

LEARNING FROM EXPERIENCE

WATER AND ENVIRONMENTAL SANITATION IN INDIA

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Having wells and pumps nearby saves hours of time fetching water.

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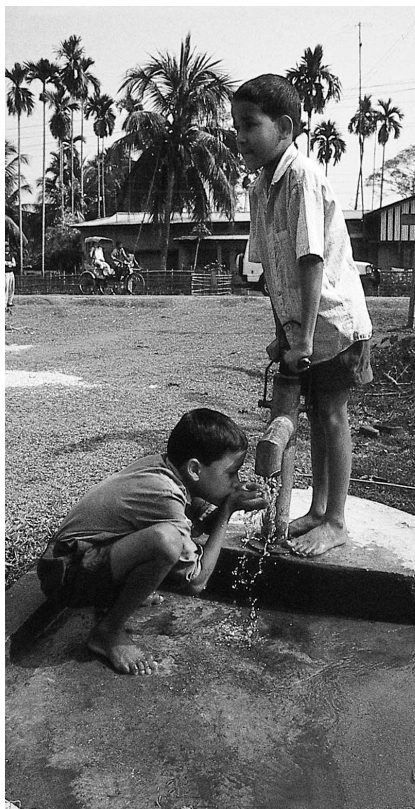
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introduction

Since independence in 1947, India has been committed to providing water and sanitation to its people, making substantial progress in water supply beginning in the 1960s, and in sanitation and hygiene education starting in the 1980s. This commitment has paid off in some remarkable results: Between 1980 and 2000, water supply coverage nearly tripled, and sanitation progress, though less remarkable, grew steadily. Largely as a result, India has seen a decline in diseases caused by unsafe water and poor hygiene. One remarkable achievement, the eradication of guinea worm disease by the mid-1990s, highlights the strength of India's commitment to WES.

India's water and sanitation programme, strongly supported by UNICEF for nearly three decades, has provided not only services but also long-term training and technical support, especially in the case of water supply. The programme has also encouraged technological innovation and international expertise while at the same time strengthening input from the community and local private sector.

The WES programme in India has evolved and expanded to coincide with changing conditions and priorities. In the late 1960s and 1970s, UNICEF, reflecting the Government's priorities, devoted a significant portion of its efforts in India to water supply coverage. Beginning in the mid-1980s, the programme expanded to include sanitation. In both water and sanitation, the emphasis was initially placed on the development of technical solutions and then turned to quality control, operation and maintenance of equipment, and the



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Drinking water reaches more than 90 per cent of all rural households.

promotion of good hygiene and related behaviours. In recent years, programmes have increasingly encouraged communities to define their own needs and participate in planning and managing WES services. Many pilot projects have been launched. Some became institutionalized, while others did not translate successfully to full-scale implementation. All have been useful in learning more about what can and cannot work in the field, on a sustainable basis.

Why look at India?

The successes and innovative ways of responding to social and environmental conditions of the Indian experience yield valuable lessons for other developing

countries. The Government of India worked with UNICEF and other partners to develop and test practical solutions to several challenges: How can WES services best be tailored to the physical, social and economic conditions of each locale and the needs of each community? How can people change generations-old behaviours to create demand for services and then use and maintain them most effectively? What roles should the government, private industry, non-governmental organizations (NGOs) and other groups play in WES and how can they best work together?

To capture some of the lessons learned in India, UNICEF commissioned an independent evaluation of its WES programme in India over the past 30 years. The evaluation, which took place in 1998 and 1999, was conducted by a team of independent sector specialists, using literature reviews, interviews, surveys and other methods. The conclusions were published in a report.¹

This publication, which presents the team's findings in a format accessible to a wider audience, explores lessons learned that can help other nations in their efforts to provide universal WES coverage for their citizens.

India shares with many other developing countries important characteristics that affect demand for and supply of WES services. These include various unfavorable conditions in terms of geology and remote locales, economic constraints, and some long-standing traditions that affect hygiene and health behaviours and create particular burdens for the very poor and for girls and women.

The WES programme in India

is UNICEF's longest-supported programme in water and sanitation, providing a valuable long-term perspective. UNICEF began supporting India's WES programme in 1966 in response to a drought emergency (see Box 1). The programme subsequently became one of the organization's most prominent WES efforts worldwide.

In searching for solutions to technological, social and behavioural challenges, UNICEF has variously served as an innovator, capacity-builder, advocate and mobilizer. It has maximized its limited financial contribution to India's overall WES budget through various means, including a focus on pilot projects and technical innovations, many of which were later applied on a much larger scale.

By recognizing where it could best complement others' activities (including those of the Government, private sector, and NGOs), UNICEF widened its impact and strengthened its credibility and reputation, and in turn, worked more effectively in other sectors.

What UNICEF has learned in India has been important to its work in other parts of the world. Partnerships with the private and public sector, now recognized as essential in human development, marked UNICEF's involvement in WES in India from the beginning. Technological advances first developed in India, such as the Mark II handpump, have been widely applied elsewhere in the world.

And as important as these practical applications proved to be, the programme in India also contributed to UNICEF's recognition that water and environmental sanitation are an integral part of its mandate to secure children's rights. WES is a fundamental part of the right of the child to "the enjoyment of the highest attainable standard of health" as expressed in article 24 of the Convention on the Rights of the Child.

This publication looks at four areas that are key to water and sanitation programmes in India and worldwide:

1. Coverage: Access to water and sanitation

India almost quadrupled its water supply coverage in just three decades. Political commitment, technologically strong experimentation and long-term support to training and quality control contributed to this remarkable progress. The increase in access to sanitation has been far smaller.

2. Technology: Adapting to local conditions through innovation

The WES programme has been successful in adapting drilling rigs, handpumps and latrines to local conditions. Moreover, local manufacturing capacity has grown to the point where Indian companies not only supply domestic rigs and handpumps but have also built up a sizeable export market.

