in all 32 states. One of the key programmes with which it was linked was the *la salud empieza en casa* ('health starts at home') programme run by the Maternal and Child Health directorate. This set out to train health *agentes* in every community; they in turn trained and supported groups of health *procuradoras*—pregnant women, mothers of young children—in elementary health and child nurture. Prominent among these simple actions was the case management of diarrhoea and the use of ORT; household cleanliness and personal hygiene was another. By 1993, the 'health starts at home' programme had trained 82,000 *agentes* and 760,000 *procuradoras*.

One of the most important CDD programme innovations was a system of epidemiological surveillance<sup>30</sup>. Every death of a young child in Mexico from this point onward had to be described and registered. Since 70 per cent of deaths took place at home, a responsible member of the community would have to interview the parents and ascertain by verbal autopsy the course of events leading to the child's decease. The death certification process had to be swift and efficient, even in remote rural areas. It was the basis of a health information system that made it possible for the national CDD programme to know within a month of any death from diarrhoeal disease; when the programme had begun in 1983-84, all its information on diarrhoeal deaths was eight years old. The analysis of death registers made it possible to identify places where child populations were at high risk from diarrhoea and concentrate efforts accordingly.

Further evidence emerged of the inadequacies of doctors. In three quarters of all deaths at home, the mother had consulted a physician about her ailing child. He either had not taught her to use ORT or had not made a good diagnosis; since almost all the deaths were avoidable, the physicians had let their clients down. A new strategy was initiated. In areas where health facilities were few, the programme set up 'ORS houses': a local woman was trained in oral rehydration, given a supply of sachets, and was on stand-by for any local mother who needed her assistance.

The intensive CDD strategy in Mexico involved many other elements—television and radio campaigns, monitoring and coordination with many programmes that target children or target ill health, or both. National Health Weeks, with quantified outputs not only for ORT promotion but also for immunization and distribution of vitamin A, gave the programme an impor-

tant boost. Under another programme known as the 'White Flag', villages where all mothers were able to recite the correct use of ORT and other child survival activities were entitled to raise a white flag. By 1994, five million mothers had been trained in the use of ORT. The target of reducing diarrhoeal deaths by 50 per cent was met two years early—in 1992. The programme was so successful that it attracted visits from health officials from all over Central America, Asia and Africa, and its approach was widely copied.

During 1992, a major effort was made to give CDD programmes a new impetus; Jim Grant impressed a number of intergovernmental Head of State regional meetings—those of the South Asian Association for Regional Cooperation (SAARC), OAU and the Arab League, for example—to adopt 80 per cent usage of ORT as a mid-decade goal<sup>31</sup>. At the same time, emphasis was given to other parts of diarrhoeal disease control strategy. Since the number of diarrhoeal deaths caused by dehydration had dropped to one half of the total, or 1.5 million, an increasing proportion of the remaining deaths could be attributed to infections requiring antibiotic treatment<sup>32</sup>. New evidence showed that there was a strong link between persistent diarrhoea in the small child and malnutrition. Loss of appetite, the impact of fever on the body's energy store and the draining away of nutrients could be a lethal combination, especially if one bout followed closely on another. Thus the new CDD strategy emphasized the three Fs: 'fluids', 'feeding' and 'further help'; this strategy incorporated the need for a mother to seek further help if the diarrhoea was persistent, bloody or accompanied by fever, or if signs of dehydration were present. Included in the strategy was the provision that every child seeking care outside the home would receive ORS and that every health facility would offer correct case management for diarrhoea<sup>33</sup>.

Also emphasized was the need for increased public investment in safe water supplies and sanitation. After all the miracles of modern campaigns against disease have been performed, the sanitarians and engineers must also have their day.

Soon after the International Drinking Water Supply and Sanitation Decade of 1981-90 began, Unicef launched its 'child survival revolution'. The hot pursuit of a reduction in deaths from diarrhoeal disease by curative means thereafter pushed long-term preventive action and quality of life improvements somewhat into the background. Water and sanitation programmes had a much reduced organizational profile over the next few years, and when some came up for review—the Pakistan programme in 1986, for example—they might find

themselves unfavourably compared to CDD control via ORT and fighting to remain in existence<sup>34</sup>.

