→ HANS VAN DAMME, DIRECTOR, IRC (CWS)

UNITED NATIONS CHILDREN'S FUND FONDS DES NATIONS UNIES POUR L'ENFANCE

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CONFIDENTIAL

1st October 1987

Dear

Draft policy paper for the UNICEF Executive Board 1988 on Water Supply and Sanitation

Attached please find a draft of a policy paper on Water Supply and Sanitation, prepared for presentation to the UNICEF Executive Board in April 1988 at the request of the Executive Board in April 1987.

This paper provides an overview of ongoing activities and broad guidelines for the discussion and endorsement by the UNICEF Executive Board.

The draft must be finalized by 15 November 1987 for translation and printing. Any comments from your side are welcome - preferrably by telex or electronic mail - before 26 October 1987.

For your information, several detailed documents on different aspects of UNICEF inputs in water supply and sanitation are under preparation and expected to be available between December 1987 and March 1988:

- UNICEF Programme Guidelines on Water Supply, Sanitation and Hygiene. A manual for programming and project planning and management. Approximately 500 pages.

- Guidelist AQUA.Plus A guide to equipment and materials for community-level-operation-and-maintenance water supply and sanitation projects. Approximately 600 pages.

- The WET Programme Digest. A country-by-country summary description of ongoing programmes. Approximately 150 pages.

- Water Supply and Sanitation in UNICEF 1946-1986. UNICEF History Monograph No. VIII. Approximately 70 pages.- An account for the first forty years as condensed from The WET History, UNICEF WET Monograph No. 2.

- Evaluating Water Supply and Sanitation Projects: Training Course. Course Modules and Guide for Course Moderators. UNICEF/IRC (The Hague), August 1987, 104 plus 91 pages.

Sincerely yours,

Richard Jolly

Richard Jolly
Deputy Executive Director
(Programmes)

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DRAFT Board paper

29 September 1987

UNICEF CO-OPERATION IN WATER SUPPLY AND SANITATION: A REVIEW AND PERSPECTIVE

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DRAFT Board paper

UNICEF CO-OPERATION IN WATER SUPPLY AND SANITATION: A REVIEW AND PERSPECTIVE

Summary

This document examines UNICEF co-operation in water supply and sanitation as essential components of primary health care. It traces the shift from technology oriented water and sanitation projects to an emphasis on the social approaches of community mobilization, women's involvement, hygiene education and human resources development. The report recommends that efforts towards the International Drinking Water Supply and Sanitation Decade goals be extended beyond 1990 to the year 2000, consistent with the target of health for all by that date. Guidelines for UNICEF's role, proposed in chapter III, stress that inter-agency co-ordination and a commitment to the application of cost-effective, village-level operation and maintenance technology within the context of community participation are integral to UNICEF's strategy.

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I. BACKGROUND

This report has been prepared at the request of the Executive Board in 1987 for a "review and perspective of water supply and sanitation programmes supported by UNICEF, with particular reference to linkages with health" (E/ICEF/1987/11, para. 106).

UNICEF support to water supply and sanitation dates from 1953 when a limited number of demonstration schemes were jointly assisted with the World Health Organization (WHO). The Executive Board has provided basic policy guidance for UNICEF involvement in this sector through its review of studies by the WHO/UNICEF Joint Committee on Health Policy (JCHP) carried out at 10-year intervals in 1959, 1969 and 1979. In 1982, the Board also considered a policy study on the maintenance of community water supply and environmental sanitation facilities (E/ICEF/L.1442).

The aim of all UNICEF co-operation in water supply and sanitation centres on the ultimate objective of securing child health and well-being through improvements in the physical/biological/social environment of children and their communities. This is to be achieved primarily through the provision of safe, sufficent and accessible supplies of water together with sanitation facilities and promotion of their use, as well as through related measures for food and personal hygiene, environmental sanitation and vector control. UNICEF co-operation takes place within the framework of the overall objectives of the International Drinking Water Supply and Sanitation Decade for 1981-1990 (IDWSSD) formally proclaimed by the General Assembly on 10 November 1980:

Safe water and adequate sanitation for all by 1990. This goal is crucial to the effort to achieve health for all by the year 2000, as endorsed by the World Health Assembly.

Impact on child health and well-being

Adequate supplies of safe water and basic sanitation are essential elements of primary health care (PHC). Each year an estimated 12.4 million deaths occur from water-, feces- and dirt-related diseases. 1/ Poor environmental sanitation is a critical link in the chain of diarrhoeal disease which entraps young children of developing countries and claims the majority of deaths in the 0-5 age group. Contributing factors are unsafe and insufficient water supplies, the lack of safe means of human waste disposal and inadequate personal and household hygiene, including poor food handling practices. These conditions lead, among other health problems, to gastrointestinal viral and bacterial infections and to infestations of a variety of intestinal parasites which drain limited food supplies and heighten malnutrition. Other serious consequences of poor hygiene are skin and eye diseases, notably trachoma.

The considerable impact of water and sanitation on diarrhoeal diseases has been established by a 1985 WHO review of 67 studies from 28 countries (see table below). Findings indicate that improvements in both water quality and availability are especially effective, reducing diarrhoeal morbidity rates by nearly 40 per cent. Reductions in diarrhoea-related deaths are thought to be even more significant.

Percentage reductions in diarrhoeal morbidity rates attributed to water supply or excreta disposal improvements

Type of intervention	Number of results	Percentage reduction Median	Range
All interventions	53	22	0-100
Improvements in water quality	9	16	0-90
Improvements in water availability	17	25	0-100
Improvements in water quality and availability	8	37	0-82
Improvements in excreta disposal	10	22	0-48

Source: Esrey, Feachem and Hughes, "Interventions for the control of diarrhoeal diseases among young children: Improving water supplies and excreta disposal facilities," Bull. WHO, 63(4), 757-772 (1985).

Beyond the prevention of diarrhoeal morbidity and deaths, improvements in water supply and sanitation are effective in controlling cholera, typhoid, amebiasis, giardiasis and a variety of helminthic diseases. When water provides the only transmission route, as is the case with guinea worm (dracunculiasis), safe water supply is the single solution to combatting the disease. However, most diseases spread through multiple fecal-oral transmission routes, necessitating improvements in sanitation, food hygiene and knowledge as well.

The benefits of water supply and sanitation far exceed the impact on communicable diseases. Even seemingly peripheral socio-economic benefits for communities can have direct bearing on health. Accessible water supply can eliminate the wearisome labour of women and children who must fetch water over long distances, typically a walk of two to three hours each day. A trek of this length can consume 600 calories or more, adding up to one third of the daily nutritional intake. The impact of saving so many calories directly benefits the health of the woman, facilitates breast-feeding and aids the development of her children. In releasing women's time for more productive activities, the introduction of accessible water supply is often the first step in women's advancement to full participation in the development process.

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As water is universally a community priority, water and sanitation activities serve as an effective entry point around which communities can organize other basic services. Economic benefits accruing from water supply activities include micro-irrigation leading to improved household food supplies, animal watering and promotion of commercial activity. In summary, water supply and sanitation enhance the overall quality of life for children and their communities in both the short and long term.

The International Drinking Water Supply and Sanitation Decade, 1981-1990

As a promotional measure, the Decade has succeeded dramatically in heightening international awareness of the urgent need for the two essential services of safe water and sanitation. This trend is evident in the increasing number of countries making firm commitments to this sector: as of 1986, 76 developing countries have set full or partial targets for the Decade, with a similar number reporting the establishment of Decade plans. National action committees are in operation in about 80 countries. Other examples of positive impact include: more efficient co-ordination among the external support agencies; the widespread adoption of cost-effective technologies, strategies and community-based aproaches; and improvements in human resources development including the establishment of knowledge and experience networks.

Inter-agency co-ordination

Progress towards the Decade goals has been characterized by a successive joining of forces and realigning of policies and action which has few parallels in the history of development. An integrated international system

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is now in place for supporting Governments in extending water and sanitation services. At headquarters level, the chief mechanism for co-ordination is the Steering Committee for Co-operative Action for the Decade, made up of the 11 United Nations agencies with a direct involvement in drinking water and sanitation programmes. Of these, five organizations are responsible for major inputs: the United Nations Department for Technical Co-operation for Development (UNDTCD), WHO, the World Bank, the United Nations Development Programme (UNDP) and UNICEF, as shown below.