3. Behavioural Change: Improving WES-related practices

Attention has been shifting to balancing the supply of 'pumps and pipes' and other hardware with efforts to understand and change the way people use and manage services. Strategies are now more community-based and gender-responsive, built on the recognition that disseminating information alone rarely leads to a change in practices and behaviours. The WES programme in India pioneered 'intersectoral convergence' by establishing links with other facets of development – such as health and income-generating skills – long before UNICEF adopted an integrative human rights-based programming approach.

4. Partnerships: Working with others to maximize results

Partnerships are key to maximizing resources to provide WES services to a growing population. Through more than 30 years of collaboration as an innovator and capacity-builder, UNICEF has forged particularly strong partnerships with India's national and state governments and public and private sector groups.

Box 1 UNICEF's support to India's WES programme

The UNICEF-supported WES programme in India is UNICEF's longest running and one of its most prominent WES efforts worldwide. UNICEF first worked with the Government of India in 1966 by importing rigs to drill for water in drought-stricken, hardrock areas of Bihar and Uttar Pradesh states. The programme then extended drilling to other areas while promoting local adaptation and manufacture of the technology. Beginning in the 1980s, programme focus expanded to include sanitation and hygiene awareness.

With the input of UNICEF and other partners, the government's priorities have changed over the years to place greater emphasis on hygiene promotion and behavioural change. To illustrate some of these priorities in the WES sector, UNICEF's current Master Plan of Operations (1998-2002) states:

In extending support to the country's efforts to assure every child the right to safe water and a clean environment, UNICEF will adopt the following strategies:

- Promote education for behavioural change
- Improve quality and sustainability
- Enhance community participation
- Encourage innovation and scaling-up
- Promote intersectoral cooperation

coverage:

Access to water and sanitation



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A girl enjoys a drink of water at an early childhood development centre.

Surface water in India is scarce and groundwater is deep and difficult to reach. Traditionally, most villagers used water from any source available to them, such as ponds, rivers, springs and wells. Water quantity greatly depended on the season, and water quality was generally poor. As late as 1980, less than a third of the population (31 per cent) had ‘full coverage’²² of clean drinking water, and virtually no rural households had access to sanitation facilities. Access to water was a prerequisite to the later introduction of latrines in both rural and urban areas.

In 1966-1967, severe drought hit the states of Bihar and Uttar Pradesh in northern India. The Government requested emergency help from UNICEF, which re-

sponded by airlifting 11 borehole-drilling rigs into the country from the United Kingdom. These rigs could drill far below the earth’s surface to tap into groundwater that was otherwise unavailable. In addition to meeting the short-term need, the effort showed the potential of what are known as down-the-hole hammer drilling rigs to reach water under India’s hardrock areas.

The Government of India subsequently made the provision of clean, safe drinking water a cornerstone of its rural development programme and strengthened its collaboration with UNICEF to provide these services. By 1976, almost 300 rigs were in use, with the Government of India and UNICEF each supplying about half the total.

Early success raised expectations of what the drilling programme could achieve. By the early 1980s, at the beginning of the International Drinking Water and Sanitation Decade, the Government identified an additional 230,000 ‘problem villages’ in need of water. These ‘problem villages’ were very remote; prone to drought, cholera, or guinea worm disease; or built upon particularly unfavourable sites. To back up the commitment to extend water coverage to more of the rural poor, the Government considerably increased the funds allocated to water and sanitation.

Besides having increased financial resources and being supported with political will, the effort to expand coverage achieved success because of three other factors: new, locally adapted rigs that could drill boreholes more quickly; the provision of long-term service for the rigs and training support for the operators and engineers; and standardization of drilling specifications.

Until 1998, when the responsibility for water well drilling was transferred to state agencies, UNICEF provided spare parts and service on the rigs. UNICEF also provided training over the years to drilling operators and engineers. This support reduced the down time for rigs. Thus, they performed consistently over the long term, drilling an estimated five to eight boreholes a month.

Standardizing norms for drilling also helped widen coverage by increasing the number of boreholes drilled. Standards set on the depth and diameter of drilled boreholes provided operators working independently throughout the country with simple, measurable indicators.

Box 2 More water, better hygiene

In focus group interviews held in Rajasthan and Tamil Nadu as part of the evaluation of the India WES programme, women and men described the improvements they had seen in their villages in a generation. Many noted that more water is available and that people now use more water for washing and other hygiene practices. Although anecdotal, this example shows how rural people see the effect that expanded water supply coverage has had on their lives.

Standards were set for minimum yield for a handpump, minimum surface casing and the surface sealing necessary to protect the borehole from the entry of polluted water. In some cases, conditions did not require the boreholes to be drilled as deeply as specified. However, the standards encompassed the different situations that hydrogeologists and engineers might encounter, thus saving the time and expense that would have been spent in setting specifications for each site.

Elements of success

UNICEF supplied more than 300 drilling rigs to the rural water supply programme in India between 1967 and 1997 at a total cost (at time of purchase) of some \$33 million. In doing so, the organization contributed to a programme that now covers 600,000 villages and provides water to well over four fifths of India's population.

The provision of equipment alone did not lead to the kinds of results seen in India over the past 30 years. The elements contributing to this expanded coverage include:

- **Clear goal.** Beginning in 1973, the Government set specific targets. Although these were refined over the years and have not been entirely attained, they clearly established a national priority to which the Government and its partners could respond.

- **Role as an innovator.** UNICEF, as an external partner to the Government of India, has had the flexibility to take risks, to undertake in-depth study to aid in decision-making and to test new equipment.

- **Long-term support.** UNICEF maintained support, such as training of borehole drillers, service and provision of spare parts, for 10 years after supplying each rig. Standardizing the drilling specifications also helped ensure consistent results over the long term.

holes drilled per year, quality was compromised in some cases, for example, in cleaning out the drilled borehole or in measuring yield before moving on to the next site. UNICEF worked with the Government in exploring ways to improve or 'rejuvenate' the output of low-performing boreholes.

Beyond the drilling programme, India faced other water quantity and quality issues. Over the years, the water table dropped, primarily because of irrigation. This increased the risks of depletion of the water supply for domestic use.