Water and sanitation programmes were not only popular with governments and communities, however, they were well-established elements of the Unicef country programme portfolio. Even during the fundamentalist phase of GOBI, they did not all languish; in some cases, the opposite was the case. However, there was no escaping that a challenge had been posed to the water supply and sanitation engineers: to bring their work within the sight-lines of child survival, and make 'water mean health'—as measurably and affordably as possible. This meant that much more effort needed to be invested in the 'software' elements of education and community participation, particularly of women, as compared with the hardware elements of borehole drilling and handpump development.

A programme that from its drawing-board stage was designed to forge the link between safe water supplies and improved health for women and children was the Unicef-assisted programme in Nigeria. This was launched as a Water Decade programme in 1981, initially in Imo state. This was a state with a high incidence of guinea worm disease, of which Nigeria was an acute sufferer with 2.5 million victims annually. Although expenditure on drilling rigs and support vehicles constituted a large slice of the Unicef capital contribution to the scheme, much more management effort, personnel and time went into the software components. The linchpin was health education, to be conducted by 'village-based workers' (VBWs) from the participating communities. Their training ran the gamut of maternal and infant care as well as pump care-taking, safe waste disposal, breastfeeding and nutrition<sup>35</sup>.

The programme had another unusual feature. One of its teams focused exclusively on sanitation—on promoting the construction and use of the VIP (ventilated improved pit) latrine. Such an item had never previously been seen in the rural hinterland of Nigeria and—initially at least—little demand could be anticipated. So the Imo state project was planned on the basis that communities would have first to build a certain number of VIP latrines before they would be entitled to the installation of a borehole. Demand for water was to be used as leverage for the introduction of hygienic excreta disposal. Although this idea was to be widely copied elsewhere, the Nigerian programme was one of the first to start out with an interdependent water, health education and sanitation strategy.

In its very early days, the Imo State Watsan Project could almost be said to have overcompensated for previous water supply programmes' lack of attention to 'software', with teams of community organizers to set up water and sanitation committees in the community, VBW training, maintenance schemes and

the establishment of centres for VIP latrine production. As the model developed and was replicated in four other Nigerian states, the balance between the various activities shifted and some of the emphases changed according to experience. Also influential was a major study carried out in Imo state in conjunction with the London School of Tropical Health and Hygiene. This set a trend of closer evaluation of water and sanitation programmes worldwide to understand more about the connection with health and whether it was truly measurable.

The study found that guinea worm infestation had significantly dropped among people living within 500 metres of a handpump. More significantly, the project was responsible for a reduction in malnutrition from 7 per cent to 3 per cent in three-year-old children in participating villages<sup>36</sup>. It seemed that quality of life improvements could produce health benefits other than the cause-and-effect associations of impure water with specific water-related infections. The study also found that new knowledge was having an impact on health behaviours—household water was being more carefully kept, for example—but that this was more often learned from the project personnel than from the VBWs. From 1986 onward, the programme began to depend less heavily on the VBWs to provide the missing link between water and health and instead adopted social mobilization techniques. Schools were enlisted as well as mothers' clubs, television and radio; T-shirts and posters were produced and project notice boards were erected in the communities. The numbers of VBWs were reduced and their training confined to water use (including guinea worm prevention), drainage and human waste disposal, mobilization for immunization and diarrhoeal case management including ORT.

One of the original goals of the International Water Decade was eradication of guinea worm disease, or dracunculiasis. This extremely unpleasant condition is unique among water-related diseases in that it has no connection to sanitation, and can only be contracted by imbibing water containing the specific agent—a tiny cyclops that produces a worm. This gestates in the body over several months and gradually emerges through a painful ulcer in the skin. If the victim exposes the emerging worm in a water source—perhaps to soothe the pain—that water source becomes reinfected. By the mid-1980s, the condition was already highly localized—confined to several West African countries and to parts of India and Pakistan. Not only in Nigeria, but elsewhere, a determined international effort was mounted to reduce the case-load of infection and bring total eradication within possibility for the 1990s. Ex-US President Jimmy Carter undertook a leadership role in this context, especially for West Africa.

In 1986, a Unicef-assisted integrated programme for guinea worm control, water supply, sanitation, hygiene education and community health care began implementation in the Indian state of Rajasthan. Funds were provided by the Swedish Government for what became known as the SWACH programme—a word meaning ‘clean’ in Hindi. The two SWACH districts contained 11 per cent of the total guinea worm case-load in the entire country<sup>37</sup>. A priority was to break the cycle of transmission by preventing victims—those with worms emerging through the skin—from wading in drinking water sources. This meant altering the traditional ‘step-wells’—wells with a flight of steps down into the water—so that the water could be drawn only by bucket and pulley. By mid-1988, nearly 3,000 step-wells had been converted. To supplement local supplies, over 2,000 of a projected 4,000 handpump tube-wells had also been installed<sup>38</sup>.

