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Monograph

THE WET HISTORY

Water and Sanitation in UNICEF 1946-1986


UNICEF

THE WET HISTORY

WATER SUPPLY AND ENVIRONMENTAL SANITATION IN UNICEF

1946 - 1986

by

Martin G. Beyer

UNICEF WET Monographs

No. 2

UNICEF, New York

Second Revision, 1st December 1986

The contents of this monograph
reflect the views of the author,
and not necessarily those of
United Nations Children' Fund (UNICEF)
or any other United Nations organization

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The illustrations are gratefully acknowledged from:

Master Vicary Gibbs (Pakistan), p. 4;
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Nepali artist (UNICEF, Kathmandu), p. 20;
Martin Beyer (WET/UNICEF, New York), p. 34;
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Lazarel Ion (Rumania), p. 47.;
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Herb, Norwegian Consumers Association (Norway), p. 113;
Chinese artist (IDRC, Canada), p. 136.

For all abbreviations and acronyms see Part 7

FOREWORD

The UNICEF WET History was written as part of the "UNICEF History Project", which serves to record how UNICEF, the United Nations Children' Fund, arrived at its present-day policies and their implementation for helping to improve the health and well-being of children and mothers around the world.

The task to write very recent history is like being in front of a smörgâsbord and not knowing which end to begin with. Secondly, to deal with a subject, with which the writer has been closely and actively connected and continues to do so while writing, does not necessarily promote great objectivity. The reader therefore is recommended to take everything stated, analysed and opined on in the following with the appropriate grain of salt, a substance of which there should not be too much in drinking water.

It must be remembered that whatever development in the field of water and sanitation has taken place in the world, it is the compounded result of a giant teamwork with thousands of professionals and millions of people in the communities involved. On UNICEF's side, and with UNICEF a number of sister and brother agencies, there are many colleagues who have helped and continue to help bring the work forward day by day. Jointly with the planners and specialists from the country governments we work with, they help develop policies, strategies, technologies, social and technical approaches.

A summing up of the present state of UNICEF policies and current approaches and methods to help spread the benefits of low-cost water supply and sanitation, can be found in the UNICEF Programme Manual on Water and Sanitation. At the end of 1986 this was in draft form, subject to revision and comments for its finalising.

Special mention should be made of the work of Ms. Maggie Black, whose able and vivid pen has drafted a chapter, entitled "The Handpump Cometh", for the book version of UNICEF's history, "The Children and the Nations". This is a most adequate and informative account of the principal developments of UNICEF's involvement so far produced anywhere. For the period up to 1969, there is no other account available, save going into further in-depth research, which at the time of the present writing is not feasible. For this reason I have elected to use Maggie Black's account almost untouched for the section on the first main chronological phase, 1949-1967 ("The demonstration projects").

As to the rest, this WET History was written in bits and pieces whenever a spare moment was available. Leaking, dripping and sloshing all over the place, I hope that the benevolent reader would forebear with my direct and subjective rendering of this account. May he or she feel that the historian's efforts are worthwhile to understand the present on the basis of a checkered but never dull past. To your health in sparkling fresh water!

Martin G. Beyer
Senior Policy Specialist
(Drinking Water and Sanitation)
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1 INTRODUCTION - THE PRESENT SITUATION AND BASIC FACTS

The Crystal Drop Award

At the closing ceremony of the Vth International Water Resources Congress in Brussels on 15 June 1985, Dr. Alexander King, the President of the Club of Rome, was introduced to the participants as the Chairman of a jury for selecting the first recipient ever of the Crystal Drop Award for action in the international field of water resources and their use. This had been instituted during a previous Congress in Buenos Aires in 1982 by the arranging International Water Resources Association.

To the audience of water scientists and engineers, planners, geographers, government officials and other persons concerned with water resources, their management and use, from all over the world, Dr. King proceeded to first describe the award and the opinions of the jury consisting of scientists and government personalities from different parts of the world. He included the views of the Club of Rome, the famous association of scientists from 45 countries, concerned with the future of humanity, acting as an advisory body to the United Nations and governments alike on global issues of development.

At the very end of his speech, Dr. King as an effective surprise stated: "I now come to the pleasant task of announcing the award of the Crystal Drop to UNICEF. The jury members were impressed by the success of the sustained efforts of this organisation in persuading children and, through them, their parents of the vital importance of water in the process of development and improvement of the quality of life and, in this way have contributed significantly to the success of the sanitation and drinking water decade. UNICEF stands out, amongst the Agencies of the United Nations for its efficiency and practical action and we feel that this reward will be a stimulus for the continuation and still greater effectiveness of UNICEF in this field."

With these words, a beautiful clear drop of Belgian Val St. Lambert crystal glass was dedicated to UNICEF for its decade-long efforts to help put water resources to good use by the communities in the poorest areas of about one hundred developing countries in the Americas, Africa, Asia and the Pacific. This award, which came as a surprise not only to the audience at the Water Congress in Brussels but to the colleagues of UNICEF as well, signified a great recognition on the part of the international community, involved in science, technology and their application to development. The work behind these UNICEF efforts is described in the present part of UNICEF history, the whys, hows, whens, whereabouts and, not the least, the whos, who made and continue to make it possible.

It must be realised at once that UNICEF's involvement in the matter of community water supply and sanitation is just one part of a major complex concerned with the survival, health and well-being of children in the whole world and - by implication - their mothers and the rest of their communities. Also whatever UNICEF may be achieving in its assistance through government programmes, would not have been possible without the purposeful interaction and linking between the different child-related sectors, including health, education, food and nutrition, social welfare and others.

The problems of our globe appear overwhelming and quite terrifying, particularly with the present, still ongoing population increase, affecting our whole environment and quality of life. UNICEF's inputs along with those of governments, the communities and other external agencies alike in trying to cope with these problems, are very modest, much too modest. Nevertheless, these efforts are much better than doing nothing at all.

Actions to relieve negative situations and to bring clear advancement in development to any population, do stand the chance to reach a breakthrough, when the improvements begin to be continuous and when the countries and the communities begin to manage on their own. In terms of water supply and sanitation, this is clearly visible and tangible. Part of the action is perseverance and patience. Any change for improvement requires some time to be accepted and ingrained with any population.

In terms of safe water supply and the awareness of people for the needs and the usefulness of it, this can be a rapid process even within months after inaugurating a water supply scheme in any community. In terms of a more lasting effect on governments and communities together for proper organisation and upkeep of the installations on a nation-wide basis, in many parts of the world this seems to take a good half generation, ten or fifteen years in order to mature, or even longer.

UNICEF has now (1986) been involved in water and sanitation since over 30 years back, more than a generation. The real large-scale involvement in increasingly nation-wide programmes, is going on for more than fifteen years. In some countries, notably in south and south-east Asia, there is a good chance that for most, if not all of their inhabitants, there will be not a luxurious but satisfactory supply of fresh water for drinking, personal hygiene and other domestic purposes. Sanitation is lagging far behind for a number of behavioural and other reasons but at least has become an issue with some country programmes attempting to tackle it at a large scale.

With this half generation behind us, the time is ripe for some stock-taking. How is UNICEF doing? How did we reach the present level of experiences and relative results? How is it done and why? The Crystal Drop Award seems to be an indication that UNICEF is regarded by the international world as being on the right track. What that is, we shall see right away.

United Nations and UNICEF objectives and goals for water and sanitation

UNICEF activities for water supply and sanitation aim at assisting governments in the developing countries to develop water supply and sanitation in the poorest rural and peri-urban, slum and shantytown areas. This is done as part of the development of basic services for children and as one of the supporting activities for the ongoing Child Survival and Development Revolution.

UNICEF's inputs and the underlying policies cannot be viewed as isolated phenomena. They have grown out of a framework of the actual needs and a wider context of international concern for a badly needed development of health, welfare and the economy of the developing world. These concerns were strongly manifested during the last fifteen years on a world-wide basis by different the United Nations system along with other groups in a series of regional and global conferences and meetings. The agenda of these meetings have been variously touching on general or sectoral aspects of development. The resolutions and recommendations pronounced as a result of these reunions do not necessarily signify a binding commitment. But, indeed, they serve well as a strong element of promotion for the individual governments to follow in their setting of national policies, goals and commitments.

Aside from the general mandate and objectives of UNICEF in terms of improving the health and well-being of children in the developing countries, there is the array of objectives and goals, agreed upon by the Member States of the United Nations. Among those particularly bearing on water supply and sanitation, the following should be noted:

* The goal of "Health for All by the Year 2000" set by the World Health Assembly.

* The first objectives and targets covering a group of countries, not only for water supply and sanitation but for overall development, were set at the meeting of the American countries at Punta del Este, Uruguay, 1961. Among the targets was the provision of water supply to 70 percent of the urban and 50 percent of the rural population in Latin America and the Caribbean by 1971. The actual achievement corresponded to 78 percent of the urban target for water and 38 percent for urban sewerage fulfilled. Twenty-four (24) percent of the rural population were served with water supply by 1971, but little headway was made in sanitation. Although the rural targets were not met, this effort established a good base for the future development of the sector.

* The improvement of the environment, with a global programme established at the United Nations Conference on the Environment in Stockholm, Sweden, 1972, to be taken care of by the then newly formed Agency, UNEP.

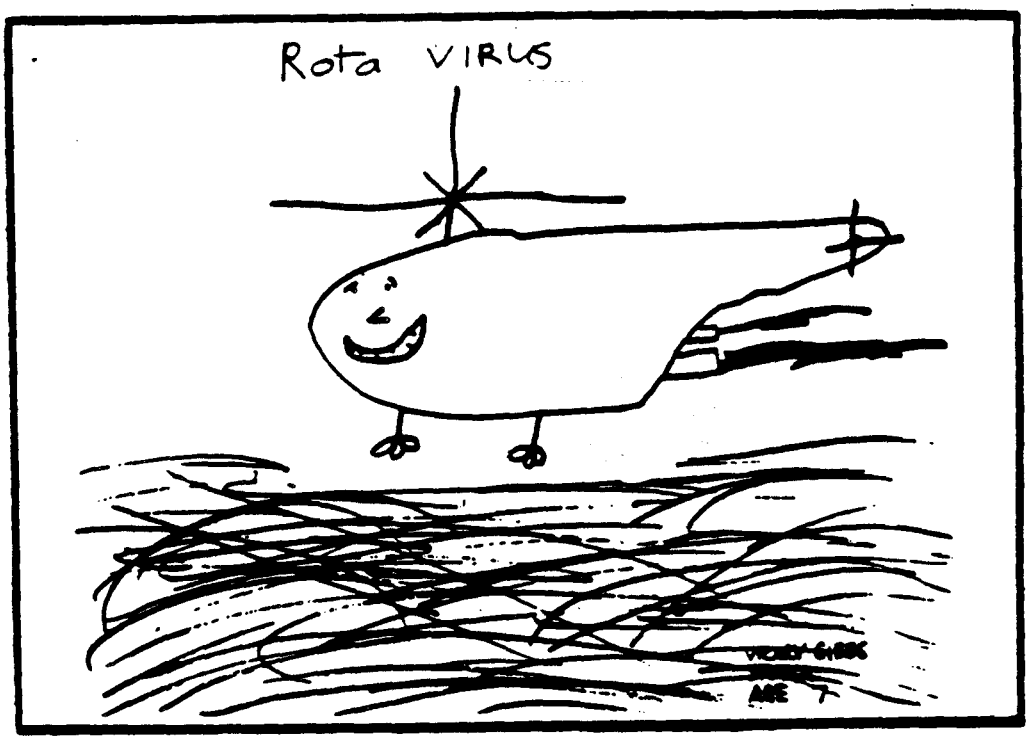
* The first recommendations to provide water supply and sanitation for all in the whole world were formulated at the UN Conference on Human Settlements (HABITAT), Vancouver, British Columbia, Canada, 1976. At this conference a notable input to promote these recommendations were made by NGO's, headed by the environmentalist, the late Lady Barbara Ward.