Agency	Type of activity	Yearly expenditure for low-cost water and sanitation	Staff
UNDTCD	Water resources, rural water supply, especially in Africa	$10 million (grants)	20 hydrogeologists/drillers, 5 in New York
WHO	Environmental health, human resources development, Decade Secretariat	$20 million (grants)	70 sanitary engineers (field), 10 in Geneva
World Bank	Low-cost water/sanitation approaches, presently developing financing of broader national programmes	$50 million (loans), expected increase	70 engineers/economists, including 30 in Wash. D.C.
UNDP	Funding of development and novel programme approaches, Decade co-ordination	$20 million (grants)	2 in New York, 1 in Geneva
UNICEF	Support to low-cost programming and implementation in 95 countries	$60 million (grants)	145 in field, 4 in Supply, 2 in New York
		$160 million	

Under an informal but firm agreement, UNDP, UNICEF, WHO and the World Bank co-operate in strengthening country programmes through: (a) co-ordination of sectoral policies, planning and programme preparation; (b) joint activities in human resources development, health education, information exchange and other areas; and (c) aid co-operation through the Decade Steering

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Committee and its country-level mechanisms such as Decade National Commissions, Technical Support Teams and World Bank Sector Development Teams, as well as with bilateral and non-governmental organizations (NGOs). Recently, the four agencies have also begun to pool their staff expertise in order to achieve more with joint resources. The strongest complementarity of WHO and UNICEF assistance has so far occurred in South-East Asia and the Pacific, with gradual development in the Americas. A good example is a recently established sub-regional post of Water and Sanitation Adviser, Central America and Panama, jointly funded by the Pan American Health Organization and UNICEF.

Global policy framework: A new resolve

A most signficant breakthrough of the Decade has been the unreserved international commitment to reaching the most deprived populations through the community-based approach. A recent manifestation of this international accord is the "Abidjan Statement" summarizing the conclusions of the 1986 World Bank/UNDP-sponsored international seminar in the Côte d'Ivoire attended by representatives of 30 sub-Saharan African countries and 15 external governmental and non-governmental agencies. The statement proposes a five-point strategy for achieving lasting health and economic benefits for the rural and urban fringe populations of Africa through community management of water supply and sanitation systems based on low-cost technologies.

The fundamentals of the strategy are as follows: (a) the responsibility of Governments and donors in implementing projects adhering to a policy of sustainability and replicability; (b) the vital role of communities, especially women, in planning, selecting, siting, constructing, installing and

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maintaining their own water supply systems; (c) the multiplier effect of an integrated approach combining water supply, sanitation and hygiene education with PHC, nutrition and other programmes; (d) the necessary compatibility of technology choice with community resources for maintenance; and (e) the essential element of community maintenance backed by a national strategy of standardization and distribution of spare parts, thereby cutting recurrent costs and increasing reliability.

Coverage

The Decade goal of water for all by 1990 will be reached in only a few countries; notable progress has been achieved, for example, in Bangladesh and India. Sanitation goals will not be met due to the more complex challenge posed by specific needs for materials, knowledge and the attitudinal changes required for community acceptance. As implementation experience has shown the original Decade goals to have been overly ambitious, many countries have revised these targets downwards to more realistic levels.

The leading constraints to Decade progress reported by Governments include lack of funds, a shortage of both sub-professional and professional personnel and operation and maintenance difficulties. Population increase, specifically the rapid urbanization affecting all regions, has also proved a constraint in achieving target coverage. In 1970, urban residents accounted for one fifth of the total population in the developing world, compared to almost one third at present. In the year 2000, half of humanity will live in urban agglomerations, the majority in slums and shanty towns. Although variations in progress among countries make even regional assessments difficult, WHO has provided the following estimates of coverage achieved during the first half of the Decade.

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Decade coverage: Population (millions) covered in developing countries (excluding China) by WHO region

Region	1980				1985			
	Water Supply		Sanitation		Water Supply		Sanitation	
	Urban (%)	Rural (%)	Urban (%)	Rural (%)	Urban (%)	Rural (%)	Urban (%)	Rural (%)
Africa	49 (58)	58 (22)	45 (53)	52 (20)	71 (62)	93 (31)	77 (68)	82 (28)
Americas	183 (78)	52 (42)	159 (68)	21 (17)	250 (90)	59 (46)	203 (73)	24 (19)
South-East Asia	144 (64)	257 (31)	67 (30)	58 (7)	183 (67)	285 (33)	86 (32)	63 (7)
Eastern Mediterranean	88 (83)	48 (30)	61 (57)	10 (6)	121 (91)	67 (38)	91 (68)	13 (8)
Western Pacific	45 (77)	57 (50)	52 (90)	65 (57)	47 (66)	77 (62)	62 (88)	70 (57)
TOTAL	509 (72)	472 (32)	384 (54)	206 (14)	672 (77)	581 (36)	518 (60)	252 (16)

Source: "IDWSSD Mid-Decade progress review," WHO, A39/11, 21 March 1986. (To be updated based on WHO document available mid-October).

The WHO mid-decade progress review points out that while the overall level of coverage for urban residents has increased only slightly, the trend toward service upgrading is apparent for both water supply and sanitation. These gains represent monumental efforts by most developing countries to maintain and extend coverage in the face of accelerating urbanization and continued increases in total population.

At mid-decade, the total number of unserved populations in the developing countries (exluding China) was estimated at 1.2 billion (i.e. 1,200 million) in need of water supply (198 million urban residents, 1 billion rural) and 1.7 billion in need of sanitation (352 million urban, 1.4 billion rural), out of a total population of 2.5 billion (870 million urban and 1.6 billion rural).

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Resources

In 1980, the funding requirements for reaching the Decade goals of universal coverage were estimated at a total of $600 billion. The last two years, however, have been marked by widespread agreement that the only feasible approach to achieving universal coverage lies in the use of cost-effective methods such as public standposts, handpumps and latrines, combined with community-based social strategies, strong human resources development and hygiene education. Based on the increased use and proven effectiveness of such low-cost approaches, it is now estimated that Decade goals for total urban and rural coverage can be reached at only 30 per cent of the original estimate, or $180 billion (1987 prices). This does not cover the need for upgrading and/or replacement of old installations which would require much higher expenditures, particularly for conventional urban water supply and sewage systems.

The discrepancies between total installation costs of conventional urban water and sanitation (approximately $600 or more per capita) and the lower-cost systems (around $30 per capita) are indicated by the present total funding levels of about 80 per cent for high-cost urban and 20 per cent for low-cost urban and rural systems. In a realistic "optimal mix", about 60 per cent of total funding would be earmarked for the high-cost installations (which, however, would serve only 15 per cent of the total population) and 40 per cent for the low-cost options serving the remaining 85 per cent of the population (made up of 25 per cent low-income urban and 60 per cent rural). "Low-cost urban" refers here to dense agglomerations of low-standard, mostly unplanned housing served by public standposts from often makeshift additions to municipal pipelines, handpumps or open wells. Sanitation is provided by

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latrines or septic tanks and ad hoc garbage disposal. In contrast, water supply in more affluent urban areas takes the form of conventional treatment, storage and reticulated distribution with household taps; sanitation needs are served by flush toilets with sewage systems and organized garbage disposal.

External funding currently accounts for some 25 per cent of the total investment capacity available for water and sanitation programmes in the developing countries, compared to domestic inputs from national authorities and communities which make up the remaining 75 per cent. A feasible objective would be to increase domestic inputs to 80 per cent of the total by 1990. In absolute terms, a total amount of $18 billion per year, against the present level of about $10 billion, is required for water supply and sanitation in the developing countries for a 10-year period beginning in 1990. Of this $18 billion, 40 per cent or $7.2 billion, would be required for low-cost water and sanitation in rural and low-income urban areas, of which external resources would account for 20 per cent ($1.4 billion), and domestic resources for 80 per cent ($5.8 billion), as shown in the table below.