From the outset SWACH set out to do far more than reduce dracunculiasis cases. The underlying assumption of the programme was that people’s desire to rid themselves of a painful and debilitating complaint, once they understood how it was caused, could be parlayed into a more wide-ranging transformation of their water use and cleanliness behaviour. This was to be achieved by an innovative strategy of health education and the mobilization of the community, especially of women. One technique was the ‘Village Contact Drive’—a 15-day peregrination of the countryside by teams of young men and women. They visited villages to discuss guinea worm, give out filter cloths to use over water pots, and generally start the ball rolling in a lively and entertaining fashion<sup>39</sup>. Local girls, specially selected and trained as animators and ‘guinea worm scouts’, would then follow up.

A 1988 study carried out in SWACH areas found that not only had guinea worm incidence dropped by 55 per cent, but that there had been significant change in practices concerning the collection, storage and consumption of drinking water<sup>40</sup>. Over the next few years, the programme consolidated its gains both in water supply protection and in hygiene promotion. By 1993, the number of patients reporting with guinea worm had gone down to 47, all of whom had their worms surgically extracted before they began to emerge from the skin and become infective<sup>41</sup>. Eradication of guinea worm from its strongest redoubt in India was within sight. In the country as a whole, the number of reported cases had dropped from nearly 38,000 in 1984 to just over 1,000 in 1992, and the number of endemic villages from 13,000 to 250<sup>42</sup>.

By the end of the Water Decade, a growing number of country programmes—in Bangladesh, the Sudan, Uganda, Burma and elsewhere—were beginning to find a successful balance between ‘hardware’ and ‘software’

components. One advance was a dramatic reduction in the costs of installing deep wells by borehole drilling, partly by the use of more modest and appropriate equipment; partly by improved borehole location using hydrogeological mapping techniques; partly by better logistical management of expensive drilling equipment<sup>43</sup>. Another important gain was the use of social communications and message marketing in 'Watsan' as was also taking place in nutrition and health.

A new set of operational principles based on the use of appropriate technology, community management, the integration of water with sanitation and hygiene education and the increasing involvement of women, especially for health promotion, was gradually emerging; this was reflected in a Unicef policy review submitted to the Executive Board in 1988<sup>44</sup>. Meanwhile the 'health' benefits from water and sanitation were reinterpreted to include many things other than disease control: a higher standard of household and personal cleanliness, lower case-loads of malnutrition, savings in women's time and convenience. At the same time, new evidence from WHO showed unequivocally that improvements in both water quality and availability had the effect of considerably reducing diarrhoeal sickness and death<sup>45</sup>—a finding that helped restore the sector's confidence in its contribution to child health and survival.

The International Drinking Water Supply and Sanitation Decade, in spite of the fact that it did not manage to reach the ambitious goal of 'Water and Sanitation for All', was widely regarded in the international community as a success<sup>46</sup>. Many countries that had previously refused to contemplate handpump and latrine technology as the way to bring extremely basic services to underprivileged and underserved populations had been won over. Very important, the Decade had seen an unprecedented degree of inter-agency collaboration between the World Bank, the UN Department of Technical Cooperation for Development (UNDTCD), UNDP, WHO and Unicef; and an unusual degree of common vision, as exemplified in statements issued at international review meetings at Abidjan (1986) and Interlaken (1987)<sup>47</sup>. Although Unicef was a very small donor in comparative financial terms, providing approximately 1 per cent of investment in the sector (\$70 million annually)<sup>48</sup>, it had successfully played a pioneering and catalytic role. Because of its low-cost, low-technology approach, the programmes it supported had managed to serve 14 per cent of the population provided with water, and 4 per cent of those provided with sanitation<sup>49</sup>.

Although the task of service provision was still daunting—in 1990, 1,330 million (37 per cent) people in developing countries were still without safe water and 1,900 million (61 per cent) were without sanitation<sup>50</sup>—the gap between the rhetoric of 'Water and Sanitation for All' and practical reality was

beginning to close. Only 20 per cent of the annual \$10 billion a year invested in public health engineering had gone into low-cost technology during the Decade; but the increased credibility of such approaches had dramatically reduced prospective costs of universal coverage spread. It was therefore agreed that the goal of 'Water and Sanitation for All' could be realistically rescheduled for the year 2000. There was now a chance that this target represented something more than an aspiration.