* The UN Water Conference at Mar del Plata, Argentina, 1977. The outcome was the Mar del Plata Action Plan for improving the knowledge, use and management of the world's freshwater resources. An essential part of this Plan was the resolution to declare the period of 1981-1990 the International Drinking Water Supply and Sanitation Decade (IDWSSD).

* The United Nations Conference on Primary Health Care, headed by WHO and UNICEF in Alma Ata, The Kirgiz SSR, USSR, 1978. Water supply and sanitation were declared an essential part of Primary Health Care.

* The inauguration of the International Drinking Water Supply and Sanitation Decade 1981-1990, by the General Assembly of the United Nations, New York, 10 November 1980. This was the first time any non-political issue ever had been taken up by the General Assembly, which dedicated an entire day of its plenary session to presentations and discussions of this topic. The express goal of the Decade is for the governments of the world to aim at providing everybody with adequate water supply and sanitation by the year 1990.

* The United Nations Conference on Women in Nairobi, Kenya, at the end of the Women's Decade, 1985, affirmed the role of water and sanitation in the life and advancement of women.



Through the child's clear eye: This is a main cause of diarrhoea in children, a rotavirus, according to Master Vicary Gibbs, son of Mary and Ken Gibbs, when young Vicary was of age seven. This rotavirus took some time to crawl through the WATERFRONT paper HEAPS, so Vicary is now quite a bit bigger and probably working at an electron microscope, and Father Ken is Resident Programme Officer for UNICEF in Quetta, Baluchistan, Pakistan and a friendly salute to Mother Mary.

Among all populations in the world, infants and young children are most vulnerable to sickness and death through diseases related to water, feces and dirt. In most developing countries, the majority of deaths among young children result from the vicious circle of diarrhea compounded by malnutrition. A major link in this chain of disease and death is poor environmental sanitation, including unsafe and inadequate water supplies, the lack of safe ways for disposing of human wastes, unsafe household hygiene, including food handling practices and lack of personal hygiene among children and adults. Such conditions also leads to infestations of a variety of intestinal parasites which further drain meager food supplies and heighten malnutrition. Malnutrition resulting from poor sanitation among nursing mothers further reduces nutrients available to their babies. So does the heavy and wasteful expenditure in terms of time and energy by women and children through drawing water from distant and generally contaminated sources. In keeping with its work for improving the well-being of children and women, UNICEF therefore supports development of drinking water supply and improved environmental sanitation in rural areas, urban slums and shanty-towns in developing countries.

UNICEF supports programmes for water supply and environmental sanitation, including community mobilization with hygiene education, as basic components of primary health care. This is done in the context of integrated national development plans. UNICEF's inputs in this sector are carried out within the framework of the International Drinking Water Supply and Sanitation Decade, 1981-1990. They are thus co-ordinated with activities of other United Nations agencies, bilateral, governmental and non-governmental organizations at country, regional and international levels. UNICEF seeks to build national capacities to provide safe water supplies and to promote environmental sanitation through the provision of technical, financial and material support to national planning and programming.

UNICEF co-operates in:

1) Advocating and promoting government water supply and sanitation policies through all phases of planning, monitoring and evaluation of programmes and projects. These are particularly aimed at benefitting the most marginal rural and peri-urban communities;

2) Assisting in developing strategies and approaches at all levels from communities to central government;

3) Strengthening government capacities for planning, management, human resources development, selection and application of adequate technologies, and inter-sectoral co-ordination;

4) Promoting community participation and, particularly, activities involving women to the benefit of their advancement, in defining local needs, programme planning, financing, project implementation, maintenance, repairs and human resources development, including sanitation and hygiene education.

5) Assisting in training community level workers;

6) Promoting, developing and applying low-cost appropriate technology;

7) Providing emergency services, wherever so required, designed to lead to medium- and long-term solutions to water supply and sanitation needs;

8) Providing timely supplies in order to minimize loss of impetus, encouraging local procurement in accordance with UNICEF supply policies with the use of low-cost items ensuring wider coverage with the limited funds normally available;

9) Stimulating procurement of supplies, which are acceptable and appropriate for users. (Examples include handpumps which can be used by women and children, latrine designs which afford privacy for adults but are not too dark or frightening to children and simple hand-washing facilities for schools.)

10) Assuring early consideration of cost-efficiency of equipment over time;

11) Promoting time-saving equipment for higher project implementation rates when appropriate;

12) Promoting village level operation and maintenance through simple designs and the easy availability of tools and spare parts. (For example, gravity-fed systems, sturdy hand pumps, off-set pit latrines, and slow-sand filters.)

13) Encouraging national standardization of parts and materials in order to simplify ordering, storing and supplying;

14) Facilitating local manufacture through national industries and through the promotion of skills and resources essential for local manufacture and assembly.

Scope of UNICEF co-operation in water and sanitation

UNICEF's expenditure for water supply and sanitation in 1985 reached 58 million US dollars. This was spent in some 95 countries. The cumulative amount of UNICEF funds spent from the inception of the participation in water supply and sanitation programmes through 1985 amounted to over 500 million US dollars. The total inputs into the same UNICEF-assisted country programmes, including the major components of government and community inputs as well as other external contributions, are in an order of magnitude of many billions of dollars.

The number of beneficiaries of programme components with direct UNICEF participation since several years back amount to 15-20 million people per year for water supply as against so far only 2-4 million per year for sanitation. The total number of beneficiaries per year in all the programmes in the same rural and peri-urban areas may be estimated to possibly 50-60 million per year at the most. This optimistic figure would still amount to only half or less of the real needs in order to fill the goals of the Decade. (Statistics, indicative of the funding, are found in Chapter 6 (annex).

2 UNICEF'S ROLE AND WORK RESULTS FOR WATER AND SANITATION

The question of what UNICEF's role and the results of the organisation's work is in the long run in the development of children's environment in the world, probably never could be properly answered. Possibly fifty years hence some analysis might be feasible, when two or three generations have passed and the ideas and concepts would hopefully have become rooted in the individual countries. This notwithstanding, some overview could be given at the present juncture, in order to put the historical development in a more proportionate perspective.

The results of the work - are they sustained?

The absolute measure of the number of installations completed, whether they are handpumps set into wells or latrines dug and constructed, is just a first step indicating the volume of the construction work carried out. A second step is to find out how many of the facilities function after a certain given time. A third and more important step is to ascertain whether the installations are being utilised fully on a permanent basis, preventing earlier and unhealthier practices. A related item is whether the installations are being maintained to their full capacity for their expected lifetime. This would ensure lasting effects on the health and well-being of the children and their communities. The measure of the impact on the health, well-being and the economy of people through improvements of water and sanitation, is a very complex matter. As of the time of writing this account, several global studies are about to be published on the health impact (Briscoe 1986 and Feachem et al., WHO Bulletin) and on the economy (through the World Bank Department for Water and Urban Development).

The goal of all work from UNICEF's side is to phase out of the more active participation with the governments and the communities, when full or a considerable degree of sustainability of the projects has been assured. So far this has been done only in a few countries, such as Argentina in the 1960s or, more recently, Fiji and Panama. The fact that UNICEF stays on with support to this sector in so many countries is because of the magnitude of the problem, with the actual progress still being overtaken by the continued population increase. It includes the continued but as yet insufficient improvement of government inputs and development of human resources in the individual countries.

Even so, many countries, especially in South and East Asia, by lately have been able to provide at least the most basic of water supply services to large parts of their unserved or under-served populations. This was made possible by the introduction of low-cost and relatively simple technologies, backed up by considerably strengthened government organisations. Increasingly water supply and sanitation is coupled with other basic services, including health and education. In some cases, the supply of fresh water to the communities also serves family food production through small-scale irrigation, which aids in motivating the communities for continuous upkeep of the facilities.

In this way, the UNICEF inputs in many countries initiated the use of new approaches or strongly helped promote them. Now, after often ten or fifteen years - in some places such as Nigeria, even shorter. In many of the countries they show lasting results with a good potential for further development and spread.

Sanitation with its intrinsic constraints, linked particularly with excreta disposal, so far has made slower progress. The basic concepts, though, have won acceptance in government agencies and, from many populations. In some countries, notably in southern Asia and in large parts of the Americas, environmental sanitation begins to gain wider acceptance and social respectability. The UNICEF action in these fields, even more than for water supply, has been and remains linked with major developments and inputs headed by WHO, UNDP and the World Bank.

After a slow start - and how could it be otherwise, now with hundreds of thousands of handpumps installed annually all over the world - there is an increasing awareness and feeling of responsibility in many parts of the world, on the side of the local populations, for their water supply and sanitation facilities. This includes increasingly well functioning maintenance of handpumps and spring systems. In West Africa by 1986, this was evident in Burkina Faso, Niger, Mali, Benin and Guinea, spreading to neighbouring countries as well.

UNICEF's role

What then is UNICEF's role on the world scene as to water supply and sanitation? This must be seen against the background of a total need in 1985 to provide adequate household water supply to 1.3 billion people and of sanitation to 1.9 billion people.

The role is two-fold: Firstly, water and sanitation are seen as two basic needs and services. Without water people cannot survive. Without sanitation people and especially children are left much more vulnerable to the risks of infections through a number of communicable diseases, including many forms of diarrhoeas, skin and eye diseases. Therefore the UNICEF inputs in these fields supplement the other actions for the survival and development of children and help demonstrate the effects and importance of using simple, low-cost means.

Secondly, given the limited capacities for funds and technical assistance in the entire group of internationally active agencies and organisations, UNICEF in close co-ordination and co-operation with many of these bodies, fills an important role. This pertains especially to many of the poorest areas and regions or countries, where few other external organisations venture or would be allowed to work. Around the beginning of the 1970s, this also partly was the case with the selection of technical approaches. At that time, much of the external support from other agencies was dedicated to higher technologies with known technical parameters and a conventional, mainly urban setting.

A number of pre-conditions did exist, which made new and partly rather sweeping approaches possible from the side of UNICEF:

* Clear objectives and policies. Within the framework of these it was easy to fit in the rapid expansion, extension and linking of the activities with other sectors.