Investment needs for achieving total water and sanitation coverage in the developing countries
(in millions of US dollars)

Investment	Urban		Rural & low-income urban		Total	
	1986	1990	1986	1990	1986	1990
Domestic	6,000	8,640	1,500	5,760	7,500	14,400
External	2,000	2,160	500	1,440	2,500	3,600
TOTAL	8,000	10,800	2,000	7,200	10,000	18,000

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UNICEF's share of investment in rural and low-income urban water and sanitation is foreseen at $60 million annually for continued support to most of the programmes presently ongoing in some 95 countries. The table below suggests annual investments by region for low-cost water supply and sanitation, given overall United Nations priorities for development. These give strong emphasis to Africa where the need for external funding will remain much greater than in other regions.

Estimated total annual investment needs for low-cost water supply and sanitation, 1990-2000
(in millions of United States dollars)

					Annual UNICEF allocations	
Region	Water	Sanitation	Total	(%)	Water & Sanitation	(%)
West Africa	280	240	520	(7)	12	(20)
East Africa	160	200	360	(5)	9	(15)
Middle East and North Africa	160	200	360	(5)	6	(10)
Americas	720	800	1,520	(21)	6	(10)
South Central Asia	680	1,040	1,720	(24)	18	(30)
East Asia & Pakistan	440	640	1,080	(15)	9	(15)
China	640	1,000	1,640	(23)	-	-
TOTAL	3,080	4,120	7,200	(100)	60	(100)

Source: -- (based on WHO document available mid-October)

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II. REVIEW OF UNICEF CO-OPERATION IN WATER SUPPLY AND SANITATION */

The first phase of UNICEF involvement in water supply and sanitation (1953-1967) was characterized by demonstration projects carried out with technical backstopping from WHO. The gains of these early years, when annual UNICEF funding averaged less than $2 million, can be summed up as technical experience for UNICEF and WHO rather than any definite development of national policies or programmes.

The 1970s: Going to scale with low-cost technologies

The second phase of UNICEF co-operation (1968-1980) began with the launching of the first planned large-scale water supply programme, prompted by the 1966-1967 drought in the States of Bihar and Orissa in India. Indeed most of the large programmes supported by UNICEF during this period began as relief operations for emergency situations, including the war of liberation in Bangladesh, flooding in Pakistan, earthquakes in Guatemala and Peru, the Sahelian drought of 1972-1974 and civil strife and drought in such countries as Angola, Mozambique and Sudan. Although UNICEF emergency assistance necessarily emphasized water supply for immediate survival needs, it formed the basis for rehabilitation and long-term measures, helping to lay the groundwork in some countries for the target of nation-wide coverage eventually codified under the IDWSSD.

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*For a more detailed account, see UNICEF History monograph VIII, "Water and sanitation in UNICEF, 1946-1986," UNICEF, New York, 1987.

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The 1970s were marked by rapid technological advances which made it possible to attack the problem of insufficient water on a much larger scale than ever before. New materials led to a variety of new designs and products; the increased use of plastics, for example, significantly facilitated the installation of piped schemes. Soon reliability and maintenance emerged as a leading issue: a 1975 UNICEF survey in India found 70-80 per cent of handpumps were out of order at any given time. Most of these were traditional cast iron models developed in Europe and North America for single farm households. Intended for total use of a few minutes per day, the pumps could not withstand daily handling by hundreds of users. Given the lack of reliable handpumps suitable for village-level operation and maintenance, UNICEF took a lead role in supporting the manufacture of appropriate technologies in developing countries. These efforts culminated in the first production of the India Mark II handpump in 1976, a local product of innovative design setting new standards of reliability and cost effectiveness (see pp. 30-31).

The concept of village-level operation and maintenance was fundamental to the design of low-cost appropriate technologies. The growth of the new technologies was therefore paralleled by promotion of commmunity participation, a dynamic which UNICEF, together with WHO, had stressed as the key to success for water supply and sanitation projects since the first JCHP study in 1959.

New understanding of disease transmittal and waste disposal led in some countries to greater acceptance of the importance of environmental sanitation. However, an effective large-scale approach in this area was still lacking at the end of the 1970s despite a number of country experiences which were beginning to serve as models for replication elsewhere. In Bolivia,

Indonesia and Zaire, for example, personal hygiene was promoted through installation of bath and laundry facilities at water points. In the Chiapas Highlands of Mexico, UNICEF helped launch a highly popular around-the-clock radio programme in the indigenous languages of the tzotzils and the tzeltals, covering topics such as proper water use, sanitation and hygiene.

Such cases, however, remained isolated examples at the end of the 1970s, when sanitation claimed on average less than 5 per cent of annual UNICEF expenditure in the water sector, consisting primarily of materials for latrine construction. In 1979, 20 per cent of the countries with which UNICEF co-operated in water supply received such materials, with a marked concentration in South-East Asia. While water is a naturally felt need and consequently a high community priority, sanitation practices rely on behavioral changes relating to some of the most sensitive aspects of human life and therefore require a considerable amount of advocacy and promotional effort. As the viability and acceptance of low-cost technology ("the hardware") grew, so did the corresponding need for "software": the social approaches to ensure proper water use and accompanying hygiene practices.

The 1980s: CSD linkages and the social approaches

The proclamation of IDWSSD in 1980 signified international support for the low-cost, community-based approaches benefiting the most deprived populations. The definition of the Decade goals coincided with the clarification of UNICEF's objective of reducing infant and child morbidity and mortality through a combination of selected interventions articulated as the child survival and development (CSD) strategy.

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Thus, a new challenge emerged in the early 1980s: how to link water, sanitation and health education with other CSD activities, fully exploiting the opportunities provided by water as an entry point for the organization of other PHC and social services. The new concept of health education far exceeded information delivery, aiming instead at behavioral change for healthy habits concerning water and its impact on the control of diarrhoeal diseases (CDD). Diarrhoeal disease, the major child killer in developing countries, is a prime target of the CSD strategy. Within the overall context of CDD, the environmental preventive intervention of water supply and sanitation was now complemented by the bio-medical life-saving measure of oral rehydration therapy (ORT), which had recently revolutionized diarrhoea treatment.

New insights into the social patterns of knowledge, attitude and practices as well as epidemiological and biomedical discoveries forced a revised understanding of the interdependence of water, sanitation, nutrition, health and education, making obsolete the purely technical public works approach to water supply. Similarly, the original definition of sanitation largely in terms of latrine construction gave way to the concept of environmental sanitation in its widest sense, encompassing hygiene education along with sanitary disposal of excreta and garbage. In 1979, supplies and equipment constituted over 90 per cent of total UNICEF support to water and sanitation. This share had dropped to 65 per cent in 1985, a reflection of increased attention to non-supply social approaches. UNICEF co-operation in this sector in the 1980s has been characterized by this shift in emphasis from the "hardware" of technology to the "software" of health education and community mobilization, women's involvement and human resources development.

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Health education and community mobilization

Inclusion of health education and community motivation components in UNICEF co-operation in water supply and sanitation programmes was made mandatory based on the conclusions of the 1982 Executive Board review, "Maintenance of community water supply and environmental sanitation facilities" (E/ICEF/L.1442). Motivational activities connecting water and sanitation as integral to health delivery are generally aimed at three levels: policy makers, implementers and the community. The desired integration of water and sanitation with nutrition, family food production and other development activities within the PHC framework is, however, necessarily a long-term goal given the sectoral nature of government services. Even water and sanitation are seldom linked administratively and are sometimes located within different Government ministries.

As linkages between hygiene behaviour and health are neither simple nor obvious, project experience has found practical face-to-face demonstrations by health workers or trained volunteers to be most effective, e.g. in Nigeria (see pp. 33-34) and Pakistan where some 400 village promoters of water and sanitation were trained with UNICEF assistance over 1982-1986, an activity now continued by the Government. In Bangladesh, village-level health promotion has been facilitated by co-operation with several local NGOs having intimate knowledge of the communities. However, a major constraint in many countries has been the lack of recognition for community health workers whose status is not commensurate with their multiple responsibilities. Because their role is crucial to the entire health strategy, UNICEF is seeking ways to promote the health workers' cause, a point illustrating the fact that community-level mobilization must be reinforced by mobilization of social organizations at higher levels of policy, resources and implementation.