At the World Summit for Children, universal access to water and to a sanitary means of excreta disposal by 2000 was adopted as one of the seven main goals. Elimination of dracunculiasis by 2000 was adopted as a subsidiary goal; this was later adopted by Unicef and WHO as one of the 10 priority mid-decade goals for children targeted for achievement by 1995<sup>51</sup>. Its complementarity to health and nutrition goals—which would otherwise not be achieved—was fully recognized. At the same time, a new consciousness was developing around water and sanitation as not only a health asset, but environmental and socio-economic assets as well. The new perspective could be summed up in a word that had made its international policy debut only at the end of the 1980s but had already been widely adopted into development thinking. That word was 'sustainability'.

During the 1980s, the acute pressure of modern technology, population growth and consumer demand on the planetary fabric, an issue that had been smouldering away unobtrusively since the early 1970s, re-erupted on the global agenda. A new generation of international environmental worries—species loss, ozone depletion, global warming, deforestation, toxic wastes—had begun to capture not only scientific but popular attention. The world's environmental resources were being rapidly squandered, often in the name of 'development'; yet, at the same time, the poverty that development was supposed to correct was still widespread.

In 1983 the UN Secretary-General invited Prime Minister Gro Harlem Brundtland of Norway to chair the World Commission on Environment and Development and explore these twin dimensions of global stress. In 1987, the Commission published its report: *Our Common Future*. From this point on, environmental issues played a dominant role on the international agenda. This continued up to, and beyond, the UN Conference on Environment and Development, which took place in Rio de Janeiro in June 1992. The Earth Summit was the crowning event of the Brundtland process, and it was intended to usher in a new world order of planetary resource conservation.

Ever since the state of the environment first became a matter of international concern in the late 1960s, committed publicists for development such as the economist Barbara Ward had linked its plunder with world poverty. Waste and overconsumption of the earth's natural wealth were counterpoised with humankind's unwillingness to do much for the poor. Others laid responsibility for incipient disaster on the poor, whose extraordinary fertility was precipitating a global population crisis. Brundtland linked the twin concerns in a different way.

*Our Common Future* stated that poverty in the developing world was both a cause and effect of current environmental degradation. The insensitive kind of technological transfer that pauperized land, people and natural systems would lead to no common future at all. For the first time, a body commanding widespread respect convincingly argued that what passed for progress was not an inevitable fast-forward towards a more comfortable world, at least for the majority, but a reckless adventure full of global self-destruction. Only 'sustainable' forms of development could blend the fulfilment of human needs with the protection of soils, waters, air and all forms of life—from which, in the longer term, planetary stability was inseparable.

Thus was launched the idea of 'sustainable development': development based on the equal right of all humanity to a healthy and productive life, but one that did not jeopardize the right of coming generations to their own slice of the earth's pie.

During the early 1980s, Unicef did not engage with the rising environmental storm. Preoccupied by the 'child survival revolution', issues such as climate change and industrial pollution seemed remote from the organization's main agenda. But after the publication of *Our Common Future* and the call for an Earth Summit, it became clear that a huge energy flow was moving in the environmental direction and that, philosophically and practically, children's concerns must be placed within it. In 1989, the Unicef Executive Board discussed a review on 'Children and the Environment' and agreed that all Unicef programming should be placed within a 'sustainable development' framework<sup>52</sup>. The following year, Unicef teamed up with the United Nations Environment Programme (UNEP) to co-publish a report entitled *Children and the Environment*, which explored the specific ways in which, as the most vulnerable members of the human race, children suffered from an overstressed and polluted environment<sup>53</sup>.

Since Unicef's efforts were spent on extending basic services to those outside their reach because of poverty, the style of programme it supported already matched in most essentials the criteria of 'sustainable development'. Basic services programmes were low on capital resources, strong on appropriate technology, minimal in their environmental implications, keen on soliciting

people's active participation and aimed to build capacity within communities to underpin service delivery on their own behalf.

Where people's traditional economic activity—farming, fishing, herding—had previously been in ecological balance but was now contributing to environmental degradation, as on the eroded hillsides of Nepal or in the dry-land scrub of the African Sahel, basic services programmes were grounded in this reality. Household food security and village-level food processing; groundwater and surface water development schemes; fuel-efficient stoves and community wood-lots; loans for small livestock and gardening plots, were all intended to help families re-establish control over their economic lives in environments where the subsistence resource base was steadily shrinking. All these were, in fact, programmes that attempted to cut into the downward spiral resulting from the simultaneous and compounding experience of poverty, population growth and environmental degradation.