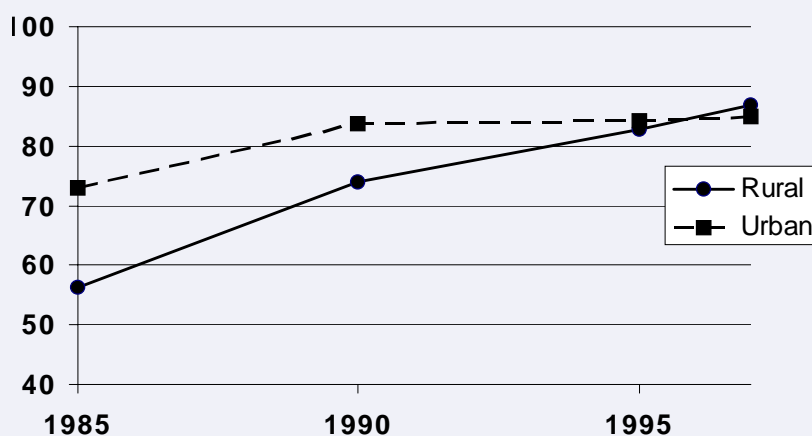
Water quality was also threatened. In some cases, this was because of poor practices in maintaining cleanliness around the borehole source. In other cases, the water became contaminated from natural or human-caused pollutants such as arsenic, excess iron, fluoride and other substances that degraded the water in some areas.

UNICEF has been involved in these issues through efforts in advocacy as well as research and development, particularly dealing with fluoride concentrations and water conservation. In maintaining gains in coverage, sustainability of the groundwater resource must be addressed.

Challenges

In trying to extend coverage to so many people over such a large area, inevitable tensions and trade-offs arose. One of the most significant trade-offs related to the delicate balance between meeting coverage goals and maintaining quality. With so many new bore-

Figure 1 Access to drinking water in India, 1985-1997
% of population with drinking water coverage



Source: Government of India Economic Survey, 1997-1998.

technology:

Adapting to local conditions through innovation



UNICEF/00-0630/Lemoyne

The India Mark II Deepwell handpump has revolutionized life in rural India.

Development of new technology was critical in expanding rural water supply and has played an important, though less successful, role in sanitation. UNICEF has supported technological innovations that have led to:

- Drilling rigs that operate on hydraulic power and are more versatile and manoeuvrable, thus increasing productivity and access to remote villages
- Handpumps that are standardized, low cost and sturdy
- Sanitary latrines that, although never used as widely as hoped, paved the way for improvements in hygiene behaviour and sanitary practices.

Drilling rigs. From the late 1960s onwards, as new targets were set to provide water to India's population, UNICEF and the Government developed policies to expand coverage and adapt rigs to Indian conditions. The rigs being used in India at the time were

pneumatic, or air-powered, and could not successfully reach water in some areas. Hydraulic-powered rigs were in use elsewhere in the world, but it was assumed that in India they would be too difficult to operate, maintain, and repair. UNICEF challenged that assumption and successfully tested hydraulic rigs in India. After a trial introduction in the late 1970s,

UNICEF was able not only to show that the rigs could successfully be used in India but also to analyse the size and type best suited to Indian needs (see Boxes 3 and 4).

In retrospect, this may seem an easy step, but with conventional wisdom arguing against it, the decision to test hydraulic rigs would have been a very costly one if it had failed. UNICEF, as an external agency, was in a better position than the Government to take such a risk. Once hydraulic-powered drills were proven suitable in India, drilling equipment was further adapted to suit Indian conditions. For example, the practice was introduced of using two smaller trucks, rather than one big truck, to mount a rig, increasing access to remote villages. In addition, local companies quickly began manufacturing the equipment, and in some cases improving its design.

Handpumps. When handpumps were introduced with the first boreholes, there were frequent

Box 3 Is piped water a step forward?

At first glance, it seems advantageous to install piped water systems in which water flows from taps rather than being drawn from handpumps. Piped water, brought to the surface with motor pumps, can save considerable time for community members – especially girls and women, those most likely to fetch water for the household – and make more water available to improve personal and domestic hygiene.

Yet piped water, when available, can widen the divide between rich and poor. Better-off families can install house connections, while poor families are often left to carry home water from public taps that do not always function regularly.

In addition, the flat-rate water tariff used in some places (rather than rates based on metred use) can stimulate over-consumption of water when it is easily accessible, including for such non-household uses as irrigation, livestock production and selling water to the poor.

breakdowns. The cast-iron pumps, originally designed for family use, could not withstand the heavy demands at community water sources with pumping continuing 10 to 12 hours a day. In 1974, a UNICEF survey showed that only 25 per cent of the handpumps worked at any given time. In reviewing the findings, UNICEF realized that a more reliable handpump was needed, and even considered withdrawing its support from the drilling programme if one was not developed.

Several NGOs had already begun trying to develop a sturdy, low-cost, easy-to-manufacture pump. In 1975, UNICEF joined the effort by working closely with local designers and manufacturers. UNICEF did not pay for research and development but instead provided technical expertise and coordination among the partners. UNICEF's involvement provided an added incentive to manufacturers, because they recognized the potential for higher sales of handpumps developed through their research and development efforts.

Using a pump designed by a Swedish engineer for the Sholapur Well Service as a point of departure, local designers and manufacturers developed the India Mark II, or IMII, handpump. UNICEF used its technical and financial capability to quickly set up the pumps and monitor their use in large field tests.