* The integrated approach to basic services and later support by these to the large-scale singular actions of CSDR and UCI. This entailed a multi-sectoral attack on the problems of poverty and ill health. The different sectoral activities could be designed in a way to be mutually supportive.

* The strategies of convergent inputs from the technological and social angles with a pronounced promotion of community motivation and participation.

* The UNICEF advocacy reinforced and proven through the combination of policy promotion, assistance in the planning, delivery of material and equipment together with technical assistance with a strong training component, especially where new technologies are involved.

* Decentralisation from an administrative and managerial point of view. The relative independence of the individual field offices in each country, area and region, greatly helped in purposeful country-based designs of programmes and projects between governments, UNICEF and other agencies locally. This also has made it possible to involve the local populations in the decision and planning processes. Another consequence is that of securing full responsibility with a minimum of work and administrative constraints for UNICEF's own staff, including the water and sanitation project specialists.

* Liberty of action. The same decentralisation both of the field from Headquarters and within UNICEF Headquarters from the outset provided a liberty of action to everybody involved in policy formulation, advisory activities and direct programme and project support, which is quite unprecedented in the UN system. Needless to say that this not only is an added stimulus to the individual, but also greatly helps to the efficiency of the action.

* Relatively ample funding. Not the least the system of special contributions ("noted" projects) provided the necessary financial basis for the relatively capital-consuming activities. It was realised at an early stage that, like criminality, action for water and sanitation anywhere in the world would be worthwhile only, when carried out on a sufficiently large scale.

* Rapidity of response: The lead time from the first ideas for the inception of any programme activity to the day the first pipes are laid or the first latrine is dug, is somewhere around two years. Nevertheless, UNICEF among all the external agencies is known for its relatively rapid response to the needs, and a positive one. This again has a reassuring effect both on government officials and, internally, on UNICEF's own staff as a further incentive for appropriate measures to be planned for and undertaken.

* Sense of obligation to do something: The needs and the consequences of the absence of water and sanitation services are obvious. So is the fact that there often are no other external organisations available for some of the poorest areas, into which UNICEF puts largest parts of its assistance. This has developed UNICEF's commitment to continue and strengthen the inputs to quite a matter of conscience. Governments are aware of this and throughout the years have become used to UNICEF responding positively. This again heightens a sense of obligation and commitment - with needs, however, also to balance UNICEF's inputs for water and sanitation against the needs of other fields.

* Openness in co-operation with other agencies: Another great strength is the open and unhindered co-operation with the wide range of other organisations within and without the UN system, including a great many NGO:s.

UNICEF policies

The policies and, in their application, the strategies followed, have grown out of the ever widened experiences in the field. These experiences are not only those of UNICEF:s but as learned from many countries and many organisations. Most important among these other organisations, especially for the first decades of UNICEF's work, is WHO. This organisation, for the wider context of environmental health and Primary Health Care, remains a prime resource for policy guidance and knowledge in the related medical and public health fields.

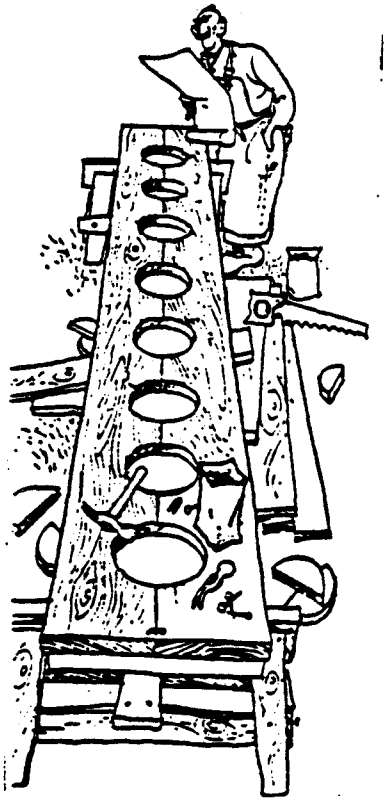
The development of UNICEF policies grew organically, albeit somewhat unsystematically, with the expansion of the scope and complexity of the inputs. To a certain degree in both policy and programme development, the law of least resistance was followed. Developments were steered by the actual needs and requests from the field. Since these in the early beginnings were predominantly supply-oriented, large gaps in terms of efficiency would occur in some of the major programmes, until the shortcomings were detected and corrective action could be taken.

Still there was a logical development of the inputs. Through the sound self-criticism and sensitivity, inherent to the UNICEF system, a kind of natural redressing of the balance in the approaches was continuously and consciously sought throughout the years.

There was a first phase of reluctant basic acceptance and approval by the Executive Board in 1953 to have UNICEF enter the field of water supply and sanitation on a limited basis. A second phase allowed the gathering of the experiences from largely demonstration projects.

These experiences were then summarized officially to the Executive Boards of both organisations through studies on water supply and sanitation in the UNICEF programming, by the Joint WHO/UNICEF Committee on Health Policies. Such studies were carried out with ten year intervals. The first one was presented to the Executive Boards of WHO and UNICEF in 1959. The second one came in 1969 (informally called the "Ledermann Report", after the consultant, who edited it).

The third and latest one, from 1979, treated "Drinking water supply and sanitation components of Primary Health Care". Like the preceding reports, through its recommendations as approved by the Executive Boards, this one remains the basic policy guideline for UNICEF's work.



JCHP Study urges emphasis on sanitation: Our biggest order so far - an eight-holer!

The cornerstone of the policies are the objectives. They have always remained the same: Through adequate supply of safe water close to the households to contribute to improved health and well-being of the children and their communities, and to lessen the drudgery of women and children in their otherwise onerous trek for water from distant and polluted sources. For similar reasons, environmental sanitation is included. This helps to improve personal hygiene, thereby cutting off the transmission routes of a great many diseases which are fatal, disabling or debilitating, especially to young children.

The general principles of these objectives always did underlay UNICEF's involvement. It was, however, only during the last five years up to 1985 that the objectives could be more clearly expressed. This was done on the basis of, firstly, new insights in the biomedical and epidemiological aspects of health and malnutrition; secondly, the sharper focus on child health and the singular low-cost measures promoted through the CSD and UCI action lines; thirdly the understanding of the many and complicated social factors with motivation, acceptance and participation by the communities, the engagement of women in the work and the need for appropriate upkeep of the facilities and supporting mechanisms for this. By lately, also the role of water supply as an entry point for CSD and UCI has been clearly recognised.

The recognition, acceptance and adjustment to this sharpened focus took several years and seems only now, in 1986 to have reached a stage of fuller understanding in various parts, not only in UNICEF, but also in other organisations concerned. The many and complicated health and social development factors made it difficult for those who sought a clear-cut answer to questions of cost-benefit or for those who tried to define simple indicators for measuring the "success" or "failure" of any programme or project.

There is a close link to policies as they gradually were formulated for themselves by other organisations. The overall tenets of the Mar del Plata Action Plan form the basis for all activities under the promotional aegis of the Water and Sanitation Decade. Detailed Decade policy guidelines were drafted in 1981 by a small working group between Dr. Bernd Dieterich, the then Director of the Environmental Health Division of WHO, John Kalbermatten of the World Bank and Martin Beyer of UNICEF during a week-long session in the medieval village of Perouges near Lyon, France, but never ratified by the Decade Steering Committee.

A significant joint international policy development, and, it seems, strongly influenced by the various UN bodies and underpinned by UNICEF's own experiences, was that of the bilateral donor organisations as prepared at a meeting in Königswinter on the Rhine, near Bonn, Federal Republic of Germany. This was held jointly with the major UN organisations in October 1984. The conclusions and recommendations were officially endorsed by the donor countries at a DAC meeting in Paris, in March 1985.

These two meetings prompted the unanimous resolve by the donor agencies to follow the low-cost, simple technology approaches, coupled with community-based planning and implementation, as recommended by the UN agencies. This was agreed upon with the awareness that this strategy was the only one, which would make possible greater strides towards resolving the problems of water supply and sanitation for the more than one billion people without any organised water supply and the almost two billion without sanitation facilities in the world. Thus there now exists a global policy framework, which in its turn closely connects with the international action for CSD, spearheaded by UNICEF.

The two major parts of the two-pronged approach to the strategies, merit a detailed account, before entering upon the more chronological part of the history. This pertains to the technologies on the one hand and the social approaches on the other. For a better understanding of the year-to-year history, also a third component is described, namely the mechanism to help achieve the results under the policies and strategies: Management and support.

The strategies I: The technological background

The needs for water and sanitation of the many hundreds of millions of people, living under conditions of extreme poverty in physically difficult terrains always presented seemingly insoluble problems. In order to solve these, the first step was to identify and develop technologies, which would allow for low-cost approaches. They had to make it possible for the communities to undertake a large part of the

construction work themselves. Furthermore, the communities needed to take complete responsibility for the appropriate use and upkeep of the installations, including their operation, maintenance and repairs.

Shaul Arlosoroff, the World Bank Adviser on water and sanitation research and development, at the beginning of the Water Decade coined the acronym "VLOM" for Village-Level Operation and Maintenance. VLOM is now a household word, which accurately describes the aims of the technologies in order to achieve the objectives and goals of the Decade.

Among the technical problems first to be tackled were those to secure access for the communities to reasonably safe, uncontaminated water resources. Fresh water, being a renewable resource in theory, is not easily available anywhere. Surface waters a priori with few exceptions are contaminated with disease-carriers. This water resource often is available only during the rainy season and occurring in few and far between areas.

Consequently, the solution had to be sought in using groundwater occurrences, through digging or drilling wells, or, in hilly and mountainous regions by harnessing natural springs, where these groundwaters reach the open. Groundwater furthermore has the advantage (with the exception of certain areas in the world where they are saline or have too high a content e.g. of fluorine), to be filtered by Mother Nature in its passage through soil beds and rock formations.

Another factor, especially with the population pressure on the soils and the vegetation, was - and increasingly continues to be - the lowering of the water tables in the most easily accessible open (unconfined) aquifers (water-bearing formations).

Quite a deal had been achieved up to the mid-1960s in terms of low cost approaches to rural water supply in the world, though only in selected areas. Dug wells were still predominant but began to dry out due to the lowered water tables, especially in the hard rock areas, such as the East African high plains or on the Indian sub-continent. Certain countries such as Uganda had been provided with a great number of drilled wells with handpumps, but progress was slow with the then existing techniques of cable-tool drilling.

Large parts of the rural areas and many districts in the cities and towns were left un- or under-served due to the lack of viable inexpensive technologies that would allow for rapid coverage. A great change occurred during the 1960s with a technical revolution in terms of water well drilling through the new rapid compressed air drilling methods and other improvements, e.g. in rotary drilling with the application of hydraulic drive heads and the use of new additives to the drilling media, such as polymers, for stabilising borehole walls.