In more general terms, the accumulating conquest of disease, malnutrition and illiteracy was in itself a contribution to a better and more sustainable environment. These interactions between environmental care and child-centred development were underlined in a special chapter of the 1990 World Summit for Children Plan of Action, which began: 'Children have the greatest stake in the preservation of the environment and its judicious management for sustainable development, as their survival and development depend on it.'

The commitments of world leaders at the Children's Summit to survival, protection and development goals with a strong bearing on the environmental crisis of gross poverty and underdevelopment were initially overlooked in the preparations for the Earth Summit. At the Third Preparatory Conference in Geneva in August 1991, Richard Jolly, Deputy Executive Director for Programmes, spoke on 'A Human-centred Strategy for Environmental Improvement: The Children's Dimension.' In a statement that began the process of incorporating children's issues more distinctly into *Agenda 21*, the Summit's follow-up action plan, Jolly placed meeting human needs at the centre of any strategy for environmental conservation. He used the phrase 'Primary Environmental Care', originally coined by Oxfam and other NGOs, to describe the sensitivity to the environment that should be built into all development programming so that communities could protect the health of their soils, trees, water, plants and animals—their livelihood base<sup>54</sup>.

At the Earth Summit itself, Jim Grant and a strong Unicef team did a great deal to advocate the children's cause. The Viking ship *Gaia* sailed into Rio harbour carrying aloft the legend: '*De um mundo melhor para todas las crianças*'—'A better world for every child'; this was just one of many events and spectacles

in which children played a leading part. In his address to this second UN 'Summit', Grant called attention to the 'older face of the environmental crisis: . . . I am talking about malnutrition and disease, early death and life-long disability, paucity of choices, discrimination against women and children, and structural violence—all the consequence of, or closely associated with, poverty and underdevelopment.'<sup>55</sup> He made a strong plea that the follow-up programme to the Earth Summit should incorporate 'the list of "doables" already embraced by the world's leaders in September 1990', and that children should be seen not only as victims of environmental degradation, but also as protagonists for a more environmentally stable world.

Unicef had reason to feel satisfaction that the children's message was coming across. Children's visibility in events linked to the conference—Rio de Janeiro is the world capital of street child culture—was itself an illustration of the heightened consciousness worldwide of children's issues. In addressing Unicef's areas of concern, *Agenda 21* exceeded Grant's expectations. It included a special chapter on 'Children and youth in sustainable development', which called governments' attention to the World Summit for Children Goals and demanded a place for the voices of children and youth in the 'participatory process for sustainable development and environmental improvement'.

Many other chapters of *Agenda 21* covered topics of importance to Unicef: health, poverty, women, demographics, education and training, finance. And there was one chapter in the all-important section of 'Conservation and management of resources for development': the protection of the quality and supply of fresh water. When all the Earth Summit rhetoric was over, water supply and sanitation was the most important programmatic context in which the interests of Unicef and those of planetary and human subsistence met.

At the end of the Water and Sanitation Decade, a Global Consultation on 'Safe Water and Sanitation for the 1990s' was held in New Delhi, at which the leading international experts in the sector established a principle for the next decade: 'Some for all, rather than more for some'. Implicitly, this reiterated the pronounced shift in international thinking towards the low-cost approach. The New Delhi Statement also emphasized the need for a transformation of attitudes and structures in water boards and public service utilities if the goal of 'Water and Sanitation for All' was to have any hope of being met; and the need to devolve management of services away from their centralized control into the hands of communities themselves. The scene was set for a more widespread application in the 1990s of the

operating principles developed during the Decade, within the framework of international collaboration so carefully built up.

In the run-up to Rio, an International Conference on Water and Environment was held in Dublin early in 1992; this meeting produced the key recommendations on water resource development and management on which the relevant chapters of *Agenda 21* were based. Of direct concern to Unicef were two chapters: one on protecting and promoting human health, by ensuring universal access to safe drinking water and sanitary means of excreta disposal, and one on the protection of fresh water resources<sup>56</sup>. In the latter, emphasis was placed on the vulnerability of fresh water as a finite resource, on water as an economic and social good with a corresponding price tag and on the management of water by a participatory approach involving users, planners and policy makers at all levels—especially women. The thrust of current international thinking in the sector now tended to stress not only the public health benefits of water supplies and environmental sanitation, but their sustainability and their important role in enabling communities to improve their members' quality of life and socio-economic status. This was to have a profound effect on Unicef's evolving policy in the sector.