The India Mark II design was established by 1977, and demand soon grew beyond the capacity of the initial producers. New manufacturers were identified in a systematic way: UNICEF engaged an independent inspection agency, Crown Agents, to verify the technical and financial capability of companies that applied to become Mark II manufacturers. Once their competence was assured, UNICEF placed a trial order. UNICEF and Crown Agents

Box 4 Big rigs, small rigs

Technology development involves choices. In the 1980s, India had two types of hydraulic rigs to choose from, and, given the costs of the equipment, much debate and analysis went into the decision. 'Big' rigs, weighing 20 to 35 tons and mounted on large trucks, could drill boreholes to a diameter of 150 to 200 millimetres. 'Small' rigs, in contrast, weighing 10 to 12 tons, were mounted on two smaller trucks, and could drill boreholes to a diameter of 125 millimetres. In fact, both had their place. Big rigs could provide larger boreholes for possible motor pump installation and coped better with the conditions in states where the geologic formation was more complex and the aquifers were deeper. Small rigs reached more remote areas and could drill boreholes sufficiently wide for a Mark II or Mark III handpump. Over time, UNICEF developed detailed technical specifications to guide procurement, and eventually the drilling capacity and manoeuvrability of the small rigs made them the preferred option.

worked with those that passed the test to establish a functional, internal quality-control system.

By 1984, when the Mark II was a countrywide standard, 36 Indian firms were manufacturing the pump, and 600,000 pumps had been installed. By 1998, 3 million pumps were in operation and the Mark II was being exported to countries throughout the world.

Strict commitment to quality was a key factor in the success of both the domestic programme and the export of Indian handpumps. For more than 15 years, UNICEF arranged and paid for pre-delivery inspections of all handpumps. It also provided technical support to manufacturers to improve production techniques and strengthen internal quality control systems. This approach created awareness of the need to procure high-quality handpumps and spare parts and it ensured product monitoring and effective quality control.

UNICEF collaborated on a number of projects aimed at improving the capacity of communities to manage their water systems. In the late 1980s, in cooperation with the United Nations Development Programme (UNDP)/World Bank Handpumps Project, the Mark III, or IMIII,

handpump was developed and tested. Compared with the Mark II, the Mark III pump had higher initial capital costs but lower operation and maintenance costs over time (see Box 5).

Latrines. Sanitation issues emerged as a priority in the 1980s. A Technical Advisory Group (TAG) was formed in 1983, drawing members from the Government of India, the World Bank, UNICEF and UNDP. In part influenced by the success of the water programme, with its MK handpumps, in 1986 TAG recommended a standard latrine design as the basis for sanitation efforts around the country. The recommendation focused on a technical solution – local construction of a specific type of latrine – rather than on equally important issues of cost recovery or beneficiary contribution or even on latrine use and maintenance.

The twin-pit pour flush latrine (TPPF) that the TAG promoted could be built by local masons and seemed cost-effective for both rural and urban areas. The Centrally-Sponsored Rural Sanitation Programme (CSRSP) launched by the Government in 1985 as part of its focus on sanitation, accepted the TPPF

design as well as the costs, which were expected to be reasonable.

However, sanitation coverage in India, particularly in rural areas, could not reach the levels of water supply coverage. People initially were not prepared to bear the cost for the new latrines, especially since there was little motivation to use them. The programme eventually achieved better results by introducing latrines at lower cost and placing greater emphasis on behavioural change.

Elements of success

Technological innovation has played an important role in extending services to the poor, as seen in the widespread use of rigs and handpumps. Yet, as the sanitation example shows, introducing technology does not guarantee its use. Certain factors that explain why some of these technological innovations succeeded include:

- **Partnerships.** The partnerships that UNICEF developed with NGOs and the private sector were essential in the development and manufacture of the Mark II and Mark III handpumps and drilling rigs.
- **Adaptation to local conditions.** Drilling rigs and handpumps both benefited from close study of conditions in India and from adaptations such as the two-truck arrangement for rigs. The use of local components eliminated the need to import spare parts, thus minimizing down time and costs.
- **Quality control.** Paying close attention to quality control, as UNICEF did in working with new handpump manufacturers, led to India's worldwide reputation for durable and cost-effective technology.
- **Acceptance by users.** Drawing water from a village handpump saves users, who are most often women, hours each day. When

people saw the immediate and evident benefits, the pumps became an integral part of village life.

Challenges

Even the best-performing equipment needs regular maintenance and occasional repair. With more than 3 million handpumps in operation, the Government is faced with rapidly mounting operation and maintenance (O&M) costs. Although the annual O&M cost per pump is not unreasonably high, the cumulative costs are onerous. For this reason, the Government began to consider a more decentralized approach – sharing responsibilities with local governments and communities – that would not only save costs but result in better service, including less frequent breakdowns and more timely repairs.

Over the years, different arrangements to manage community water supply have been proposed. A three-tier system, first suggested in 1979, called for a caretaker in each village, a block-level mechanic to look after 100 pumps and a mobile repair team responsible for 1,000 pumps. In fact, the system broke down at the village level, in part because the caretakers were volunteers and did not have adequate time for the tasks required of them. Current arrangements vary from state to state, but generally they involve state-level technical departments working with communities. Asking communities to share costs is obviously not a politically popular stance, so it has received little support.

In addition to the direct costs of operations and maintenance, there are less apparent but still very real indirect costs. For example, repairing or maintaining a pump takes time that a person could spend on other activities, including income-generating enterprises.

One lesson learned is that for community-based handpump management to work, no matter

what type of pump is used, broad change is required that considers issues of ownership and control, technical back-up, financing, and fairness and equity.

The sanitation programme taught different lessons. The first is that, for the most part, community members had not been sufficiently involved in choosing the technology or introducing it to others in the community. Other important lessons were drawn from the fact that many people were initially reluctant to use a new latrine because they feared breaking it, thought defecating in the fields away from their village was more hygienic or preferred to use the latrine as a storage facility. In addition, the cost of the facility proved to be well beyond the means of the rural poor, who tended to give little value to the service in the first place.

These experiences have led to a shift of focus in sanitation. As will be described in the next section, the new emphasis is placed on offering lower-cost latrine options coupled with efforts to change behaviour.