Other technological improvements followed suit. With the rapid spread of water well drilling, handpumps had to be improved for continuous heavy use by hundreds of villagers for each pump. For piped schemes, new plastic products provided longer life and easier handling. Old technologies for water treatment were revived inasmuch as they would be appropriate, as was the case with slow sand filtration. New insights in

the epidemiology of water-, excreta and other dirt-related diseases, combined with developments in East Asia, southern Africa and Europe, prompted new designs of excreta disposal facilities (latrines). Other fields of environmental sanitation developed with the use of both mechanical, chemical, engineering design, biological and other ecological means, e.g. for eradicating schistosomiasis.

All these changes were in due time incorporated in the technological approaches to UNICEF-assisted programmes and projects. They were made prominent parts of the new programme strategies towards the end of the 1960s. Also, they made it possible to attack the problems on a much larger scale than was possible before.

It did, however, also require a change in policies for overcoming the previous urban bias among both governments, international and bilateral organisations. Furthermore, there was a need for getting a great number of planners, technical designers and implementers geared to the seemingly simpler and "baser" approaches. Finally, the social, "software" parts of the programmes and projects had to be developed in order to ensure the appropriate use and upkeep of the facilities. This, as described in the following, again required a fresh angle of attack.

For UNICEF, these new orientations were reflected in the staffing, both in terms of project specialists at Headquarters and in the field. UNICEF's Supply Division gradually incorporated posts with procurement officers, specialised in water supply and sanitation equipment. A large part of the materials and equipment going into the country programmes entailed and continue to entail an expenditure of many millions of dollars per year. People in remote areas are utterly dependent on the reliability and longevity of the items sent to them. Therefore it was necessary to develop specialised technical knowledge within UNICEF of a market comprising many hundreds of highly competitive and varied items, including big, complicated drill rigs and thousands of miles of pipes and hundreds of thousands of handpumps.

For many years during the 1960s into the mid-1970s, one single procurement officer in New York handled most of the water supply procurement. This was the late Hans Lotje, a highly professional procurement man. He had left a good position with Fried. Krupp in Germany, preferring to deal with handpumps in the UNICEF context. Among his personal inputs, Hans Lotje was instrumental in proposing considerable changes in the then most commonly procured handpump, the Dempster pump from the Midwest of the United States. In this work, he was for some years assisted by Henry Villa-Real. Gradually, the group of procurement officers was widened to comprise a specialist for drill rigs. For a number of years this was Anders Sars from Sweden, later succeeded by Haavald Schjerven from Norway.

On the European side, a large slice of UNICEF's procurement during the later 1970s and the early 1980s was taken care of by Paul Bayer in Geneva, partly also by Derek Hunt. The present procurement activities for water and sanitation are in the hands of a team in Copenhagen, headed by Goran Johnson and including Haavald Schjerven, Jörgen Andersen, Bernard Pacaud, Stanley Hall, Madan Arora (formerly of the New Delhi office) and Ruhne Swahn. The New York Supply Division office manages procurement in

the Americas through Ben van Gool, and local and regional supplies were handled e.g. in the New Delhi Office for many years by Gerry Lyckholm and Lawrence Ostlund in Bangkok, both Swedish.

The rapidly developing technologies and the ever increasing variety of goods available and the methods for using them, require a constant monitoring of the market and technical developments. The last fifteen years have seen a remarkable development of information networks, both formal and informal, which are very helpful for this purpose. These are now also linked to the most recent concerted efforts to promote human resources development with all their elements of training under the aegis of the Decade.

The first beginnings of such networks were made through WHO and its International Reference Centres, the one for Community Water Supply and Sanitation in The Hague, and the other one for Waste Disposal in Duebendorf close to Zurich in Switzerland. Later, a great number of other institutions and organisations were joining in, including the International Development Research Centre of Canada (IDRC), CEPIS (PAHO-affiliated) in Lima, Peru, CETESB in Brasil, CIEH in Ouagadougou, Burkina Faso (then Upper Volta), NEERI in Nagpur, India, PEPAS (WHO) in Kuala Lumpur, Malaysia, and the Asia Institute of Technology in Bangkok.

A number of NGO's strongly contributed to both technical development and the spreading of information on this subject. One of the foremost is OXFAM (UK). Others included War on Want in India, AFPRO and the Sholapur Mission, as well as the Water Development Society (Hyderabad, Andhra Pradesh), likewise in India. A number of universities did and do their best to develop and inform on methods for groundwater prospecting, water well technologies, pumps and sanitation practices. Only by lately, the links to the health and social and economic disciplines were more properly established and the scope of the information and the use of these other disciplines to modify the technical designs were thus broadened.

A brave effort to further systematize this knowledge network was initiated during the late 1970s by the IRC in The Hague, in a somewhat ambitious special programme, suitably called POETRI. UNICEF was involved in the consultations for setting this programme up and later contributed to modify this effort. Eventually POETRI was absorbed in the general reference functions of IRC and its correspondent institutions.

IRC, the International Reference Centre in The Hague, does merit a special note, as it is the only comprehensive reference institution on a global basis. From its inception in 1970, it has remained almost entirely funded by the Netherlands Government. Since some years back its Governing Board includes representatives for UNDP, WHO, the World Bank and UNICEF. This participation from the side of the international organisations helps to keep the function and output of IRC appropriate to the needs for information around the world. A good side-effect for UNICEF and the other organisations, is the informal contact through IRC with the Netherlands as one of the major donor countries, and in the same time one of the most interested ones, technically speaking, in water-related questions.

The strategies II: The social approaches

The technological revolution that would make it possible for the benefits of water and sanitation to reach the masses, had to be accompanied by a radically different approach to the users and their communities. The recognition of this coincided with the same need in the other fields of UNICEF-related work. Thus the basic services concept in the late sixties and during the seventies was accompanied by buzz-words such as "community participation" at the "grass-roots level", serving as constant reminders to all development workers not to forget that programmes were meant not for machines alone.

With the earlier strongly "hardware"-oriented introduction of new technologies to the countryside, most of the time the human angle tended to get forgotten. Government drilling teams rushed in with their mighty machines, drilled holes in the ground in a jiffy, plunked in their handpumps, and left the villagers to fend for themselves. The results often were disastrous. Thousands of pumps would soon stand out of use, broken or idle for want of maintenance and repair.

Something had to be done. Time and again, in the UNICEF context, voices were raised and quite officially so, in writing and supported at the highest policy level through the Executive Board, that the communities had to be involved in all the stages of programme and project development. So it was said already in the first JCHP study on water and sanitation in 1959, and duly repeated in the two successive ones.

This did not go unheeded by UNICEF, nor by other organisations involved. The question was how to analyse and define the issue, and then what to do in order to really help stimulate and implement this difficult complex of questions. There was a long way to go, first in-house, within UNICEF, and then to bring the ideas out into practice in the field. Governments had to be involved and to be induced to include this element into their own planning and structure.

The communities had to be stimulated into turning the external assistance to self-help. Age-old social structures, habits, attitudes and beliefs had to be changed. The traditional top-down procedures had to be reversed and then to be redesigned for a two-way traffic of ideas and inputs. A number of major issues had to be tackled jointly, including the need to integrate the water supply and sanitation components with all those of the other fields: health services, education, family food production, and nutrition.

With the recognised need for promoting community motivation and participation (now known as "social mobilisation"), in UNICEF's work and organisation, new elements such as Project Support Communication were incorporated. Over the last several years an increased interest on the side of many other agencies did strongly contribute to more purposeful and practical support to the proper introduction of this indispensable element in the field.

Another very strong factor in favour of this development was the development and application of the Primary Health Care (PHC) idea. To this were added the elements of health and sanitation education and women's advancement. All these linkages were contained in UNICEF policies since the inception of the integrated basic services concept. They proved not easy to convert into practice in the country programmes. One major reason was that rural water supply mostly was dealt with separately from other aspects of community and agricultural development by the governments.

The UNICEF advocacy through its assistance to government planning for integrating government services in different sectors with one another, did foreshadow the recommendations and practices as now accepted by most governments through the joint United Nations system promotion of the Water and Sanitation Decade.

The very way of UNICEF working with the governments, what with the different sectors joining forces and reinforcing each other, made for much of the impact of the UNICEF-supported water and sanitation activities both on the project areas, on national policies and on the policies by other external agencies. Although the historical development of the UNICEF experiences will be described later, some of the main points of the development of social approaches are summarised here:

The first conscious set of actions to break away from a purely technology/"hardware" concept, was to make government and UNICEF staff conscious of the problems and solutions to community motivation and participation.

This was done through a series of regional workshops during the years 1980-81, coinciding with the beginning of the Decade. Such workshops with participants from several countries in each region were held in Arusha/Tanzania, Ouagadougou/Upper Volta, Beirut/Lebanon, Lima/Peru and Ubon Ratchathani in Thailand. This last workshop could benefit from the experiences of the previous ones. The result from Ubon Ratchathani was a workshop report, the title of which indicates its aims: "Towards A Programmer's Guide". It contains the first guidelines on community involvement in water and sanitation, as based on UNICEF experiences.

A number of national country conferences and seminars, arranged jointly by the host governments, UNDP and WHO on the Decade subjects, took place from 1980 onwards. The elements of social mobilisation were emphasised from the beginning. No doubt, considerable promotion of policies and improved understanding between different government agencies and sectors to the benefit for later actual field work, were achieved through these meetings.

There was not only the need for a strong advocacy. We needed to know more systematically, what we were advocating. Also there was the need to follow up with active promotion and support to the UNICEF field offices and through them to a great number of governments, how to educate and activate the communities. Therefore it seemed like a providential coincidence that all of a sudden a Senior Adviser on Community Participation appeared at UNICEF Headquarters in 1980, Madame Ma Yansheng (family name first) from the People's Republic of China. She became an

integral part of the WET team (more about this later), and a crucial part of WET's service to the field. She also strongly helped direct UNICEF's policy thinking and the important liaison and alignment with the overall policies of the international world for community involvement and women's advancement as related to water and sanitation.

Mrs. Ma's work and that of the Programme Officer for Health Education, Muriel Glasgow from Guyana, well-known from a long and cheerful career with UNICEF, helped greatly to establish the appropriate balance in WET's work, preventing it from going overboard with purely technical concerns.

The other important factor was the introduction of stronger health education/community motivation components in individual country programmes. Health education seems to be the stepchild of any health system. In the past, it rarely had been linked with the improvement or introduction of water supply and sanitation facilities in the communities. The recommendations of the Joint Committee on Health Policies for decades clearly had stated that something must be done to provide health education to the communities with every installation provided to them.

This need also was obvious to anybody visiting the projects in the field. Consequently, in 1979 a first beginning was made by dispatching a senior specialist in health education to one of the most difficult project areas from a socio-cultural point of view, to Pakistan. Difficult for the reason that the level of women's prestige and influence in the rural societies in most provinces was very low. Also the matter of sanitation, the very mention of feces in any conversation was absolute taboo.