The immediate task for the 1990s was, however, to help develop strategies to reach the water and sanitation goals established by the World Summit for Children, and to try to ensure that behavioural change to promote good health would go hand in hand with increased service coverage. During the Water Decade, the most significant advance had been in village water supply coverage: there had been a jump from 30 per cent to 50 per cent of rural inhabitants<sup>57</sup>. But there had been very little change in the proportion of people with sanitation, either in rural or urban areas, and a number of Unicef programmes now set out to improve the coverage of latrines. A few pioneering projects in poor urban areas had had some success in the 1980s: a soak-pit project in Baldia township, Karachi, had proved very popular, for example, as a way of replacing bucket latrines with a more hygienic method of waste disposal. But while crowdedness and lack of natural facilities created some demand for sanitation in the towns, there remained a major challenge of creating demand for sanitation in rural areas, especially in the countries of South Asia where poverty and squalor were rife in large parts of the countryside.

Bangladesh, where cholera was still endemic, was an example of a country where improved sanitation was a critical need. By the late 1980s, tube-well water had become a popular consumer item—similar to a refrigerator elsewhere. But only 4 per cent of people used a sanitary latrine<sup>58</sup>. The same popularization process was now needed for latrines if lasting benefits were to

be made for public health. An intensive sanitation push orchestrated by Unicef began in 1989. Extensive social mobilization was conducted through the media and many social institutions, including the Islamic clergy and village defence corps. Political backing was cultivated at the highest level behind the concept that Bangladesh was suffering from 'pathogen overload'. By 1992, sanitary waste disposal had gained sufficient respectability for Prime Minister Begum Khaleda Zia to address a national rally on the subject, exhorting women to change their families' habits. By 1994, pit latrine coverage had risen to 35 per cent<sup>59</sup>.

During the early 1990s, the role of sanitary promoter in poor rural and urban areas was increasingly assumed by NGOs. 'Software' development and application, especially the nuanced negotiations surrounding personal hygiene and health education, were not within the expertise of the typical sanitary engineering department. Nor were the social mobilization and message-marketing techniques necessary for fundamental behaviour change. Accordingly, public utilities were increasingly seen as having a service design, facilitation, large-scale construction and technical role; NGOs, community leaders and committees and the 'private' or artisanal sector were seen as the key movers and shakers in small-scale construction, maintenance and local management and the promotion of hygienic behaviour.

A strikingly successful programme modelled along these lines was the Intensive Sanitation Project in Medinipur district in West Bengal, India. Set up with state government approval and Unicef support, this project was an attempt to prove that rural dwellers could be persuaded to pay for, build and use pit latrines. The subject of excreta is especially loaded in India, to whose 'untouchable' caste the task of removing night-soil—'sweeping'—was traditionally assigned. Sanitation, especially in rural areas, had always lagged pitifully behind water supplies in India, having reached a coverage of 3 per cent as compared with 78 per cent by the early 1990s<sup>60</sup>. The lacklustre performance was the result of the authorities' lack of commitment to rural sanitation, largely based on the conviction that it was almost impossible to persuade people to use latrines. The Medinipur project set out to develop a provable, replicable model that could transform both official attitudes and the squalor of the rural environment.

In 1987, Unicef identified an organization well suited to break down ingrained attitudes: the Ramakrishna Mission Lokasiksha Parishad, a leading NGO with an extensive network of youth clubs throughout Medinipur district<sup>61</sup>. Although somewhat daunted by the scale of Unicef's sanitary intentions—to reach 80 per cent of the 8.3 million population of the district with messages about hygiene and to see latrines installed and used in 50 per cent of

households—the Ramakrishna Mission took up the challenge. The project was formally launched in March 1990 and by 1994 had reached more than 2,600 villages<sup>62</sup>. Although in its first two years relatively few latrines were constructed, thereafter attitudes began rapidly to shift. By late 1994, over 52,000 latrines had been built, more than two thirds of them by poor families. Around 40 villages had been declared ‘sanitation villages’, meaning that 80 per cent of households had installed latrines and taken other measures to improve the environment<sup>63</sup>.