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Social mobilization also involves building networks for health education, reaching target audiences at all levels through communications channels serving as vehicles for health messages. These are usually sharply focused on basic themes such as the importance of handwashing. UNICEF is co-operating in a global pilot project producing radio programmes on CSD subjects, including messages on home hygiene, for adaptation to local contexts.

Given the cultural sensitivities surrounding the subject of sanitation, motivational elements to promote understanding of the importance of personal and household hygiene require special emphasis. The adequate disposal of the feces of infants and small children calls for particular attention as, contrary to popular belief, these have a higher count of pathogens than those of adults. In the past, there has sometimes been an unfortunate tendency to treat sanitation as secondary, resulting from the priority that many communities give to water supply because it is a felt need. As the disposal of excreta and household waste, along with aspects of personal hygiene, are even more directly related to health than is water supply, community realization of the dangers of contamination through feces and waste is an essential first step in introducing sanitation measures.

While socio-cultural studies prior to interventions are now included as prerequisites for UNICEF programming, such efforts in the area of water and sanitation must be further developed and linked to knowledge, attitudes and practices studies for CDD. Such studies can be instrumental in message development and testing, leading to design of activities. In Morocco, for example, based on the conclusions of a socio-cultural study which underlined the potential of mosques as an entry point to hygiene activities, demonstration sanitation facilities have been installed at these sites and training of imams as health communicators has been initiated.

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In Algeria, a nation-wide CDD campaign carried out annually since 1984 has been complemented since 1986 by the introduction of a comprehensive sanitation component. Among the objectives are purification of all water sources, including the protection of rural wells by lime-filled and sealed porous bricks. As of September 1986, 115,000 wells had been successfully improved in this manner. Campaign success has been credited to wide-scale social mobilization utilizing radio, television and the print media.

Support for sanitation and hygiene has special priority in low-income urban areas where basic needs for water supply may already have been met but where adequate sanitation is essential in reducing health hazards among overcrowded populations. Some of the most valuable project experience has been gained in the Americas. In Rio de Janeiro, Brazil, for example, the collective self-help efforts of grass-roots organizations in the favelas (squatter settlements) have provided improved sewage and garbage collection systems for a population of some 100,000. The community's own resources are used extensively in terms of labour, organization, administration and equipment, with residents absorbing some 25 per cent of the cost of materials. UNICEF assistance, initiated in 1980 in one favela, ceased in 1985 with the full institutionalization of the project as a city-wide programme now covering some 96 settlements.

However, progress in sanitation and hygiene still lags well behind water supply. UNICEF will therefore accelerate its advocacy, putting the full weight of its communication support behind this programme, to raise awareness and stimulate national commitment for sanitation, without which progress in water supply can have little long-term impact.

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Women's involvement

Today women's involvement is the centre piece of the participatory approach, based on their role as water providers, household managers and child educators. As the primary users of water facilities and the target group for hygiene education, women are now viewed not as passive recipients of a programme but as the decisive factors in its success. Recent project examples of this trend can be found in Thailand where the Population and Community Development Association is teaching north-east village women to perform preventive maintenance and minor repairs on a lightweight handpump designed at the University of Malaya. In Sri Lanka, women are involved through the non-governmental Sarvodaya Shramadana movement in both maintaining pumps and manufacturing all of the above-ground components. Water and sanitation projects in Burma and Kenya are linked to women's income-generating activities based on time saved through increased water accessibility.

UNICEF co-operates in the programme, Promotion of the Role of Women in Water and Environmental Sanitation Services (PROWWESS), along with other organizations including UNDP, WHO and the Institute for Studies, Research and Training for the Advancement of Women (INSTRAW). Activities demonstrating how women can be instrumental in water supply, sanitation and hygiene education are now underway in 10 countries; influences already discernible in other areas and activities indicate the potential snowball effect of these pilot projects. Consistent with UNICEF's implementation strategy for women in development (E/ICEF/1987/L.1), the role of women as key to the success of water and sanitation projects receives priority emphasis.

Human resources development

Second only to the issues of political commitment and the social mobilization elements of health education, human resources development is the most critical component in achieving nation-wide water and sanitation coverage. Training needs for planning, management, implementation, operation and maintenance are even more urgent than those for actual installation of facilities. UNICEF supports human resources development largely on a pragmatic basis of on-site training, focusing on training of trainers. In certain cases, national or regional training facilities have been assisted, such as the Wad Magboul Institute for Water Technicians in Sudan. Technical co-operation among developing countries is a growing element of human resources development, aided by UNICEF through support to study tours and experience exchange. In 1986, a total of 16,358 water and sanitation personnel were trained with UNICEF support.

UNICEF is active in the Task Force of the Decade Steering Committee responsible for human resources development, which aims at co-ordinating and providing policy guidelines to Governments and other agencies. UNICEF also co-operates with the UNDP/World Bank Training and Information Programme on Water and Waste Management which has established a training network of developing country institutions encompassing policy makers, engineers, engineering students, educators and field workers. The programme has produced a set of information and training materials covering both technical aspects and concepts of community mobilization and health education. UNICEF field tests these materials, linking activities with its own support to village/district-level training. UNICEF maintains close ties in this area with WHO, the International Labour Organisation (ILO), the United Nations

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Educational, Scientific and Cultural Organization (UNESCO) and is developing contacts with the Food and Agriculture Organization (FAO). UNICEF also works closely with training institutions such as le Centre Inter-Africain des Etudes Hydrauliques (Burkina Faso).

Technological developments

UNICEF's early experience in handpump development has been extended through a collaborative UNDP/World Bank global project for handpump development and testing. The project is integrally linked to many UNICEF-assisted water activities and UNICEF, as one of the largest purchasers of handpumps in the world, participates both in project supervision through chairmanship of an Advisory Panel and in the field testing and development of improved handpump designs. Local manufacture has already become the norm in some countries. The widely used India Mark II is now manufactured in Mali as well. In Bangladesh, annual production of 100,000 units of the locally developed Tara handpump is planned in collaboration with private manufacturers; a total annual capacity to produce 360,000 No. 6 handpumps has also recently been identified. Mozambique is utilizing locally-made pumps for shallow wells. The Afridev handpump, developed in Kenya and Malawi, has many positive features regarding ease of maintenance and potential for local manufacture in developing countries.

The UNDP/World Bank global low-cost sanitation project has established the technical basis for UNICEF advocacy in this area. In Egypt, India, Lesotho and the United Republic of Tanzania, UNICEF has co-operated with the project in introducing latrine construction and related environmental sanitation components in an effort to reach national coverage. The development of the

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ventilated improved pit (VIP) latrine has revolutionized on-site excreta disposal. Its structural simplicity and effectiveness in controlling flies and odour have made it popular in both rural and urban areas in many countries and its design adapts readily to the use of local materials.

In Cape Verde, Indonesia, the Philippines, Thailand and the Turks and Caicos Islands, rain-water catchment systems have been rediscovered as simple, low-cost means of harnessing this resource. Use of alternative energy (wind, sun) is rapidly gaining acceptability in several countries. Despite a high capital cost, wind and sun pumps are cost-effective in comparison to mechanized pumping using fuel. Solar pumps are being tested in many countries in West Africa, while Cape Verde, Somalia, Sudan and the United Republic of Tanzania currently employ wind energy for pumping.

Monitoring and evaluation

During the 1980s, monitoring and evaluation has been emphasized throughout the programming cycle as a necessary management tool, with a corresponding increase in both the number and scope of evaluations of UNICEF-assisted water and sanitation projects. Over 1985-1986, 47 evaluations were completed in this sector, comprising 14 per cent of all such studies undertaken. Depending on needs and means, objectives have ranged from simple progress evaluations to health and socio-economic impact studies. In order to systematize approaches and elaboration of appropriate methodologies, UNICEF has recently developed training modules for water and sanitation evaluation in co-operation with WHO and the International Reference Centre for Community Water Suppy and Sanitation (The Netherlands).

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General conclusions emerging from an analysis of recent evaluations underline the need to: emphasize UNICEF inputs in water supply, sanitation and health education as a single integrated package; further exploit the importance of water as an entry point; more clearly define the roles of Governments, communities and UNICEF; and encourage greater responsibility by Governments. Major bottlenecks were found to have often resulted from general underestimation of logistics inputs, pointing to the importance of examining existing logistics capacity when formulating projects.