No wonder that it would take a very unusual and strong character to undertake this seemingly hopeless task. It had to be a woman in order to be able to reach her fellow women. UNICEF was lucky enough to find her, in the person of Margarita Cardenas. Margarita had a long and distinguished background as Chief of the Sanitation Education Section of the National Health Services in Paraguay. It may have been a long shot to send her around the world to a place strange to her and vice versa. It turned out to be a stroke of luck, with her becoming not only fully accepted, but with her starting a completely new trend in forming the concept of men and women sanitation promotors for villages in Pakistan.

The effects of that work, further reinforced through UNICEF somewhat later employing a male counterpart, Chit Chaiwong, Director of the Sanitation Department of the Thailand Ministry of Health, another stroke of luck, were very tangible. Not only was this the beginning of introducing the concept of rural sanitation in that particular country on a larger scale. The clear impact on the personalities of the young ladies that had been trained and then sent out to their work sites was so positive as to be straight-out startling. If anything, this was a most refreshing experience in how women's emancipation could be brought about against heavy odds.

These health education efforts have now crept into other country programmes, although they still are far from being as universal as would be desirable. Other countries with similar inputs with UNICEF project staff in place, are e.g. Nepal, India and Indonesia. In India, large part of the pilot projects going on, are based on the participation of local NGO:s. The trend is now to combine the health education activities of the water and sanitation programmes with the promotion of other health elements, notably in the CSD and the immunization contexts. In 1985 this was made a mandatory element of any water and sanitation programme.

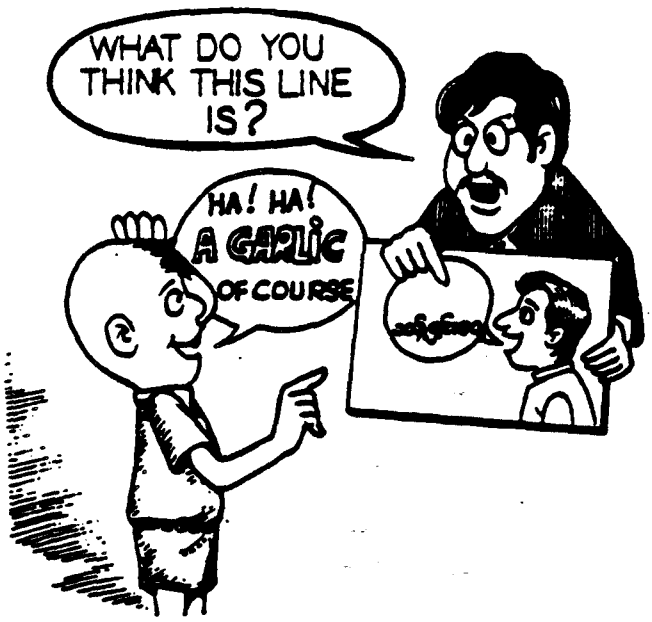
A great step forward was the establishment of the post of a Programme Officer (Health Education) with the WET team in New York filled by Muriel Glasgow. In this post until mid-1986, when she left for Haiti, Muriel proved to be the ideal person for helping establish a systematic approach to health education and to serve a great many field programmes in their work with the governments to introduce this element on a broad basis.

Considerable inputs were made in a few countries through the UNICEF colleagues from the Project Support Communication (PSC) group, prior to the more specialised health education efforts. Based on the guidance from the New York PSC unit, first under Björn Berndtsson and later under Revy Tuluhungwa, several PSC Officers in the field made highly valid inroads. One of the first and very successful ones was Anne Haaland (pronounced "Holarnd"), a journalist from Bodö on the Arctic Circle in Norway. She really blew a lot of life into the Nepali water, sanitation and health education scene with her support to fabulous Nepalese authors and illustrators of pamphlets and manuals. Many other colleagues helped in similar ways, to get understandable messages across to the communities, such as Sampe Lalunghpa, our Tibetan PSC/Information man in Rangoon.

Since women are the traditional carriers of water, devoting large part of their time and energy to this arduous task, and for sake of their hygiene and privacy, being dependent on adequate sanitation, the issue of women, water and sanitation is absolutely fundamental. Women's advancement simply is not possible without access to water close to the domiciles, and any improvement in their general living conditions would contribute to the same objective. Also, in the decision-making, planning, implementation and operation and maintenance of water and sanitation facilities, the participation of women can become a major factor in promoting their own say and status in the communities. It also can help them to be better accepted by the men on more equal levels.

This clearly had been recognised for quite some time. During the early 1970s, UNICEFs then Adviser for Family Welfare, Mary Racelis, did stress this important factor in her work and writings. A more permanent representation of women's involvement in water and sanitation was assured from 1981 through 1986 Madame Ma Yansheng. When the Decade Steering Committee set up a Task Force on Women and Water, Madame Ma jointly with the Director of the revived UN Institute for Studies, Training and Research on the Advancement of Women (INSTRAW), Mrs. Dunia Pastizzi-Ferencic, was made Co-Chairperson of the Task Force.

In this capacity Madame Ma contributed strongly to the policy guidelines on women and water of the Decade Steering Committee and to the promotion of the ensuing concepts for their introduction into actual field programmes. This also helped in the effective promotion of women's role in water supply and sanitation at international conferences culminating in the UN Conference on Women in Nairobi, 1985.



When testing a picture with a "bubble" to indicate what the person says, people in Nepali villages thought the "bubble" was a garlic. They are not familiar with the idea of this symbol being used to show what people say.

What is the situation in your country?

The issue on women is closely linked with the overall scope of Human Resources Development (HRD), which includes training of a wide range of people in the different countries, for planning, management and implementation of water- and sanitation-related work. HRD deals with the organisation of and funding for human resources. The levels of skills and capacities being developed in the different countries range from the villages out in the countryside all the way to the ministerial cabinets. The curricula involve not only technical specialities but anything that helps bring water and sanitation to the inhabitants for permanent use.

The people to be influenced and trained are administrators and planners, engineers, water well drillers, other craftsmen such as masons, health and agricultural extension workers, and - most importantly - villagers/users, for the maintenance and repair of the facilities. Especially for the higher echelons of administrators and engineers, there was and remains the need to understand the approaches for low-cost, "VLOM" technologies and the corresponding social components.

For all these years, HRD has been an essential element in the programmes and UNICEF's support to them. The inputs often were on a pragmatic basis, especially when training of water well drillers or community-based craftsmen was involved. Most of this training was on the worksites. In some cases support was given to central national or regional training facilities. The Wad Magboul Institute for Water Technicians, including water well drillers, near Khartoum in Sudan, is one such case. UNICEF undertook some funding of materials and equipment for this school, and also for some time took over the financial responsibilities for the chief teacher in water well technology from UNDP/TCD, Alfredo Tupas from the Philippines, who set quite a mark in training standards.

Another major line of training, absolutely crucial both for guaranteeing the upkeep of pumps and piped schemes, and for involving the communities fully, is that for operation and maintenance of the facilities. As seemingly simple a device as a handpump, needs proper upkeep and repairs. Government-based maintenance technicians are rare or non-existent and require a budget, organisation, management and transport. For most handpump types, some back-up organisation still is necessary in order to supplement the work of village maintenance workers or "caretakers" as they are called in India, but as to be kept to a minimum.

The development and the sheer amount of people already now being added to each year as beneficiaries of new water supply and sanitation facilities, necessitate a tremendous effort on a global scale to create the personal know-how and skills within each community. The magnitude is indicated by the present (1985) figures for new handpumps being installed each year under the official government programmes: in Bangladesh, around 90,000, in India, around 140,000.

These country-wide efforts involve large parts of their populations, rural and urban. The external assistance is provided by dozens of organisations in each country. UNICEF provides for between ten and twenty percent of the total external support in funding terms to low-cost programmes. There is thus not only the need for a very massive HRD effort, but for a very co-ordinated and concentrated one.

For this purpose, another Task Force of the Decade Steering Committee deals with Human Resources Development. UNICEF participated actively from the beginning in this work, which aims at co-ordinating and providing policy guidelines to governments and other agencies. Since several years back, there is an active involvement also in specific work, such as the development of training materials by a UNDP/World Bank Global Project, and with other organisations as well, including IDRC and many national agencies. One important forms of UNICEF co-operation is the field testing of such materials in UNICEF-assisted programmes. Later UNICEF will help spread the tested and "proven" methods and materials on more nation-wide bases

UNICEF's close contacts with reference and training institutions, such as IRC and CEFIGRE, work towards the same end. By the mid-1980s there still was a long way to go in terms of a really comprehensive grasp of the HRD situation. Among the most interesting matters coming out of

this work for the next several years will be the field testing and final adjustment of the many curricula for training at different levels and of different categories of trainees, as well as of the many materials now centrally produced for global use, in field conditions in different parts of the world. It should be noted that training, mainly of trainers, is a prime task of UNICEF's own project staff around the world.

Last but not least, there are the economic aspects, what with the financing of the installations, their operation, maintenance, repair and replacement. In this respect, UNICEF never has been very strong due to the lack of internal expertise. The origin of most of UNICEF's major inputs was in emergency situations and in the poorest areas. UNICEF's assistance always came in the form of grants. The technology used was and is very simple, and only rarely would allow for any metering of water supply, if a fee were to be levied of the users. Many governments would in the earlier days - some still do - regard water as an inalienable right for any human being, to be dispensed without charge.

But in recent years, many external donor organisations, headed by the World Bank, would strongly advocate that the users pay fully for the services they receive. UNICEF, depending on the circumstances in each country and each project area, never would take an absolute stand on this issue. This did not preclude a general recommendation to have the communities pay for as much as they could for the installations, at least in order to supplement the government, UNICEF and other external inputs for the capital costs. In an increasing number of countries, governments do follow this trend, beset as they are with weak budgets and few means of their own.

For covering operation and maintenance costs, the UNICEF recommendations are considerably stronger: These should be the complete responsibility of the communities. This coincides with the technical development, prompting complete independence of the communities in terms of the physical upkeep of the installations. Contrary to what it may seem, individual families and persons even in the poorest of communities normally are prepared to pay for water delivered to them. In many parts of the world, the cost of water as provided by private water vendors is exorbitant, up to ten or twenty times in absolute monetary values to what people pay for their abundant tap water in industrialised societies. Thus the concept of payment, at least for the upkeep and spares and repairs is not so alien even to the poorest communities. The question is how to make it affordable and well managed.

The true economy of low-cost water and sanitation systems for many years was subject to speculation and considerable discussion. This discussion came up especially when comparing the advantages of different technical approaches with each other. It even more so was drawn into the fore, when "cost-benefits" were evoked in order to compare the usefulness or lack of same of water and sanitation inputs as compared to those of other health programmes and components.

Rough estimates could be made and were made. Naturally, relatively precise data were available on the cost of materials, equipment and specific technical phases of any work process. When it came to overall costs, though, the ideas were much more vague. Government budget and

input figures could be idealised or variable. It is even more difficult to calculate the value of the input from the communities in terms of their labour and local materials. The most tricky issue is the assessment in absolute terms of the benefits. Rough estimates could be arrived at but nothing more than that.