The project achieved this breakthrough by putting first priority on awareness-building and mobilization, and second priority on technology and construction. The Ramakrishna Mission conducted motivational camps and instructional sessions for all kinds of personnel: door-to-door motivators in the village, women handpump caretakers, village masons, local drillers and *mistris* (handymen), singing squads, wall painters and leaders of the *panchayati* or local councils. This intensive effort proved that age-old habits thought to be intractable could be dislodged. Many people—especially women who valued the privacy of a latrine and its round-the-clock availability—were prepared not only to abandon ‘open defecation’ but to push the idea to reluctant neighbours. The cleanliness of the village—its fitness to receive visitors—became a status symbol.

The members of the youth clubs constituted the ‘motivator’ group, each visiting 200 families. The club would provide an interest-free loan for a latrine if the customer put down half the price, but no subsidies were permitted. Production centres for latrine-ware at a wide range of prices were set up so that families could select their facility according to their pocket. Many motivators—female as well as male—found paid work as sanitary masons. Gradually, a whole new local employment, manufacturing and sales sector developed around a previously unwanted consumer item—the latrine. Its fullest expression came with the creation of the ‘sanitary mart’. This was a retail shop with construction materials such as pans, traps and foot-rests, as well as other items: soap, nail cutters, toothpaste, water filters, ORS packets, bleaching powder and iodized salt.

The Medinipur strategy interlocked directly with water supply provision and with control of diarrhoeal disease. After 40 families had built latrines, they were entitled to the installation of a handpump. The villagers made a contribution to maintenance and women caretakers were trained. So effective has cost recovery been that each village will be able to afford a new pump when the old one wears out. To deal with diarrhoeal disease, an intensive community-level drive backed by the health authorities has set up ORS depots in villages, similar to Mexico’s

CDD programme. Designated village women keep a stock of sachets and are trained in helping mothers to administer rehydration correctly.

The intensive sanitation project in Medinipur has galvanized the authorities not only in West Bengal but in a number of other Indian states and the central government. The social mobilization and 'sanitary mart' model is now being tried in districts all over the country. Central government has rewritten its national policy and guidelines on sanitation, and the policy of heavy subsidization—especially for those who can easily afford to construct facilities—has been dismissed as non-sustainable.

In Indonesia, an extraordinary effort on behalf of sanitation in the district of West Lombok has similarly had provincial and national repercussions. In this case, the moving force was the *bupati* (district head). Before he launched his latrine campaign, West Lombok's infant mortality rate was 120, the highest in Indonesia, and its sanitation coverage rate 8 per cent—the lowest<sup>64</sup>. In discussions with Unicef, the *bupati* became convinced that given the district's good immunization and growth monitoring record, the main culprit of child death was the unsanitary environment. In June 1993 at a public meeting, he challenged the assembled representatives of the district to construct 20,000 family latrines. Unicef backed the subsequent campaign, offering financial subsidies of \$12 per latrine to help get communities interested.

As in the case of the child health and nutrition programme, the involvement of the Indonesian women's organization—PKK—was essential to the programme's success. The local PKK chapter drew up lists of candidate beneficiaries for latrines and set up a village production centre where local boys learned how to make squatting slabs, latrine pans and cement rings. Unicef subsidies paid for the materials. In spite of the fact that previous efforts to promote latrines in the island of Lombok had been very discouraging, not only were 20,000 latrines built within months, but by the end of 1994, sanitation coverage in West Lombok was nearly universal<sup>65</sup>. This success is credited to the pressure women exert on their menfolk and on the emphasis on hygiene as part of religious duty. People with no latrine are refused permission to marry or to travel to Mecca for the *haj*. The man who has become known as the 'latrine *bupati*' of West Lombok subsequently launched a movement called 'Clean Friday'—an idea taken up elsewhere in Indonesia and launched nationally by President Suharto in November 1994<sup>66</sup>. Islamic leaders in Indonesia are now promoting an association of the day of prayer with activities to promote healthy and hygienic living.

Although most of Unicef's cooperation in the water and sanitation sector still went to underserved rural areas, by the early 1990s increasing

attention was being paid to the expanding populations of slums and shanty towns in the developing world. In many metropolitan environments, services to those in the better-off suburbs were heavily subsidized, with people paying on average only 35 per cent of their costs<sup>67</sup>. Meanwhile, people in slums and squatter settlements had no services at all and were obliged to buy water from vendors. This might absorb as much as 20 or 30 per cent of their income, while still providing only a small quantity of water of very dubious quality<sup>68</sup>. In a number of countries—Bangladesh, Haiti, the Sudan, India—Unicef began to feel that the public health situation of poor urban residents demanded more attention. Since coverage rates in towns and cities are higher on average than those in the countryside, there had been some tendency in the international water and sanitation community as a whole to neglect the very high disease and death rates related to squalor and filth among children of the urban poor<sup>69</sup>.