Based on analyses of lessons learned, a screening procedure has been introduced at the earliest stage of water and sanitation project planning. This includes a checklist designed to ensure proper focus on objectives, cost efficiency and PHC linkages. Adequate specification of major supply components is also stressed. An effort is underway to facilitate experience transfer among field offices as well as systematic follow-up to evaluations.

Costs and financing

Within the range of low-cost water and sanitation technologies, the costs of installations vary greatly according to operating conditions and project design (see table below). It is most useful to compare the basic aspects of installations in terms of their annual per user costs which take into account the necessary capital investment levels spread over different populations. Operation and maintenance costs are also important, particularly from the perspective of users who typically cover these by paying fees (which may cover some portion of capital expense as well).

Table: Costs for typical low-cost water supply and sanitation installations (United States dollars in 1987 values)

of system	Description	Country	No. of users per unit	Capital cost per unit Total	Capital cost per unit Annualized per capita*	Operation and maintenance Annual per capita
ER SUPPLY/						
l diameter wells (drilled or sludged)						
low ground water	Suction handpump (cast iron)	Bangladesh	50	$150	$0.20	$0.04
rmediate	Low-lift (Tara pump) (plastic)	Bangladesh	50	$250	$0.30	$0.04
· ground water	High lift (steel)	India	250	$2,450	$1.20	$0.20
	(e.g. Mark II	Uganda	250	$3,300	$1.65	n.d.
	or Afridev pumps)	Burkina Faso	250	$11,600	$6.80	n.d.
diameter wells (excavated)						
handpumps	Cast iron pump	Thailand	250	$540	$0.70	$0.95
	Steel pump	Malawi	250	$720	$0.70	$0.20
andpumps	Platform and protected margin	Sahel	1,000	$15,000	$1.00	n.a.
water catchment						
(low rainfall)	Ferrocement, 10 cu.m.	Indonesia	10	abt $310	abt $3.50	n.d.
(high rainfall)	Ferrocement, 2 cu.m.	Thailand	10	abt $150	abt $1.75	n.d.
d water with standposts (public taps)						
ected springs th gravity feed		Guatemala	100	$850	$4.95 including Operation and Maintenance	
	Estimate	(e.g. Nepal)	500	$10,000	$3.10	$1.90
r pumps	Estimate	(e.g. Yemen A.R.)	50	$23,000	$6.75	$3.75
ITATION (EXCRETA DISPOSAL/						
latrines	Dry pit	Guatemala	2.6	$12.30	$0.04	$0.04
	VIP (ventilated	Brazil	6	$67	$2.20	$1.35
	improved pit latrine)	Burma	6	$26	$0.90	n.d.
	Water seal	39 country average	6	$121	$3.30	$1.70
		Bangladesh	6	$22	$0.75	$0.00

epresents the value of capital inputs amortized over the working life of the installation, adjusted for interest rate and other factors.
.d.= no data; n.a.= not applicable

ce: World Bank, WHO and UNICEF.

A review of data from projects supported by WHO, the World Bank and UNICEF shows that costs for small diameter wells range from under $0.50 per user per year to over $5.00, with negligible maintenance costs. Larger diameter wells cost more consistently on the order of $1.00 per user per year, with slightly higher operation and maintenance. Rainwater catchment is more expensive to install ($2-$4 per user per year), although it can be a very appropriate technology in many areas. Piped water systems with standposts, usually found in urban areas, are much more costly, on the order of $5 and above yearly per capita, including operation and maintenance. As a point of comparison, annualized per capita costs of conventional urban water supply with all conveniences typically run approximately $100 per year in a Western European country, with operation and maintenance levels of about $60.

However, costs are difficult to compare between countries and these figures should be taken only as a general guide. In the first place, labour costs, prices and exchange rates may vary across countries or over time. A second, more important factor concerns the very different technical and social conditions characterizing countries, or even distinguishing zones within a country. For the same type of installation, costs will be lower, for example, when: materials and skills are available locally; the water table is shallow, making deep drilling unnecessary; other hydrological or geological conditions do not require more drilling; unproductive wells (dry bores) are few; projected volumes are lower, e.g. in rural as opposed to urban areas and for boreholes as opposed to excavated wells; and greater inputs are available from the user communities themselves.

UNICEF experience also shows the impact of pump selection on total costs. Lower-cost pumps, some developed with UNICEF support, are now widely

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available. For example, shallow-depth handpumps are produced in a number of Asian countries at a cost of $40-$60. Wind and solar pumps vary in cost, depending on yield and depth. Recent technical developments regarding materials and their processing promise further radical lowering of costs. Pump maintenance is also a factor; although communities will carry out some maintenance themselves, a major share requires technical training.

Costs of latrines for sanitation depend in large measure on the design selected. Dry pits are quite expensive, on the order of $10 to $15, including recurrent expenditures incurred by the users. VIP latrines may cost from $25 to $100 or more to install. Water-seal models fall in the same range, depending on local conditions. Typically, the financial cost of latrines may be significantly lowered when users do much of the necessary work themselves. UNICEF co-operation often consists of supplying materials unavailable within the community, such as cement, reinforcing rods, molds and ventilating pipe. The user communities may dig pits, provide sand and gravel and do much of the actual labour. For example, in the Wanging'ombe district of the United Republic of Tanzania, households construct their own latrines, agreeing to produce a required number of bricks before a mason will construct the substructure. In terms of labour and local materials, these households contribute some 82 per cent of the total value of the completed latrine.

Community financing, through user charges as well as community inputs of labour and materials, plays an increasingly important role in UNICEF-assisted water and sanitation projects. This has led to detailed planning from a cost perspective to ensure that installations are affordable to the country and to users, and that projects are financially sustainable. To promote cost recovery, it is essential that communities are involved from the outset in

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planning and project design to allow a realistic determination of actual ability and willingness to pay for particular levels of service. The community itself must agree on how it will mobilize and collect the required contributions, from whom and at what rates, and if exemptions are necessary.

In Democratic Yemen, beneficiaries of the rural water supply and environmental sanitation project form associations responsible for collecting fees from users. This system of revenue collection pays for pump operators, fuel, spare parts and minor repairs. In a gravity-fed water system project covering small rural settlements in Guatemala, community support constituted 40 per cent of total funding over 1980-1985. The Government provided 16 per cent of funding, UNICEF 39 per cent and others 5 per cent. In the Burma rural latrine construction programme, community inputs over 1982-1987 made up 66 per cent of the total, compared to 26 per cent from UNICEF and 8 per cent from the Government. The overall programme is forecast to achieve near 50 per cent coverage in rural areas by 1990.

UNICEF is also promoting the use of incentive schemes (e.g. in Uganda) and affordable loans (e.g. Nigeria and Bangladesh). In Bangladesh, a UNICEF-supported pilot project for handpumps has been financed on a loan basis through the Grameen Bank which brings credit services within the reach of the landless who cannot offer collateral for bank loans. Surplus from income-generating activities initiated with Bank loans has also been used by some members to purchase latrines.

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UNICEF expenditure

UNICEF is probably the largest single external donor agency in terms of grants for low-cost water and sanitation installations, providing 75 per cent of grants within the United Nations system. UNICEF expenditure should be seen in the context of the estimated $2.5 billion in external resources currently spent annually on Decade country activities. UNICEF-assisted programmes are estimated to have served about half of all populations receiving new installations under the aegis of IDWSSD. The following table shows UNICEF yearly expenditure for water and sanitation over 1974-1986.

General resources funding currently accounts for some 40 per cent of UNICEF expenditure for water and sanitation, a decline from a 65 per cent share in 1981. Over 1984-1987, supplementary funds made up 55-58 per cent of UNICEF financing for this sector. The balance between the two sources of funding is forecast to have stabilized at the present breakdown of 40 per cent general resources and 60 per cent suplementary funds.