During the years many a query was raised on the cost-benefit issue. After all, during many years, between 25 and 30 percent of UNICEF's total programme expenditures were for water and sanitation. There were apprehensions that UNICEF funds would be tied up too much in "hardware" and in public works types of activities. Many times the economic risk-taking was considerable, with the organisation venturing out into uncharted waters, almost literally. Often new technologies, untried at such large scales, such as the programmes involving thousands of drilled wells cum handpumps, or uncertainties as to the availability of water resources, or lack of knowledge of attitudes and beliefs with the corresponding lack of community motivation and educational backing could as well have led to monumental failures.

As yet, we have not arrived at any conclusive knowledge on the economic issues. Some valid efforts, in the meantime have been made, notably by the World Bank, probably the only institution equipped to do such studies on a world-wide scale. During the autumn of 1986, the World Bank presented in draft form the results of several years of research on the economy of handpump water supply as a basis for their policies on this particular set of systems.

The results are interesting and very valid for narrowing down the margin of error for the cost calculations. For an overall estimate of the costs and mainly an evaluation of the usefulness of water and sanitation for the poor, most colleagues in the different agencies would shrug their shoulders. They would be prone to say that they know that water and sanitation is good for people, but that no exact indicators to measure any impact ever could be arrived at. More recent work on the evaluation of the health and socio-economic effects of water and sanitation does shed some additional light on the subject matter. As yet we have to resort to a finger-in-the-wind assessment, but then in the last analysis that might be true for anything UNICEF is doing.

Management and support

As was noted before, part of the achievements on UNICEF's side are due to the management and support structure of the entire organisation. A number of aspects, specific to the water and sanitation inputs, are worth recording. Although there is much in common between water and sanitation and the other components of health, education, nutrition etc., the relative magnitude and the strong technological orientation of especially water supply activities, did present specific problems and require specific approaches.

Planning of the UNICEF inputs never was very strong, globally speaking. The first decades after 1950 with the relatively small inputs in largely demonstration projects would only warrant planning on a local level. The first years in the 1970s of UNICEF/WET's "Sturm- und

Drangperiode", the impetuous development of large programme components as in India or Bangladesh, were planned for - yes, in a way, by medium-term project periods - but not as parts of really coherent national plans. These were to come later, in most countries inspired by the Water Decade promotion.

In a way, the decentralisation of UNICEF's work did necessarily contribute to individual planning on a country basis, rather than to entail any theoretical exercises at global, i.e. New York Headquarters levels. During the 1980s, the planning process in UNICEF with its changes towards biennial plans, more stringent personnel planning and accompanying procedures, appeared to sharpen the planning process somewhat, though.

Some doubts may still be harboured as to whether planning of sectoral inputs should be very firm, or whether it should not rather allow for a certain flexibility. That flexibility would be especially needed for seizing unexpected opportunities for special contributions. Also global and country planning more and more, and necessarily so, becomes dependent on the national governments' plans. In this context, the Decade co-ordination between the governments and the many external agencies, as - ideally - supported by the UNDP Resident Co-ordinator as focal point for the UN agencies in the countries, in many countries now contributes to making the individual agency inputs more effective.

The funding of the capital-intensive water and sanitation programmes and projects developed greatly with the spectacular increase in activities around 1970. In 1969, thus, UNICEF expenditure in this field was only 2 million US dollars. During the years of 1982-84, the yearly expenditure seemed to have reached a plateau at near 70 million dollars. With that demand for funds, UNICEF could no longer rely on the regular budget alone, insufficient as this was and remains for all that really would need to be done. This led to an increasing part of the water and sanitation inputs to be covered through supplementary funding, principally through "noted" projects. In 1985 such special contributions accounted for 55 percent of all funding for water supply and sanitation.

Consequently, there is a long-standing close co-operation with the Programme Funding Office (PFO), connected with donor contacts and the corresponding information activities. This co-operation, as always, was a three-way affair between the field offices, PFO with or without WET in New York and the donor organisations. These latter in their turn would participate either separately or jointly with other international organisations (not the least the United Nations Capital Fund/UNCDF and the World Bank), bilateral agencies and NGO:s of all denominations, nationalities and sizes.

This whole "wet business", began somewhat modestly with an enthusiastic, albeit catch-as-catch-can support around 1970 from the then Director of PFO, the flamboyant Dutch historian Victor Beermann. His power of persuasion could get stones to weep. With his great talent to scrounge funds, he on some occasions even obtained large sums for projects which hardly existed.

This happened with two million dollars from the Norwegian government, generously offered for providing drinking water to Southern Sudan. That area had been utterly devastated and emptied of people during seventeen years of violent internal warfare. With the peace between the Khartoum government and the Anya-Anya movement established in 1972, Norway kindly channelled the funds to UNICEF for doing something about the situation.

During the beginning of 1974, still nothing had been done about any programme. This was nobody's fault. There had simply been little possibility to do anything, until there was really an established local government and there would be communities around to cater for. By that year, there was such a government. A great number of southern Sudanese, Dinka, Nuer and others, who had spent many of the war years as refugees in neighbouring countries, began to trickle back. They resettled in these enormous wooded savanna areas, which part of each year are submerged by the inundations of the Sudd with the high waters of the White Nile and part of each year are bone dry. With this background and with the establishment of WET in New York, Victor Beermann, ably aided and abetted by the PFO factotum Dorothy Schleimer, could now begin to press for action, which he promptly did.

The outcome was the setting up of one of the more remarkable pioneering projects for water wells cum handpumps in one of the most remote project areas anywhere in the world. In the Bahr-el-Ghazal and Equatoria Provinces on the border to Uganda and the Central African Republic, there are now hundreds of handpumps bringing fresh water to villages. This example eventually led to the establishment of similar projects in other areas of the country. The delay in implementation was taken with stoic calm by the Norwegians. For many physical reasons it took time to get going with the first project, based on Wau, the provincial capital of Bahr-el-Ghazal.

There were many details, the inclusion of which would be picturesque but which would lead too far in the context of the present history. One yet merits to be mentioned, for being typical of all the impossible things happening. The technical consultant to UNICEF for setting up this project was Per-Fredrik Tröften, a Norwegian engineer. He was one of the pioneers for the rapid drilling methods introduced in India around the mid-1960s, and which were to be used in Sudan as well. As luck would have it, his assignment prior to working in Sudan, was in the Arctic on some coal deposits. Two days before his scheduled arrival in Khartoum, a cable arrived in New York, telling us that he could not make it on time - "my boat is icebound in a fjord in Svalbard".

Quite soon a less adventurous but more solid relationship was developed between Victor Beermann and PFO. This has continued through the directorships of Sasha Bacic and Marco Vianello-Chiodo. The task of reporting to and maintaining the flow of information with the donors, especially the very exigent NGOs, was not always easy. Often, however, it led to a very fruitful co-operation with interesting elements of much more active participation from the side of the donors.

Such co-operation in some cases developed from pure funding into active inputs in the field. Some of the major bilateral donors eventually seconded technical staff to the UNICEF offices in the project countries, especially for helping out with evaluations: SIDA in India (Bo Elding) and DANIDA in Bangladesh (Kristian Laubjerg). In other cases, international NGOs would have their local chapters participate in the work. This practice sometimes still presents problems but is very promising in the long run. The problems mainly consist in bridging the gap between the willingness and enthusiasm on the one hand and the need for technical knowledge and experience on the other, where sometimes the UNICEF offices have too small a capacity for coping with the need for proper and constant support.

An additional boost to fundraising was provided through special actions and contacts, such as the fundraising drive, initiated by the UNICEF Executive Director, Mr. James P. Grant, during his first year in office, in 1980, with the Arab world. The forming of Agfund, the Arab Gulf State Fund, through the then Special Envoy of UNICEF, His Royal Highness, Prince Talal Bin Abdul Aziz of Saudi Arabia, led to considerable additions to the funding of projects in some of the poorest countries of the world.

This was followed by rapidly established contacts with a number of other funding and financing institutions in the Arab World, notably the Arab Fund for Social and Economic Development (AFESD) and - to a more modest degree - the OPEC Fund. With some concentration of the funding efforts through these institutions to countries in West and North Africa and the Middle East, new projects for poor rural and peri-urban areas were conceived, e.g. in Tunisia, and old ones were reinforced.

The youngest major addition to the donor horizon is that of Italy. In some specific cases, the sudden generous interest in funding for development, has begun to strike water. Specific inputs were made recently for the deep drilling for water in Northern Sinai in Egypt, involving the employment of Italian water well drillers, used to the special type of heavy machinery involved. In the case of the JNSP (UNICEF/WHO Joint Nutrition Support Programme), with the overall funding of US$ 100 million over five years, components of water supply for drinking water and micro-irrigation of family food production acreage, have been added in some countries.

The advocacy role of UNICEF in any activity is underpinned by the supply and logistics provided to the projects in the whole world. Water and sanitation with their need for a massive input in the form of equipment and materials in order to have an impact, thus led to an important part of the supply action to be dedicated to this field. A description of the supply structure and activities already was provided in the chapter on technological development.

To that description should be added the changes in the nature of the work of the supply officers involved in water and sanitation. There is a noticeable trend during the last several years to change their work from being "pure" procurement officers, remaining in their own offices and dealing with papers, to what might be termed "supply programme

officers". The complexities of the equipment and materials involved as related to the overall project setting in each country, does require their frequent participation in the planning and programming work on site in many places.

In this way, the already long-standing co-operation and co-ordination of their work with that of the field offices and WET in New York, is intensified and carries with it much more of travel and planning in the field. This has proven efficient. It saves costly mistakes, which furthermore could be very discouraging to all parties concerned with the projects. Delays and mistakes can have bad repercussions in terms of the interest and enthusiasm on the side of the communities to be served, as well as on government and UNICEF staff.

A pre-condition for the achievements reached during all these years, was the support from the side of the UNICEF Executive Board and from UNICEF's top management. Notably in the crucial years of accelerated development of the water and sanitation inputs during the 1970s, the then Executive Director, Mr. Henry Labouisse, in his tranquil, benevolent way would lend tacit support to the ideas. His Deputy Executive Director, E. J. R. (Dick) Heyward, like a good band-leader was the one to make the orchestra burst out in a fortissimo at a brief flick of his baton. To this came most importantly the planning and management by the UNICEF Regional Directors, Representatives and Programme Officers, who had to co-ordinate and guide the water and sanitation project officers - often strong-willed individualists - who had to reconcile the technical exigencies with the needs for consideration of the social and health parameters in the lives of the children, our ultimate clients.

A most important aspect in the work for policies, planning and programmes, is the UNICEF staff structure. Without overexpanding on overhead and staffing, throughout the last fifteen years, from around 1970, an in-house UNICEF expertise was developed for water, sanitation and by lately, health education. This consists (1986) of some 150 specialists in some 30 field offices, dealing with major water and sanitation cum health education programme components. A backstopping and co-ordinating role lies with the small WET Section in the Programme Development and Planning Division in New York Headquarters.