One pioneering programme was in Tegucigalpa, capital of Honduras. Residents of the *barrios marginales*—shanty towns—were obliged to pay a vendor 10 times as much for a litre of water as people with a piped supply. In 1987, the Honduran water and sanitation agency, with Unicef support, began installing wells and communal tanks and trucking in water for 50,000 people in 26 *barrios*. The cornerstone of the strategy was that each *barrio* elected its own water board to take on the responsibility of recruiting labour, organizing the system's management and maintenance and ultimately repaying the investment made by the Government and Unicef. Here was a case in which the communities created their own organizations and the official body adopted a facilitating role. Within five years, household expenditure on water in the participating *barrios* had been cut from 40 to 4 per cent of annual income<sup>70</sup>.

In 1993, along with other mid-decade goals, water and sanitation sector goals were set for the year 1995: to reduce the water coverage gap by 25 per cent and the sanitation gap by 10 per cent<sup>71</sup>. At the same time, moves went ahead to articulate a new Unicef strategy for water supply and sanitation that would identify its particular contribution within the consensus about sector policy reached by the international water and sanitation community. This consensus had been informed not only by the Earth Summit's call in *Agenda 21* for water resource management within the framework of development for sustainable livelihoods, but by the various international consultations that had taken place and were continuing to take place in the Water Decade's and Earth Summit's wake<sup>72</sup>. In due course, Unicef's environment unit merged with its water and environmental sanitation section.

Unicef was concerned that its strategy should reflect the new thinking and experiences of the recent past—taking advantage of the lessons learned in many programmes around the world. The dictum agreed upon in New Delhi: ‘Some for all, rather than more for some’ was to be the main theme of Unicef’s work—as it had been in the past. But beyond the coverage targets laid down for the new decade, services must also be provided and managed in such a way as to maximize their potential health benefits and—an equally important target from the perspective of the communities they served—they should also have the capacity to reduce women’s drudgery and improve families’ socio-economic situation<sup>73</sup>. These and other principles of the new strategy were established at various consultations at which international partners and experts in the sector participated.

The starting-point of the new strategy agreed upon by Unicef’s Executive Board in 1995 was that access to clean water and sanitation at an affordable price was a basic human right. And the way to ensure that services were not only provided to the most modest community but were used, maintained and brought the necessary benefits was to involve that community—especially its womenfolk—to the maximum extent possible. Official and public health engineering management structures should be geared not to shouldering the entire burden themselves but to helping communities to shoulder most of the load: the emphasis should shift from service delivery by the authorities to employment and capacity-building in the community. Only if services were fully ‘owned’ by the community and responded to their own internally generated consumer demand would health and socio-economic benefits be maximized and a hygienic lifestyle permanently take root. The community had to be in charge of organizational and technological management, as well as paying for repairs and—where practicable—some of the installation costs. It, too, had to be responsible for mobilizing its members around the programmes’ health, environmental and economic goals. The importance of communications to bring about behavioural change, especially through education in schools, was also stressed, and a conceptual model for programme development was proposed, similar to that developed for the nutrition sector<sup>74</sup>.

By the mid-decade, 1.3 billion people in the developing world (40 per cent) were still without a safe water supply and 1.9 billion were without sanitation<sup>75</sup>. There was still a great way to go to reach close to the end-decade targets. However, there was a genuine feeling within the sector that—despite all the difficulties and resource constraints—a revolution in sanitary thinking almost equivalent to that which had taken place in the 19th century in the industrialized world had now taken place vis-à-vis the rural and poor urban dwellers of

the developing world. This new thinking had in its way reversed the process of earlier sanitary reform, which had so elevated the role of engineering in the hygienization of daily life as to move issues of public health from the province of individual action into the realm of public administration<sup>76</sup>. What was now proposed for the hygienization of life in the developing world was the dethronement of officialdom and engineers and the reintroduction of individual and community action as the key to sustainable service provision.

On the successful advocacy of such ideas, the survival and healthy development of millions of underserved children still depend.