Box 5 Beyond pump design

The Village Level Operation and Maintenance (VLOM) concept initially centred on the development of a handpump that would be easier to maintain and repair than the Mark II. In 1987, the India Mark III pump was introduced. The thinking was that easy-to-repair hand-pumps would trigger much greater community involvement. Over time, however, it became evident that long-term success of village level maintenance depends less on the technology and more on the social and institutional aspects of effective community-based management.

behavioural change:

Finding ways to improve WES-related practices

Community management of WES services and the adoption of good hygiene practices are critical to achieving sustainable improvements in people's lives. Encouraging health-promoting attitudes and behaviours plays a major role in these efforts. At the community level, for example, people's willingness to take on new responsibilities and costs will make it more likely that communities will manage their water systems and not depend solely on outside assistance. Within the household, clean water may be available, but if hand-washing and other practices are not routinely followed, the promised health benefits do not materialize. Likewise, access to latrines does not ensure that people will use and maintain them.

Behaviours related to sanitation are particularly difficult to both understand and change. The private nature of sanitation undoubtedly accounts for some of this difficulty, as does the fact that sanitary control and disposal of excreta may not be viewed as a problem in villages surrounded by substantial open space. What is more, UNICEF support to sanitation efforts in India, begun only two decades ago, first focused almost entirely on latrine construction.

UNICEF has long supported a programme entitled Information, Education and Communication (IEC) to promote hygiene among India's large and diverse population. IEC materials include a variety of booklets, pamphlets, posters, videos and manuals in several national languages. UNICEF recognizes that the IEC materials alone, no matter how widely disseminated, rarely lead to behavioural change. Their value is



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Children learn to wash their hands at a pre-school centre.

in teaching people new concepts and practices, which are then reinforced through person-to-person contacts and other means of communication (see Box 6).

To help people learn and adopt new ideas and behaviours related to water and sanitation, WES projects have trained local motivators to visit families. These person-to-person visits help change behaviour, but evaluations from the mid-1990s indicate that three or four visits are required for every installed latrine. So while the visits pay off and clearly have a place in a comprehensive behaviour-change strategy, person-to-person contact is costly, slow and labour-intensive.

In recent years, UNICEF and its partners have experimented with new ways to engage people in planning for, using and maintaining WES services, which encompass:

- community participation
- gender considerations
- intersectoral convergence, such as linking sanitation with broader health and economic concerns.

These three elements merge in new strategies and approaches. For example, if community members are to participate productively in programmes, they must first understand how gender considerations affect their roles and responsibilities. Likewise, linking sanitation with everyday concerns, such as diarrhoeal disease control, can increase community involvement.

UNICEF has long been aware of the need for changes in the social and behavioural aspects of WES services. In 1987, guidelines on community participation and hygiene education stated, "[Providing] safe drinking water to

the community [is] a very complex task... This...involves not only the change of existing facilities but also the network of behaviour and beliefs which is developed around the ownership and use of water and which involves every person.”

Community participation. Concerted efforts to involve communities in the WES programme in India date back to the early 1980s, when community members first helped ensure that boreholes were drilled to specifications. After a borehole was drilled, a village leader signed a completion certificate on behalf of the community. This established an early system of accountability. In the 1980s, well-siting involved consultations with a larger group of villagers, usually men. However, these consultations were not mandatory and depended largely on the decision of the engineer assigned to the project. In addition, the consultations generally excluded women, thereby ignoring the views of the system’s main users.

Since then, efforts have been institutionalized to encourage communities to define their needs and take part in the planning, operation and maintenance of their water systems. In some villages, water and sanitation committees have been charged with making decisions about handpump management and have also promoted messages about hygiene and sanitation.

Community involvement increased to some degree as a result of an approach developed in the 1980s called the Total Sanitation Concept. Initially applied in the states of Tamil Nadu and

Rajasthan, the Total Sanitation Concept was a seven-component package that included the provision of latrines, soakpits for drainage and other facilities.

Although the Total Sanitation Concept did not take hold in a broader context, the pilot projects advanced the WES programme because they broadened the technological and cost options available to communities and brought in NGOs as new partners. These projects also helped change the emphasis from fully subsidized sanitary facilities to those involving cost-sharing with communities, which at the same time became more involved in determining what best suited their needs.

Over time, it became clear that community participation is also crucial to the success of school

WES programmes, which in turn serve as good entry points for introducing beneficial hygiene practices and behaviour into the community. By learning latrine use, hand washing and other hygienic behaviours at school and then practising them at home, children can be strong agents of change, and they are likely to continue these good practices later in life.

Several factors account for successful school sanitation programmes: The programmes are based on community demand for services, with schools and parents contributing to the cost of the facilities; there are adequate ratios of separate latrines to the number of girl and boy students as well as to female and male teachers; and the teachers and students accept responsibility for the way the

Box 6 IEC: One ingredient of a robust programme

Resource materials on relevant topics, including text and visuals easily understood by the intended audience, form an important part of WES. These materials include booklets, pamphlets, posters, videos and training manuals. A review of more than 200 such materials produced at the national level showed that:

- One quarter are written and three quarters are visual or audiovisual.
- About 60 per cent are for use at the community level; about 35 per cent are designed for government departments and NGOs; and a small percentage are for the donor community.
- About half are in Hindi, one third are in other local languages and one fifth are in English.
- The greatest focus of the materials is on health and hygiene (25 per cent of the materials reviewed), followed by water and sanitation technology (18 and 12 per cent respectively).

Many IEC materials are produced by UNICEF’s field offices together with partners at the state and district levels. In recent years, community members have increasingly helped design and develop messages. With local capacity to produce materials well established in much of the country, the evaluation of the WES programme suggested devoting more resources to pre-testing the messages used.

latrines are used and maintained.

Gender. Women are key to the success of WES programmes, as they are more likely than men to take care of household duties such as collecting water for their families, washing clothes and dishes, cooking and handling food, and ensuring that children wash their hands and bathe. Collecting water can take up to four hours a day when water sources are not nearby. Because of these factors, women play a central role in efforts to create hygienic conditions in the home and halt the transmission of disease.