The work of this group of specialists is crucial to the successful outcome of UNICEF's assistance. Once the UNICEF inputs in any country exceed a certain level - no absolute figures, but as a rule of thumb, somewhere around 500,000 dollars per year - the work of a UNICEF specialist pays for itself. This pertains to the increased efficiency as to the use of the equipment and other supplies and, principally, for the assistance in the planning and programming and the human resources development cum training and health education components. Even in countries with a well developed administrative structure and a good complement of national engineers and other specialists of their own, a continued presence of UNICEF support staff may be necessary for many purposes, including bridging some of the internal gaps in the national bureaucracies.

The team of water and sanitation specialists in UNICEF covers several disciplines. Their provenience presently is from some forty different countries. Two-thirds are international professional staff. The remaining one-third is made up of national officers, professionals, employed in their own countries. This is a great help, since they are familiar with local conditions, speak the national languages and furthermore constitute an essential part of the recruitment base for international posts. From a professional point of view some are sanitary, civil, drilling and mechanical engineers. They are master drillers and mechanics. Some are sanitarians and others are health educators. Last but not least, in addition there is support staff in the form of finance and administrative officers, storekeepers, secretaries, laboratory personnel, drivers and watchmen.

In this way, a unique corps of specialists was created, which primarily is active in the project countries. Of the about 150 professional staff, five (after mid-1986, only three) are in New York. For all practical purposes, the colleagues form an integral part of the field offices. Their work is dedicated principally to the country, where they are stationed. Through the experiences of the past years, however, they form in the same time a global knowledge network. Increasingly the specialists attached to country projects have been drawn upon for consultations in other countries or to represent UNICEF at regional or international meetings, conferences etc.

A corresponding team spirit was fostered among this strong water and sanitation team, consisting of proud professionals with a great degree of independence. In the relation between the field and New York, and also within the team in New York, too hierarchical a structure was avoided. Whatever few necessary managerial relationships would have to exist, they were rather following the apostolic formula of "primi inter pares" - the "foremost among equals".

The first two UNICEF water project officers were employed in India in 1967, in order to help cope with the drought in Bihar and Orissa, which had begun the year before. These were Malcolm Kennedy, a New Zealander, who had worked with AFPRO, an NGO dealing with agricultural and water development in India, and a young Indian mechanical engineer, Kumar Jagtiani.

Kumar had been recruited to drill wells in Bihar with the two small drill rigs, which constituted the equipment of his contracting water well drilling firm in Bombay. These rigs were of the new rapid type. Even if they only were two small machines, they drilled fast enough in order to make an impact and to demonstrate the value of the method to UNICEF. (Both Malcolm Kennedy and Kumar Jagtiani were remaining with the organisation in 1986, Kennedy as Representative in Nepal and Kumar Jagtiani with the WES Section in New Delhi as Project Officer for Evaluations.)

During the years since, there has been a successive adding to the ranks of dedicated colleagues. All could not be enumerated in this brief account, although they would merit that. Still, quite a few will figure in the historical account for the programme development in different parts of the world. From a purely personal point of view, these

specialists have been giving a great contribution to the countries and the communities, for which they have been working in the UNICEF context. Their own experiences and personal backgrounds would provide material enough for volumes, full of adventure and passion.

One of the great strengths of UNICEF's work, has been the continuous concern to get the right man or woman to the right post. This led to a close co-operation with the Placement Section of the Division of Personnel in order to help fill the posts in the Field Offices. It took some time and the more systematic approach to job classification and personnel planning to reach some justice in the system, as far as salary levels were concerned. For several years, one specific Recruitment Officer in New York dealt skillfully with the care and maintenance of the "water people", Louise Yuen. Part of her successful handling of recruitment and placement was helped by her own frequent travels into the different regions, acquainting herself on the work sites with the nitty-gritty of the subject matter and with the WET colleagues personally.

Salary levels competitive with those of some other organizations would never be reached, but water and sanitation people in the outer world seem to largely view work opportunities with UNICEF as something highly attractive. Recurrent statements from outside persons speak of the "family" ambience or team spirit of the organization. This personal touch was cultivated on purpose for the "WET" ones and is befitting for an organisation dealing with children and their families.

The Water and Environmental Sanitation Team (WET) in New York began its irrepressible existence on 15 December 1973. That day, Martin Beyer, a Swedish geologist, came to New York from his first posting as Deputy Regional Director for the Americas with UNICEF in Santiago, Chile (into which he came as a freak of history). His first title was "Adviser, Drinking Water Programmes" - no mention of sanitation in those days! His first partner in the water business was Mérida Torresola from Puerto Rico. Mérida, who had a background in chemical engineering studies, had worked for many years as Programme Assistant with the then recently disbanded Food Conservation Division. She had therefore a great experience of how to represent technologies in UNICEF, which was a great help during the first two years of establishing the water programme.

The next one to join WET was Henk Davelaar, who as Senior Programme Officer shared the work from 1976 to 1980, when he retired. Henk with his background as an agricultural engineer from the Agricultural University of Wageningen in the Netherlands, had worked with UNICEF since the early 1950s, building milk plants in different parts of the world. Later he had been Regional Food and Nutrition Adviser in New Delhi and Representative in Lusaka, Zambia and Dar-es-Salaam, Tanzania.

The third senior partner was Paul Biron, with an engineering degree from the prestigious Institut des Arts et Métiers in Paris. Like Henk Davelaar, he was a veteran of the Food Conservation Division, had been Regional Food and Nutrition Officer in West Africa (Abidjan) and then Beirut (and a Cordon Bleu cuisinier at that). Leaving Beirut in 1976 at the beginning of the civil war in that country, Paul Biron settled in New

York and gradually became involved with WET, until he became a member of the section in 1978, retiring in 1984. It was a retirement of sorts, since Paul in 1985 found himself for four months as Resident Officer-in-Charge of UNICEF in the Central African Republic.

The third partner, also capping his UNICEF career with three years in WET (1979-1982) was Bruno Ferrari Bono, former Professor of Hydraulic Engineering in Buenos Aires, UNICEF Representative in Mexico and future Minister of Water Resources in his home country, Argentina.

A brief but very helpful interlude was the guest performance by Gordon Alexander, later UNICEF Representative in Aden, People's Democratic Republic of Yemen, during eight months in 1978, participating in the WET policy formulation work for the then ongoing JCHP study.

With the technical emphasis during the late 1970s and first years of the 1980s on water well drilling technologies, it was quite natural that WET was joined in 1979 by Bozidar (Boza) Kojicic, the senior Yugoslav drilling engineer who had started up the very large programme assistance to the drilling of deep water wells in the Dry Zone of Burma where he worked for UNICEF from 1976 to 1979. Greatly assisted by his wife, Djurdjina (Duda) Kojicic, an experienced drilling engineer also, Boza took care of WET's consultative work for groundwater technologies with boundless energy and cheerfulness. His sudden death in January 1983 of a heart attack came as a great shock.

When within a few years' time all these senior partners left WET, it was necessary to secure successors who would continue in the good spirit but who would be able to provide some longer continuity. These were Per Engebak, drilling engineer from Norway (from November 1984) and Dr. Joseph (Joe) Christmas, a hydrogeologist and engineer from St. Kitts (from March 1985). They had worked with UNICEF in the field since 1976 and 1979 respectively.

Last but not least, the happiness of WET became complete with the posting of Madame Ma Yansheng as Senior Adviser for Community Participation and Women's Advancement (1981-1986) and Ms. Muriel Glasgow as Programme Officer for Health Education (1982-1986) to the Section. Their work has already been referred to in an earlier chapter.

With the many travels of the senior WET partners, the prodigious output of writings and a copious in- and out-flow of documentation, plus some administrative functions especially to help get consultants out to the right places, WET would have been lost without the secretarial colleagues. All fondly remembered, they came in groups and stayed during well-defined historical periods.

The second "generation" after Mérida Torresola consisted of Maria-Luisa Loarca (Philippines), Marcia Brookfield (US), Josephine Gonzalez (US) and Doreen Lobo from Goa. Then, for a briefer period, Melanie Myers (Jamaica), Laura Moseley (UK) and Huguette Sajous (Haiti) were part of the team. A brief but much appreciated stint of work was done by Adriana Vink (Netherlands) around 1981-82. The present team is made up of Margaret Karp (US), Doreen Cañas (US) and Thérése Tchimouendji

(Republic of the Congo). They have become internationally known in their own right, since they manage WET entirely in the absence of the senior colleagues on travel and maintain much of the many personal contacts, on which the whole work depends.

WET's tasks always were manifold. From the outset, the support to the field programmes was given priority. The help to start up new programmes was predominant during the first half of the 1970s, especially in Asia and Africa. The last few years, until the present, have seen another set of new or reinforced programme activities coming up in Central America and Southeast Asia.

Gradually throughout its existence of the last twelve years, WET became quite a focal point for information exchange between UNICEF, the Field Offices, other organizations, suppliers of equipment and materials and interested individuals. An unending stream of documentation and verbal messages has flooded the WET office all these years. Especially in the 1970s, when there were not so many organizations dealing with the low-cost approaches, WET and the project staff in the field would have to respond to many requests for information and advice. Now there are many more institutions and other sources of information available in a large international knowledge network. Nevertheless, the demands on WET for an active participation continue and just seem to increase.

Within UNICEF's New York Headquarters, WET was part of the Programme Division, from 1980 to early 1986 in the Programme Development and Planning Division (PDPD). The Team was for long periods left quietly in peace by UNICEF's Directors. This benign neglect helped a great deal in terms of internal work efficiency. On the other hand, this state of affairs did detract from the need for adjustment to the changes in policy and the full integration of WET's work with that of other sectors. The problems of such periodic isolation pertained mainly to the relations between WET and UNICEF's management, particularly between 1980 and 1985. There seems now to be more interaction, to which no doubt the recent overall re-integration of the different programme activities, field services and advisory services, into the re-unified Programme Division will contribute.

WET relations with the Field with one or two exceptions, always were very close. Especially the imperative integration of "hardware" with "software", and of water and sanitation with PHC and other fields, was successfully arrived at by the representatives and the other UNICEF colleagues in the regional, area and country offices.

What the future will hold in store for WET is difficult to predict. The termination of the two "software" advisers of their work and posts in New York by mid-1986 marks a considerable change, which is hoped not to affect WET's effectiveness too adversely. The more stringent economic and financial climate of 1985-86 can have other repercussions. May these not go much further, since this small team already now is working at the limit of its capacity and will continue to do so, pending future developments.

Information, documentation and other external relations

UNICEF's clearing-house role for information on water and sanitation technologies, social approaches, planning and programming, was mentioned in a previous context. This kind of input in years past was mainly the responsibility of WET in New York. Gradually, part of this role was shared more with the colleagues in the field. It included participation in an ever-increasing number of conferences, congresses, seminars, workshops and other meetings on the subject of water and sanitation. Among the major events that should be mentioned, is especially the United Nations Conference on Water in Mar del Plata, Argentina, in 1977.