UNICEF Co-operation in Water and Sanitation (1974-1986):

YEAR	Number of Countries	WATER SUPPLY Number of Installations	WATER SUPPLY Beneficiaries millions	WATER SUPPLY Expenditure $US million	SANITATION Number of Installations	SANITATION Beneficiaries millions	SANITATION Expenditure $US million	TOTAL Water and Sanitation expenditure	TOTAL Per cent of total programme expenditure	Sanitation as per cent of total water + sanitation expenditure
1974	73	47 570	9.5	10.8	6 380	0.2	0.2	11.0	13.8	2
1975	82	64 325	9.0	13.3	26 520	0.3	0.2	13.5	12.2	1.5
1976	91	80 000	12.4	13.2	40 540	0.5	0.3	13.5	13.3	2
1977	77	58 000	10 (?)	16.1	176 680	1.5	1.8	17.9	14.0	10
1978	77	28 570	8.7	25.2	71 750	0.8	1.3	26.5	18.7	5
1979	90	75 920	9.1	50.2	257 720	2.1	2.7	53.1	25.4	5
1980	94	99 000	10.5	49.3	154 830	0.8	1.3	50.6	20.1	3
1981	94	65 482	13.8	44.3	109 100	1.3	1.4	45.7	20.9	3
1982	93	76 825	13.6	58.9	176 820	0.9	1.2	60.1	28.2	2
1983	97	75 270	12.9	64.5	312 700	2.8	3.4	67.8	27.6	5
1984	97	80 380	14.9	65.3	289 630	2.1	2.7	68.1	27.9	4
1985	93	92 560	16.8	49.8	307 200	6.0	8.8	58.5	21.0	15
1986	95	83 468	18.7	53.2	293 404	2.5	5.0	58.2	17.8	9
1974-86		927 000	160	514.4	2 223 274	22	30.3	544.5	21	6

UNICEF expenditure for water and sanitation by region
(in millions of United States dollars)

Region	1982	(%)	1983	(%)	1984	(%)	1985	(%)	1986	(%)
West & Central Africa	6.2	(10)	6.9	(10)	10.9	(16)	9.6	(16)	9.2	(16)
Eastern & Southern Africa	7.8	(13)	13.7	(20)	10.3	(15)	10.0	(17)	9.3	(16)
East Asia & Pakistan	16.5	(28)	16.7	(25)	18.0	(26)	15.4	(26)	13.4	(23)
South Central Asia	17.0	(28)	11.4	(17)	16.0	(24)	13.0	(22)	15.4	(27)
Middle East & North Africa	11.5	(19)	17.5	(26)	10.7	(16)	7.3	(13)	8.4	(14)
Americas	1.0	(2)	1.5	(2)	1.7	(3)	3.0	(5)	2.5	(4)
Interregional	0.1		0.1		0.5		0.2		0.1	
TOTAL	60.1	(100)	67.8	(100)	68.1	(100)	58.5	(100)	58.2	(100)

Two country experiences

India: Technological innovation and capacity building

Handpump failure rates in India, estimated at 70 per cent in the mid-1970s, had dropped to about 20 per cent by the 1980s. This dramatic progress testifies to the success of a UNICEF-supported project launched in 1974 with the objectives of developing a sturdy community handpump and maintenance system. Within two years, the India Mark II handpump was produced in co-operation with NGOs, national research groups and Government-owned steel

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manufacturers. Adopted as a national standard in 1979, it remains the design against which handpumps worldwide tend to be judged. A recent assessment */ concluded that UNICEF's catalytic role in project co-ordination, motivation and monitoring proved even more crucial than financial assistance.

Once the pump was developed, the organization of large-scale production became the goal. Quality control and standardization were deemed essential; pump component interchangeability was a key factor in economy and ease of maintenance, permitting reliance on a manegeable inventory of a few standard spare parts. Stringent screening procedures were enforced to identify qualified suppliers. In 1986, some 40 officially recognized manufacturers were producing 150,000 handpumps annually, designed to serve 250 people each. The Indian handpump industry is now estimated to employ more than 8,000 workers. To date, total new pump installations number almost 1 million. Competition has reduced prices some 20 per cent over the past two to three years despite overall industry inflation of 14 per cent. Although the India Mark II 1984 domestic price of $159 was some 50 to 60 per cent more than other locally available pumps, its maintenance costs are about a third of these.

Despite wide acceptance of organized maintenance concepts, accelerated handpump installation has put great pressure on State maintenance systems. As a result, training of pump caretakers is considerably behind schedule in many areas. In Andhra Pradesh, for example, only 6,000 caretakers had been trained

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*"Semi-industrial projects assisted by UNICEF in India, Phase II," Tata Institute Economic Consultancy Services, New Delhi, December 1984.

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by 1984, compared with a total of 86,000 pumps installed. Continuing improvements to the India Mark II design, including simplifications and greater access to lighter weight, below-ground parts, are expected to facilitate village maintenance and will entail massive training of villagers.

While the India programme has become a technical and strategical model for water well drilling and handpump installation, the absence so far of a complementary comprehensive rural sanitation programme has been striking. Current UNICEF co-operation therefore focuses on improving environmental and hygiene conditions, relying strongly on educational processes. Programmes are linked with integrated child development services, health and education. To enhance convergence, priority is given to villages where key programmes such as PHC are operational. Construction of waste disposal systems, garbage pits and chullas (smokeless stoves) is also supported. NGOs are being mobilized to assist in training of pump caretakers, dais (traditional birth attendants), teachers, Anganwadi (village centre) workers, health guides, scouts and religious leaders. This strategy, combining social approaches with continued handpump installation, brings within reach the Government's goal of providing safe water to 100 per cent of rural areas and sanitation to 25 per cent of the rural and 80 per cent of the urban populations by 1991.

Nigeria: From pilot project to national strategy

The UNICEF-assisted Imo State project initiated in 1981 in south-eastern Nigeria serves as the first model package integrating water and sanitation with PHC and CSD measures from the outset. Based on the premise that water and sanitation projects cannot succeed unless changes in water-use habits and hygiene practices are firmly established, the project combines water supply

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through boreholes with handpumps, sanitation through construction of VIP latrines and hygiene education through training of village-based workers.

The choice of project technology contrasted sharply with the national programme based on high technology solutions initiated during the height of oil affluence. As a strategy for advocacy with decision makers, UNICEF undertook to bear full pilot project costs to demonstrate the effectiveness of the low-cost, multidisciplinary approach. The best indicator of success has been the Federal Government's request in 1985 for UNICEF assistance in replicating the project on a national scale. Six States directly assisted by UNICEF now serve as models and training centres for the remaining 14.

The total investment cost of adopting the integrated approach for water and sanitation coverage in rural Nigeria has been estimated at less than $2.5 billion or $45 per capita. This is roughly equivalent to the annual operational and maintenance costs alone of a 1984 Federal plan of rural mechanized borehole systems which would have cost approximately $25 billion or $455 per capita. At end-1986, the total investment since programme inception in 1981 was $24.2 million: UNICEF contributed capital goods of $8.3 million and 60 per cent ($9.5 million) of recurrent expenditures while State Governments provided 40 per cent ($6.4 million). The Government's share of recurrent expenditure is on the rise, from 38 per cent to 75 per cent over 1983-1986. In 1986, the World Bank, in co-ordination with UNICEF, began to provide large loan components for rural and urban water supply, thus greatly increasing the likelihood of achieving nation-wide coverage within the next decade.

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Evaluation of health impact was built into the project from the beginning, as described in a report to the 1984 Executive Board, "Overview of evaluative activities in UNICEF" (E/ICEF/1984/L.3/Add.2). Findings show that average faecal coliform (Fc) counts in household water samples fell from a pre-intervention level of 20,000 to current levels in the range of 1,000 Fc/100 ml., substantially lessening the risk of diarrhoea. The incidence of guinea worm has fallen from over 90 per cent to less than 10 per cent in Imo and Kwara State project areas, with a significant health and socioeconomic impact evident in increased school attendance and agricultural output.

Sustained community mobilization efforts are fostered by village-based workers, usually two men and two women chosen by each village for training in breast-feeding, nutrition, water use, personal hygiene, environmental sanitation, ORT and communication activities. Billboards at all water points promote health messages on subjects such as immunization. Some 2,000 village-based workers were trained over 1981-1986. Given the high drop out rate of these voluntary workers, attempts are being made to compensate them from village taxes. Other project modifications include a change to more cost-effective and appropriate drill rigs to facilitate the drive for sustainability and going to scale. The programme also has built in allowances for future upgrading, e.g. boreholes are intentionally over-dimensioned to allow later installation of submersible pumps serving a larger population.