In many societies, discrimination and traditional practices relating to WES have undermined women's health and well-being. For instance, where sanitary facilities do not exist, are of poor quality or are not in working order, women in many societies habitually wait until nightfall to relieve themselves, a practice that can cause ill health and discomfort. Lack of sanitation facilities, especially separate ones for girls, is also one of many barriers to girls attending school.

For these and other reasons, the WES programme has increasingly incorporated a gender perspective: looking at the roles of women and men as users and managers of water and sanitary facilities at the community and household level and making adjustments to suit their needs (see Box 7).

This can pose challenges, however. For example, when women first became involved in the maintenance and repair of hand-pumps, it was considered quite a revolutionary step. Such responsibilities can lead to new skills and enhanced standing in the community. They can also increase women's influence over how WES services are delivered. But since the women in many of these community programmes were asked to volunteer their time, they and their families lost the income or other

Box 7 Training for gender sensitivity

UNICEF has worked to make its own staff and its partners aware of the gender-related implications of WES programmes. A UNICEF training session in Rajasthan used the following questions as a framework to make WES services more responsive to the needs of both women and men:

- Does the project lead to improving access to safe drinking water and sanitation?
- Do women have a say in planning, implementation and management of water resources?
- Have training programmes included time for women to analyse their position in society, the burden associated with water collection and its implications on girls' education?
- Is the community aware of the injustice of the burden?
- Have families encouraged their sons to share responsibility with their daughters?
- Have men gained a greater sense of sharing responsibility?
- Is the technology 'woman-friendly', in that women easily have access to and use of it?
- Can women maintain water systems?
- Are there any sustainable mechanisms/organizations to maintain the system once the project is over?
- Is the community involved in planning and implementation?
- Has the project explored the potential of promoting gender-sensitization of service providers and the community?

benefits they could have enjoyed if the women had done other work. Paying the women for their work and/or providing literacy or other skills training has been a way to deal with these concerns.

The issues concerning gender are large ones, with important implications for every community. They boil down to who in the community – women, men or both – does the physical work, makes the decisions and not only receives but also controls the benefits of improved services.

Bringing the sectors together.

During the 1990s, UNICEF adopted an approach to children's development and well-being that considered the 'whole child'. The concept is based on the principle, emphasized in the Convention on the Rights of the Child, that a child's rights are multiple, indivisible and interdependent. The approach stresses the importance of a caring environment for children through the efforts of families and communities, and

ensuring access to quality social services – health care, education, water and sanitation – that are linked to greatest impact.

Long before this whole-child and rights-based programming approach was fully developed, the Indian WES programme had already adopted practices of 'intersectoral convergence', in which development issues are considered to be inter-related and inter-dependent rather than separated by sector. The following examples illustrate this approach:

■ *Control of diarrhoeal diseases:* This effort is increasingly linked with efforts to promote sanitation and health education. For example, the Control of Diarrhoeal Diseases – Water and Sanitation Strategy, carried out in one district in each state in India, helps provide communities with improved water and sanitation facilities. At the same time it supports health education, oral rehydration therapy (ORT) and improved diarrhoeal case management at public health

facilities. An impact evaluation in 1999 showed slightly but consistently better disposal of excreta and better hand-washing practices in communities covered by the programme compared with other communities. The evaluation also showed increased use of ORT.

- **Eradication of guinea worm disease:** In Rajasthan – the state most affected by this water-borne disease – the Sanitation, Water and Community Health (SWACH) project funded by the Swedish International Development Cooperation Agency (SIDA), oversaw the promotion of safe water use and hygiene by health workers while

‘scouts’ tracked new patients. The project organized village information campaigns, trained women to filter water, and installed new handpumps and wells. The debilitating disease was eliminated in India by 1997.

- **Community health and development:** Five years after the official end of the SWACH project, an NGO called SWACH continues the effort to combine community health with nutrition, immunization, the development of income-generating skills and other interventions. Female health workers trained through the project still work with SWACH or with other NGOs to promote family welfare, immunization, improved iron intake, tuberculosis control and general hygiene promotion. Among the many reasons cited for SWACH’s success is the training and payment of female health promoters and pump mechanics.

- **Employment generation and credit:** Self-financing of latrines, introduced for the first time in a project in West Bengal in 1990, emphasized promoting local employment through the training of masons, and credit was provided to the poor to purchase a latrine. More than 350,000 latrines have been built in Mednipore, and they are still used and well maintained.

Elements of success

What has UNICEF learned about behavioural change in water and environmental sanitation that may be of use in other countries?

- **A balance must be maintained between technology and the social aspects of WES services.** As important as behavioural approaches are, technology must remain a strong element, especially in areas where WES services are just being introduced. In other words, without appropriate techno-

logy, the challenges associated with behavioural change and improved hygiene would not even arise.

- **Experimentation is needed.** Some of India’s experiments have been less successful than others, but all have been instructive in pointing the way for future efforts.

- **Gender analysis plays a crucial role.** Women’s active participation in the programme is an important first step, but making services more responsive to the needs of both women and men requires a gender-sensitive examination of the situation and potential solutions.

Challenges

Changing behaviours takes time and resources. Behaviours that have evolved over generations rarely change overnight. Developing methods to measure the cost-effectiveness of different approaches to behavioural change would help programme planners determine how best to allocate scarce resources.

With the TPPF and with other sanitation initiatives, the temptation to ‘solve the problem’ has led to going to scale too quickly without adequate monitoring and evaluation. A project that works in a test situation or in a particular area might not have success in wider applications. Because of this, UNICEF has learned the importance of monitoring and evaluation to ascertain which approaches work best over the long term and on a larger scale.

Although UNICEF has strongly advocated a gender-sensitive programming approach, there still remains a need to better understand the complexity of gender relationships, including who has access to and control over services, who benefits from improvements in water and sanitation, and how responsibilities can be shared equitably between women and men.

Box 8 New approaches to behavioural change

In the coming years, UNICEF will be able to report on several new approaches that it is piloting or developing. These include:

- **Social marketing**, in which marketing techniques are used to focus on a few key behaviours that can be measurably changed. To help determine the cost-effectiveness of behaviour change, behaviours are carefully chosen and interventions closely monitored.