III. PERSPECTIVE: FUTURE ACTION

Water and sanitation within the "Health for all" strategy

The experience gained so far during the Decade provides a strong foundation for accelerated progress towards revived goals extending beyond

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1990. Reinforced political will and recent breakthroughs in joint national and international action are now bringing these targets within reach. Efforts towards the provision of water supply and sanitation for all should continue towards the year 2000 as integral components of the "Health for all" strategy jointly endorsed by UNICEF and WHO. The new targets, set against the background of Decade experience and cast within a realistic time span, can be reached contingent upon a concerted co-ordination of efforts by Governments, United Nations agencies and inter-governmental, bilateral, non-governmental and other organizations.

Guidelines for UNICEF policies and programmes

Strengthening CSD linkages

In pursuing the UNICEF objective of reducing infant and child mortality and morbidity rates, there is a natural complementarity between actions to promote and support safe water supply and sanitation and the social-health interventions of the CSD strategy. The socio-economic and health benefits yielded by improved water supply and adequate sanitation characterize these interventions as fundamental for rural and urban development. Linkages of water, sanitation and hygiene education with other sectors are therefore essential for a strategy of mutually reinforcing integrated programmes attacking the complex of CSD problems.

Specifically, water and sanitation programmes and ORT should be treated as complementary and mutually supportive CDD components. While ORT very effectively reduces dehydration and consequently the mortality rate among children infected by some forms of diarrhoea, it remains a curative

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intervention. As the supply of safe water in sufficient quantities and adequate sanitation form the primary barriers to the transmittal of fecal-oral pathogens, the installation of water and sanitation facilities and their proper use are necessary to attack the roots of diarrhoeal disease.

In the context of CDD, UNICEF will promote safe water supply and sanitation in conjunction with ORT in all operations: advocacy, programme preparation, funding, training, monitoring and evaluation. All programme messages on CDD to user communities will reinforce this linkage and the strategy will be co-ordinated within the framework of UNICEF's systematic co-operation, especially with UNDP, UNDTCD, WHO and the World Bank. Furthermore, UNICEF will ensure implementation of its existing policy that no UNICEF inputs for water supply should be planned and programmed without the corresponding components for environmental sanitation/hygiene education. This mandatory inclusion of water, sanitation and hygiene education as a single integrated package should be monitored closely through programme previews and reviews, allowing adjustments as early in the planning stage as possible.

UNICEF will also develop strategies to link planning for water and sanitation components with other PHC elements, taking maximum advantage of the entry point potential of water projects. Training of handpump caretakers in countries such as Bangladesh, India and the Sudan, for example, includes strong health education components covering the CSD elements and demonstrations of ORT. Linkages with food security measures will be strengthened through the UNICEF/WHO Joint Nutrition Support Programme as is currently done in Sudan (micro-irrigation) and Viet Nam (fertilizer from compost latrines). The problems of poor urban communities require particular focus. UNICEF co-operates closely with the World Bank, WHO, UNDP and other

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bodies in identifying strategies for the application of low-cost technologies linked to the introduction of urban basic services.

Going to national scale

As with all UNICEF co-operation, the overall objective of programming in the water and sanitation sector is to assist countries in reaching their goals so that UNICEF can either phase out its support or shift its resources to other areas of development. Given the magnitude of needs in water and sanitation, UNICEF has achieved such progress in only a very few countries where there were adequate national and other external resources, e.g. in Malaysia and the Republic of Korea which both assumed full operation of the water programmes in the early 1980s, and in Paraguay where UNICEF support was phased out in 1985.

Water and sanitation projects are planned to enable a gradual widening in scope and orientation, aiming at evolution from pilot or demonstration activities to nation-wide coverage. The state-by-state replication strategy practiced in India and Nigeria is typical of this approach. Other countries which for many years have planned and implemented community water supply on a national basis include Bangladesh, Egypt, Indonesia and Zimbabwe.

As follow-up to the technological breakthroughs of the last 20 years has reduced costs by as much as 20 to 30 times (e.g for water points with handpump installations), UNICEF project experience shows that the feasibility of nation-wide coverage has increased even more dramatically, by factors on the order of magnitude between 50 and 100 times. This has been made possible through a technological revolution, particularly in terms of water well

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drilling resulting in vastly improved machinery and materials along with more efficient, simplified methods. For example, in India, it used to take up to one year to drill a well three to four inches in diameter to a depth of 50 metres by the old "calyx" method. The same work now takes six to eight hours. Modern exploration tools, such as remote sensing and direct read-out electronics in hand-held geophysical instruments, help reduce the incidence of dry bores (e.g. in Ethiopia, India and West Africa). Dry or low-yield boreholes can now be made productive through hydraulic fracturing of otherwise impenetrable hard rocks, as successfully practiced in Uganda.

UNICEF funding for water and sanitation represents only a very limited portion of resources within a country. In India, for example, UNICEF commitments for water and sanitation for the period 1985-1989 make up less than 1 per cent of the total investment in this sector by the Government of India. Nonetheless UNICEF can play a valuable role in demonstrating to Governments effective alternatives for sustainable and replicable water supply and sanitation schemes. UNICEF participates prominently in the joint United Nations system efforts to influence Government priorities and resource distribution by advocacy, reinforced and proven by a combination of policy promotion, planning assistance, delivery of material and equipment and technical assistance with a strong training component. A selective focus on a limited range of technologies, for example, results in a high degree of standardization as well as uniform approaches to training needs which can facilitate replicability and going to scale.

Human resources development is a key prerequisite for achieving national coverage. In this area, insufficient attention has been given to the role of counterpart training, especially for project management. More will be done at

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the programme planning stage to secure Government-provided counterpart staff and to tie them into the programme since benefits accruing from this pairing can be tremendous. In Nigeria, for example, UNICEF staff are kept to the minimum and perform largely advisory and support functions. The vast majority of project staff are State employees on secondment who are responsible for managing and executing activities at State level.

Within the framework of the UNICEF country approach, UNICEF will assist Governments in identifying acceptable service levels for water and sanitation systems, dependent on: (a) the overall needs according to the size, development and distribution of the target populations; (b) natural factors such as water resources availability, location, quantity and quality; (c) human resources factors; (d) industrial base, e.g. the potential for local manufacturing; (e) technical factors facilitating village-level operation and maintenance; (f) economic factors such as material and transport costs, salaries and wages, exchange rates; (g) cultural factors (knowledge, attitudes, practices); (h) political and administrative factors; and (i) funding sources and sustainability.

Given the significant problems regarding financial arrangements for defraying or partially covering the costs of maintenance, priority must be put on mobilizing local funds. UNICEF project planning will continue to emphasize analysis of the socio-economic situation of potential beneficiaries, in particular population density, income level and ability and willingness to assist with cost recovery measures.

A current programming trend among development organizations has been to consider concentrating assistance on low-cost programmes in a relatively few

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countries with the potential of going to national scale with water supply and sanitation coverage. For the past 15 years, UNICEF has co-operated in water and sanitation programmes in some 90 to 100 countries; it is currently committed to long-range assistance in the majority of these. However, UNICEF will collaborate with UNDP, WHO and the World Bank in identifying countries with potential of achieving national coverage in an attempt to attract maximum support from the international community for these efforts.

UNICEF internal support structure

UNICEF staff support for water and sanitation programmes is an essential element of overall programme assistance. As of 1987, approximately 145 UNICEF water supply and sanitation project officers were deployed in some 42 countries. A small unit in New York headquarters, the Water and Environmental Sanitation Team (WET) of two professional officers and two secretaries, co-ordinates activities and provides back-up for field colleagues. Of the field staff, 75 per cent are international and 25 per cent are national professional officers. The majority (60 per cent) are water supply and sanitation engineers, followed by drillers/drilling engineers (18 per cent), health educators/communicators (10 per cent), geologists (6 per cent), sanitation specialists (4 per cent) and logistics managers and maintenance specialists (1 per cent each).