- **Community management**, in which a local organization assesses a community’s needs and then works on improvements that are top priority, using mainly local resources. The external agency acts as facilitator and trainer.

- **Convergent Community Action (CCA)**, in which representatives from the community and the state form an intersectoral, multidisciplinary team to explicitly link interventions, including WES.

partnerships:

Working with others to maximize results

Through partnerships, UNICEF has been able to achieve a great impact by investing limited resources. Instead of serving as an ‘implementer’, the organization has acted more as an advocate, innovator, guide and supporter.

Government of India. UNICEF’s strongest WES partnership has been with the Government. It is commonly acknowledged within India that UNICEF has been a ‘true’ friend of the Government by collaborating on WES efforts continuously over the last 30 years, achieving credibility and collegial access to officials in the process. UNICEF’s Country Programmes for India have always been closely identified with the corresponding government priorities and planning. Rather than implement programmes on its own, UNICEF has provided technology, training and other support through the Government. The organization has supported on-the-ground implementation, advocacy and policy dialogue at all levels.

NGOs. UNICEF has established relationships with many NGOs and private sector organizations but has maintained long-term partnerships with relatively few of them. In many cases, the partnerships were project-specific and relatively short lived, involving perhaps a funding agency and a contractor or a client and a contractor. Most close partnerships have been developed with NGOs and private sector organizations that have proved to be capable and accountable agencies recognized by Government. In some cases, NGOs had pioneered approaches on a small scale, and UNICEF developed them further. The development and



Community members build latrines.

successful marketing of the Mark II handpump shows how these partnerships worked best.

As UNICEF has started to help build NGO networks and to have longer collaborations with those organizations that have performed well, it has become easier to define each partner’s objectives, strategies and inputs. Close cooperation with a core of reliable partners has made outsourcing more effective and has contributed to better monitoring and evaluation.

Private Sector. UNICEF worked closely with the private sector to encourage the local adaptation and manufacture of drilling rigs, handpumps and other equipment and accessories. It also cooperated with the Bureau of Indian Standards to oversee quality control in handpump production. The private industry’s involvement in water supply equipment has grown and now even includes production for export. The partnership with the private sector has contributed to sustainable results in India and to benefits beyond its borders.

Elements of success

UNICEF is recognized by its partners and also by external funding agencies for its positive contributions in the WES sector and for its long-term commitment at central, state and local levels. UNICEF programmes have been closely coordinated with the plans and policies of the Government.

Compared with government contributions, UNICEF’s financial contribution to water and sanitation in India, including what UNICEF receives from donors, is minimal. UNICEF has used this relatively small amount of funding to develop and test new approaches and then help build local capacity and community support, multiplying the value and impact of these funds.

Challenges

Coordination among partners has not always been close enough to make best use of limited resources. In some cases, different organizations have undertaken similar work without sharing information and lessons learned. The effectiveness of programmes in India’s decentralized setting could be improved if organizations shared a focus and defined common indicators for monitoring and evaluating results.

Another challenge is to maintain a high level of quality control and effectiveness in servicing rigs and pumps as UNICEF hands over these functions to local institutions, and some private sector partners have expressed concern about this. In order to assume these responsibilities permanently, local institutions will need encouragement and support.

Lessons from India

The WES programme in India yields lessons that other countries may find useful in adapting aspects of the programme to their own conditions and needs:

1. Long-term commitment and partnerships produce results.

UNICEF has supported India's WES programme for several decades, coordinating its activities closely with the Government, NGOs and the private sector. The depth of this support contributes to UNICEF's credibility and access in India.

2. An external agency such as UNICEF has greater freedom than a government does to test new approaches.

This relative freedom suggests an important role for UNICEF in WES and in other sectors to develop and test new approaches and build capacity among its partners.

3. Partnerships can maximize results, but they must be closely coordinated and mutually advantageous for each participant.

Partners should build on each other's capabilities, strengths and comparative advantages to have greatest impact.

4. Local realities must be taken into consideration in implementing policies made by the central government.

To be effective, a national policy framework must be shaped by local realities, including behaviours and values.

5. It is crucial to develop technology (pumps and other hardware) suited to local conditions, especially where water is scarce.

To ensure access to clean drinking

water for all children, it is especially important to create technical solutions that are feasible and sustainable.

6. A balance must be maintained between technology and the social and behavioural aspects of WES services.

Technological improvements must be accompanied by changes in behaviours and a focus on how communities use and maintain systems if lasting improvements are to be made in people's lives.

7. Gender and poverty need priority attention when programmes are planned, implemented and monitored.

These issues are key to community participation, education, training and other aspects of WES.

8. Cost data are needed for comprehensive and effective analyses.

These data help programmes improve decision-making, especially in an era of limited resources and need for greater accountability.

9. Convergence among sectors can maximize impact in a community.

Efforts to improve people's lives have greatest impact when they combine health, education, nutrition, water and environmental sanitation. For example, improving sanitation and water facilities in schools will help increase enrolment and retention, especially of girls.

10. Going to scale too quickly has adverse repercussions.

It is tempting to expand on pilot projects that seem successful. However, it is better to move slowly to ensure that promising

approaches are replicable on a larger scale.

Through its more than 30 years of support for India's WES programme, UNICEF has had the satisfaction of seeing millions of people gain access to clean water, sanitation services and hygiene education. While behavioural change has not shown such dramatic results, UNICEF has successfully advocated the need for children, women and men to play a central role in long-term decisions about WES services.

UNICEF has contributed most where it has followed through and sustained its support over time. UNICEF has benefited from the significant store of knowledge gained during this period and has also shared lessons learned with key partners. In the years ahead, partnerships with the Government, NGOs and others will become even more important.

It is hoped that India's experience will serve as a guide and inspiration for others helping people fulfil their right to clean water and sanitation. India and the rest of the world continue to face challenges in meeting this goal. In India, formidable logistic obstacles remain in expanding service, and the sustainability of the achievements made so far cannot be taken for granted. Excess demand and pollution endanger the groundwater supply, and the cost of maintaining quality services is rising. The public sector cannot shoulder the cost of providing and managing facilities in perpetuity. Involving communities and other stakeholders in the search for solutions is challenging but essential.

a timeline

of WES policy in India

Three phases mark the evolution of India's drinking water policy since Independence in 1947, particularly from the mid-1960s. Although the timeline begins in 1947, the water programme did not receive major government support until the mid-1960s. Support for sanitation is an even more recent policy issue, dating back about two decades. Five phases mark its evolution.

Water supply

1947-1980: Despite formal recognition of the importance of universal access to water and sanitation, the central Government provided little financial support until the 1966-1968 drought period in several northern states. After UNICEF airlifted 11 drilling rigs that could reach groundwater far below the earth's surface in these areas, the Government made drilling a cornerstone of its water supply programme. A centrally funded scheme for accelerated water supply was developed from 1972-1977. This programme gave 100 per cent assistance to states and centrally administered territories to extend water supply to acute problem villages (those built on hardrock or prone to drought or unsafe surface water), and particularly to those rural people from traditionally underprivileged castes and tribes.

1980-1986: Serious planning for an expanded attack on the problem of water and sanitation took place, triggered partly by the increased global attention that accompanied the International Drinking Water and Sanitation Decade. The Mark II handpump was adopted country-wide and local manufacture firmly established.



UNICEF India photo library

Women mechanics work together to repair a local handpump.

1986-present: Since 1986, the National Drinking Water Mission (renamed the Rajiv Gandhi National Drinking Water Mission in 1991) has coordinated increased activity. The directness of support and the relative freedom from bureaucratic constraint are frequently cited as reasons behind the Mission's success in improving water coverage and eradicating guinea worm disease.

Environmental sanitation

Early 1980s: In 1983, the World Bank formed a Technical Advisory Group, with its members and funds also drawn from the Government of India, UNICEF and the United Nations Development Programme (UNDP). The Technical Advisory Group supported a variety

of sanitation studies and demonstration projects.

1985-1986: The Government launched the Centrally Sponsored Rural Sanitation Programme (CSRSP) in 1985. Through this key programme, the Government allocated funds and prepared guidelines for a sanitation programme focused on rural areas



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Latrine parts available at a local production center (Rural Sanitary Mart).

under a wider housing programme. In 1986, the Technical Advisory Group completed its work and recommended adoption of locally built twin-pit pour flush (TPPF) latrines as the most cost-effective option for both rural and urban areas. The Government accepted this recommendation as the standardized latrine design for the country.

1986-1990: In 1986, the Government approached UNICEF for funding support and invited the organization to become a full-fledged CRSP partner. UNICEF launched a series of area-based micro-projects in rural sanitation in 1986-1987, as an instrument of advocacy and a way to learn from the field. As the results began to emerge, informal dialogues continued between UNICEF and the Government about alternative

approaches to the TPPF.

1990-1995: In 1990-1991, the coverage target of 25 per cent of all rural households was revised downwards, as government data showed coverage at far less than 10 per cent. A 1992 national-level seminar played a critical role in moving policy away from full reliance on the TPPF design and towards an approach that combined other hardware options with education and health linkages. The budgetary allocation for sanitation continued to be small relative to water: India's Eighth Five-Year Plan (1992-1997) allocated Rs 6,742 million (approximately US\$400 million) for sanitation compared to Rs 108,700 million (approximately US\$6,400 million) for drinking water supply. Nonetheless, sanitation finally developed its own identity in state governments'

plans, policy announcements and political governance agendas.

1995-present: In 1996, the Government issued a guideline on a variety of toilet/latrine designs, ranging in cost from US \$10 to \$100. The guideline also gave information on sanitation upgrading, encouraging households to start with a simple design that could be upgraded later. Very recently, the Government of India adopted the Restructured Centrally-Sponsored Rural Sanitation Programme (RCRSP). The policy is a shift from paying high subsidies to no or low subsidies and generation of demand for services. Women's self-help groups and small entrepreneurs help expand sanitation delivery; NGOs play a strong role in mobilizing communities, promoting demand and managing rural sanitation centres.



UNICEF India photo library

A centre demonstrating a range of technological options for sanitation.

Glossary

CCA
Convergent Community Action

CDD
control of diarrhoeal diseases

CRSP
Centrally-Sponsored Rural Sanitation Programme

IEC
Information, Education and Communication (programme)

IMII
India Mark II (handpump)

IMIII
India Mark III (handpump)

NGO
non-governmental organization

O&M
operation and maintenance

ORT
oral rehydration therapy

RGNDWM
Rajiv Gandhi National Drinking Water Mission

RCRSP
Restructured Centrally-Sponsored Rural Sanitation Programme

SIDA
Swedish International Development Cooperation Agency

SWACH
Sanitation, Water and Community Health (project)

TAG
Technical Advisory Group

TPPF
twin-pit pour flush (latrine)

UNICEF
United Nations Children's Fund

VLOM
Village Level Operation and Maintenance

WATSAN
water and sanitation

WES
water and environmental sanitation

For more information

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More information about the UNICEF WES programme is available at www.unicef.org/programme/wes

Notes

¹ UNICEF, Division of Evaluation, Policy and Planning, *Learning from Experience: Evaluation of UNICEF's Water and Environmental Sanitation Programme in India, 1966-1998*, New York: UNICEF, 2000.

² Full coverage of safe drinking water is defined, in non-hilly and non-desert areas, as access to at least 40 litres per capita per day, 250 users per spot source, within 1.6 kilometres or less.

Front cover photo: UNICEF/90-0641/Goodsmith

Back cover photo: A 20-ton rig strikes water in southern India. This large rig is used for drilling in deep aquifers and complex geologic formations and also for motorized pump installations. In the 1980s, smaller, less costly and more manoeuvrable machines were introduced to drill boreholes for the India MK II handpumps. The smaller rig became the UNICEF standard, although both types continue to be used. UNICEF India photo library

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