As indicated by these figures, there is a need to increase the proportion of sanitation cum communication/health education specialists. These areas should also be highlighted in staff training and development and should be a priority for recruitment and placement. Broader programming experience and cross-sectoral expertise is also required. UNICEF is currently implementing a

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new staff training package in communications, social mobilization and programming which should cover most water and sanitation staff by end-1988. The package focuses on training of trainers for a multiplier effect and is designed to achieve two objectives in line with the main recommendations of the information, education and communication for health strategy jointly developed by WHO and UNICEF: development of human resources; and strengthening of national capacity through training of government counterparts.

Regular updating of professional skills to keep abreast of technological and strategy developments will also be introduced for all water and santitation staff. In order to maintain regional advisory functions, it is proposed that selected UNICEF staff who possess a greater depth of experience in policy issues be seconded as needed for short-term consulting assignments to other countries. Some 20 per cent of individual staff time could be regarded as a reasonable maximum for this function. In view of the recent trend among other donor agencies to entrust project monitoring and support for major water and sanitation programme components to UNICEF, further strengthening of specialist staff capacity at the appropriate field and headquarters levels may have to be envisaged. This may also imply increased use of national and international consultants. The WET section in New York will work closely with UNICEF's Division of Personnel in instituting training and ensuring the most effective use of a limited resource base.

Recommendations

The basis: UNICEF commitments

UNICEF's global commitments for support to water and sanitation activities are foreseen to remain at least at the current level of annual programme

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expenditure. In absolute terms, this would amount to approximately $60 million per year. In view of the present proportion of 60 per cent supplementary funds to 40 per cent general resources in terms of UNICEF expenditure for water and sanitation, action should be taken to maintain the level of general resources while emphasizing fund-raising in order to increase donor support for this sector.

Objectives and targets: Water supply and sanitation as essential to infant and child health and well-being

UNICEF's objectives for water supply and sanitation should clearly envisage inputs as integrated components of the organization's overall strategy for improving infant and child health and development. These objectives coincide with the target of health for all by the year 2000 and demonstrate UNICEF's commitment to achieving the IDWSSD goals. Although water and sanitation for all will be far from achieved by 1990, this target is feasible within the framework of health for all by the year 2000 through the application of low-cost approaches within the context of community participation.

With its international partners, UNICEF will continue to be active in the ongoing process of encouraging all countries, individually or subregionally, to identify a realistic strategy for moving towards the goal of nation-wide provision of urban and rural water and sanitation by some specified year between 1990 and 2000. Based on estimates of the WHO mid-Decade progress review, these global goals would imply new water supply installations for a minimum of 1.3 billion people and new sanitation facilities for a minimum of 1.7 billion.

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UNICEF will continue to keep abreast of research developments into the health impact of water supply and sanitation and related activities, including complementarity with other interventions. This will enable improved planning of UNICEF inputs and more effective linking of water and sanitation with CSD and other actions for infant and child health.

UNICEF's role in fulfilling the infant and child health objectives

UNICEF should continue its catalytic role among the international community in piloting integrated programming, emphasizing water supply and sanitation as essential components of PHC and as an effective entry point into other basic services. Particular attention should be given to the health impact on the pre- and peri-natal stages and on infants and young children. This should be achieved through promoting hygiene (household, food and personal) in the context of CDD. Clean water supply and sanitation should be seen as necessary components of CDD, complementing ORT interventions.

Intra-sectoral linkages of water supply, sanitation and hygiene education should give greater emphasis to the social ("software") approaches, including support for community motivation and human resources development. Inter-sectoral linkages should be further strengthened, notably with activities in the areas of women in development, nutrition, education and urban basic services.

The area of social approaches has been identified as the programme aspect in greatest need of support. Special attention must therefore be concentrated on this area, entailing the development of: situation analyses; knowledge, attitudes and practices studies; curricula; materials; training and follow-up activities with policy promotion at all levels.

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Maximizing the resources

UNICEF should continue to follow the country-by-country approach to programme preparation, within the limits of available general resources and supplementary funding. UNICEF will work with its international partners to encourage and assist all countries to establish IDWSSD goals, linking these to situation analyses. UNICEF will also co-operate in identifying gaps among countries in order to focus the international community's attention and resources on certain priority countries. These priority countries would be selected according to the following criteria:

(a) Unserved population and potential for increased coverage;

(b) Least developed countries and least developed areas within countries;

(c) Commitments by Governments and local authorities as indicated by ongoing activities, revised sector plans or willingness to revise or prepare sector plans, co-ordination of external aid, allocation of human and financial resources and possible provision of revenues;

(d) Complementarity with other UNICEF co-operation, notably CSD actions within a PHC framework;

(e) Complementarity with other activities assisted by United Nations and other agencies, bilaterals, Regional Development Banks and NGOs;

(f) Potential for local manufacture of materials and equipment and willingness to set norms for designs, manufacturing and quality control.

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In this connection, UNICEF will explore all avenues to expand the scope of programmes for accelerated support to country Decade activities, including extended co-operation with multilateral, bilateral and other sources of funding and expertise. Imaginative forms of co-operation should combine UNICEF's strengths in such fields as health education, community mobilization, local-level strategies and village training with the technical skills and capital of other partners.

Strengthening specific programme components

Since social mobilization can serve as the primary vehicle for linking water supply and sanitation with CSD activities within the PHC framework, health and hygiene education which are integral to the social mobilization process should continue to be emphasized as mandatory components in all water supply and sanitation projects. These efforts should be co-ordinated with social mobilization for PHC and CSD.

High priority must be given to human resources development as a critical factor in achieving and maintaining nation-wide water supply and sanitation coverage. Increased involvement of women in all phases of training should be a primary target of support to this area. UNICEF should continue to link its co-operation in village/district-level training with activities of the World Bank, WHO, ILO, UNDP, UNESCO, FAO and others. Support should be provided for analysis of existing efforts and continued needs in terms of institutions, training curricula, materials and trainers.

UNICEF should continue to promote the use of low-cost technologies, advocating for their full acceptance in local implementation and national

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planning. The strategy should concentrate on identifying the minimum number of such technologies best applicable in a given country situation, with the goal of achieving low-cost replicability for national coverage and a high degree of standardization. Further improvement and simplification of technologies should be sought through promotion of research and development, both in country project contexts and at the global level.

Opportunities for local financing of capital, operation and maintenance costs should be examined in the situation analysis. Community participation throughout the project should be promoted in seeking cost recovery and village-level operation and maintenance should be technically facilitated by simple installation designs and ready availability of tools/spare parts.

Monitoring and evaluation should continue to be stressed as integral to the programming process from the first preparatory stages. Jointly with WHO and other organizations, UNICEF should support continued refinement of evaluation and monitoring methodology, promoting development of national capacities for evaluations.

Programme and project support mechanisms

Within UNICEF, the support mechanisms in the form of specialized field project staff should be maintained at an adequate level (around 15 per cent of total project cost) for their important work in planning, programming, implementation and human resources development. These staff members should be trained in the fundamentals of both UNICEF's general and sectoral policies and be able to programme sectoral activities within the wider CSD framework. In general, UNICEF Representatives and Programme Officers should play a more

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active guiding and supervisory role in linking water supply and sanitation with other child health-related components in the country programmes.

In view of the reduced number of specialist water and sanitation staff at headquarters and regional levels, provisions should be made for a smaller group of senior country project staff, familiar with policy and general programme matters, to be assigned for part of their time (maximum of 20 per cent per year) to consultancies and regional and global tasks as required. The WET section at UNICEF headquarters will continue to co-ordinate project support activities with other agencies, serving as an information clearing house for field offices.

Inter-agency co-ordination should remain a top priority for the world-wide development and promotion of strategies, approaches and technologies under the aegis of the IDWSSD. Co-operation with other organizations should focus on achieving simplicity and cost-effectiveness in both technical and social approaches, and on resolving the problem of the present slow acceptance and low implementation rates of sanitation. At country level, opportunities for co-programming with other United Nations agencies should continue to be actively sought.

At the international level, UNICEF should continue and reinforce its participation in United Nations mechanisms such as the Administrative Committee on Co-ordination Intersecretariat Group for Water Resources and the Decade Steering Committee, working closely with donor groups as well as other external support agencies such as the International Reference Centre for Community Water Supply and Sanitation (The Netherlands), INSTRAW and other networks for information and women's advancement.