For the promotion of ideas, policies and procedures within UNICEF, between the agencies and among the government officials, with whom we work in the individual countries, workshops and seminars often are among the most efficient tools. More and more, these have been located in project areas in the field, away from the lures of the capital cities. They have included live-in sessions in the tukuls of Ethiopian villages or similar settings in other countries.

The use of publications and the different media on global or country levels, permit both the dissemination of more specialised technical information to specific audiences or more general information that would serve for education and motivation of a general public. This can help influence potential donors. It can be used in countries with ongoing projects for reinforcing the health education and other messages.

On a global level, many opportunities were taken to publish the UNICEF views in technical journals and in papers and to present them to meetings of professionals, e.g. in specialised technical or health fields. Likewise, some thematic issues of UNICEF's own journals, "UNICEF News" and "Assignment Children", were dedicated to these questions.

A specialised channel for informations since 1975 is the irregularly appearing newsletter, "From the UNICEF Waterfront". Originally it was intended only to provide news items on developments and activities for low-cost water supply and sanitation for the information of UNICEF's field offices. The first few issues were sent out with a total of 100 copies and had no more than 3-4 pages with brief news items. Issue No. 34 in the spring of 1986 had 32 pages, complete with cartoon, pirated from somewhere, editorial and a personal gossip column!

Somehow, the word spread. WHO and the national UNICEF Committees began to request bulk copies for distribution to their different branches, and the distribution went up to 2,000 copies around 1980 - the maximum capacity of the Xerox machines of UNICEF in New York. An explanation for this interest lies in the fact that there was no other news publication on the particular low-cost approaches for water supply and sanitation available anywhere, with the exception of the newsletter of IRC in the Netherlands. Even that covered only part of the overall information that needed to be spread.

Up to the beginning of the Water Decade, "Waterfront", which was a very internal WET initiative, led a kind of underground existence. There was no planned editing, and the costs for printing and distribution were blissfully ignored and absorbed in the general hubbub of the UNICEF Headquarters printing shop and mailing room. For the writing, editing, typing and layout of the original, WET staff time and weekends were used.

Therefore, the opportunity was eagerly seized, when the World Bank offered to print and distribute "Waterfront" with their mailing list for the great number of qualified technical papers, published by them. This continues to the present day. It means that some 9,000 copies are going out into the entire world. The UNICEF Committees use it for some of their publicity. The other subscribers range from government ministries to health workers out in the bush.

This newsletter has generated quite a deal of correspondence, particularly requests for more information on many of the news items reported. Since the beginning of the Decade, a number of other similar publications have taken up or specialised in the same themes, notably "Waterlines" by the Intermediate Technology Group Ltd. (UK), "ENFO" of the Asia Institute of Technology, the ESCAP Journal on Water Resources, "Decade News" by UNDP, publications by WHO and other organizations.

In a few cases, UNICEF colleagues in the field have contributed with entire books on related subjects, either from UNICEF or other practices, but published with reference to UNICEF, So did Colin Glennie (now WES Chief in Bangladesh) on Community Participation for Water Supply, based on his eleven years of experience in Malawi, and Tom Jordan with his handbook on Gravity Feed Water Supply Systems, based on UNICEF-supported projects in Nepal.

Films (movies) and videotapes have proven highly successful both for raising public interest and for training. From the 1950s, UNICEF had produced several very good films with water and sanitation themes. The inauguration of the Water Decade in 1980 caused the production of several versions of a specific water and sanitation film, "Water Means Life", by a New York film director, Dick Young. It became very popular, won awards and nominations. Some footage from the film was used for a Decade promotion film, produced for the entire United Nations system, "Journey for Survival".

Among other, more recent productions and the last film produced in its entirety by the UNICEF Film Section, headed by Bernard Gerin, produced by Madame Ma Yansheng and directed and shot by Michael Clarke, deserves mention. This is "Good News Is Water". In 28 lively minutes it shows the joint Primary Health Care cum Water and Sanitation action in Imo State in Nigeria (1984). Intended as a training tool for Nigerian government officials and health workers, it became also an excellent film for public information.

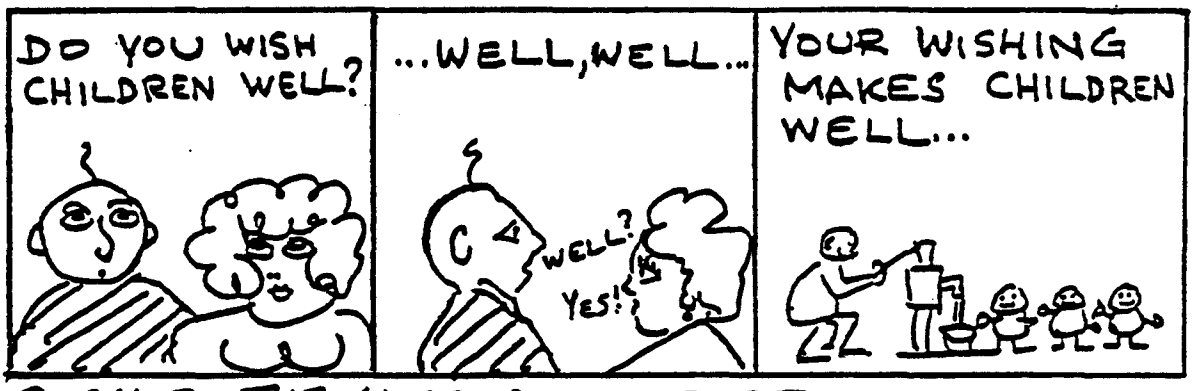
Press and media coverage in different parts of the world has been good occasionally, depending on both premeditated arrangements and world events, notably the interest aroused by the Decade activities or by the major drought emergencies. Thus nation-wide media coverage was supported

by UNICEF staff on several occasions in Spain during the 1970s and beginning of the 1980s, and included promotion of United Nations Decade activities all over Canada in 1982. As has been the case on some occasions, locally in the United States (Texas and Southern California), the Canada exercise was sponsored jointly by the national United Nations Associations and UNICEF Committees.

The National UNICEF Committees played a great role in helping promote the water and sanitation issues. Many contributed directly to funding of large components of water and sanitation programmes. Among them at an early stage were the Belgian Committee, with an input into Sri Lanka, the Canadian and Norwegian Committees, and many others.

In terms of publicity, drought-conscious countries such as Spain, would give the efforts for water and sanitation high visibility. But so did also rain-richer places. The French Committee arranged for a major exhibit on water to travel though the whole of France in 1980-81. In Spain, the Asociación UNICEF España arranged for the Fourth National Water Conference in Zaragoza in 1981 and to have UNICEF provide the keynote speech. In the Federal Republic of Germany, UNICEF, Children and Water cropped out on the square in Essen in an outdoor radio show for the International Year of the Child. There was a throng of a thousand good "Bürger" and two lady cabinet ministers of the Federal Government. Water was the theme at the National Committee Reunion in Helsinki, 1979, enthusiastically promoted by Gunni Hustich, the Executive Secretary of the Finnish Committee (whose imprint on the Committee was so great that it often was referred to as the "Gunnicef Committee"). An evening on children, water and sanitation at the Foreign Ministry in Tokyo, Japan, drew over a hundred interested listeners. And so forth.

Among the important contributions to their support of the water and sanitation issues, the UNICEF Committees did much to place it efficiently into their work on development education in primary and secondary schools. The materials and approaches produced, are a prime source of understanding of health- and environment-related issues for millions of children in many countries.



3 THE INTERNATIONAL ACTION

One of the first questions put to Martin Beyer in 1974 in his new function as the first Headquarters Adviser on Drinking Water Programmes ever, came from a colleague in a sister Agency: "Now that UNICEF has employed you as Adviser, does that mean that UNICEF wants to go it all alone?"

The answer then was that UNICEF did not have the slightest intention to "go it all alone", and that the employment of a Water Adviser was precisely for the proper co-ordination of UNICEF's work with a host of other agencies, dealing with the many aspects of the same subject. The present history is one specifically of UNICEF's work. It must, however, be borne in mind that the world-wide activities for improving the services with water supply and sanitation are a result of action during the last ten to twelve years by individual countries with the support of a more and more concerted group of external, international, regional, inter-governmental, bilateral and non-governmental (NGO) organizations. There has been a successive joining of forces and a re-aligning of policies and action with hardly any parallel in the history of development. The only exception to the present writer's knowledge would be the important health actions, headed by WHO, such as the smallpox eradication campaign, the tropical diseases and diarrhoeal diseases research, the onchocercosis programme and others.

A great advance was made with the official establishment of the International Drinking Water Supply and Sanitation Decade 1981-1990. In 1985 this led to an agreement by all the bilateral organizations to co-ordinate and to join in on common policies, using the low-cost and community-based approaches as they were promoted by the UN system, and benefitting the poorest sectors of the populations. With UNICEF as one of the key partners in this development, it is only befitting to have this noted, before entering on a more detailed description of UNICEF's particular role and participation in the government programmes. Also, before entering upon the matter of how this international network came about, it is necessary to give a thumbnail sketch of some of the other major agencies.

Water and sanitation always has been a concern of humanity. Many of the world's oldest and most fundamental documents deal with the subject of water and health. The Bible, the Holy Koran, Indian, Chinese, Japanese writings and pieces of art swell extensively on the subject of water. That the matter of sanitation in the proper place was a felt need, is clear from archeological remains from the Roman Empire. An inscription from the first century A.D. on a wall in Pompeii says, "Quisquis hic minxerit aut cacaverit Iovis Optimi Maximi iram provocabit", or in plain English, "Whosoever would pee or shit here, will provoke the wrath of Jupiter, the Biggest and the Best". The message may not have been sufficiently heeded, since this pleasant resort town was destroyed by the eruption of Vesuvius in 79 A.D., but at least the educational effort had been made.

When it came to the provision of fresh water to rural and periurban communities in the developing countries in modern times, some more timid beginnings were made under their colonial regimes. In countries such as Uganda and Nigeria, larger scale attempts were made to drill or dig wells for the villages already back in the 1920s. The independence of the former colonies gave an impetus to planning for wider coverage with basic services. Thus in the 1950s in countries such as Ghana, Malawi, Tanzania and India, national agencies were set up and objectives and targets established. At first these were kept at a modest level, since the technologies for wider and more rapid spread of e.g. water supply with drilled wells and handpumps were developed only during the 1960s and 1970s.

Eventually, the great number of external organizations became more organized. They began to give greater priority to water and sanitation as components of health and other development issues, formulating their own tasks and developing their capacities. It took thirty years from the end of the Second World War, until the international world became ripe for co-ordinating and co-operating on an operative day-to-day basis.

The United Nations System

There are at least eighteen different agencies and bodies in the United Nations system, concerned with water resources in one way or another, probably more, if one includes e.g. IMCO, the International Maritime Co-operation Organization, which would have a stake of interest in inland waterways and the question of transport of freshwater with tanker ships. There are eleven UN agencies with a direct interest in drinking water and sanitation, manifested through their representation in the Steering Committee for the Water Decade.

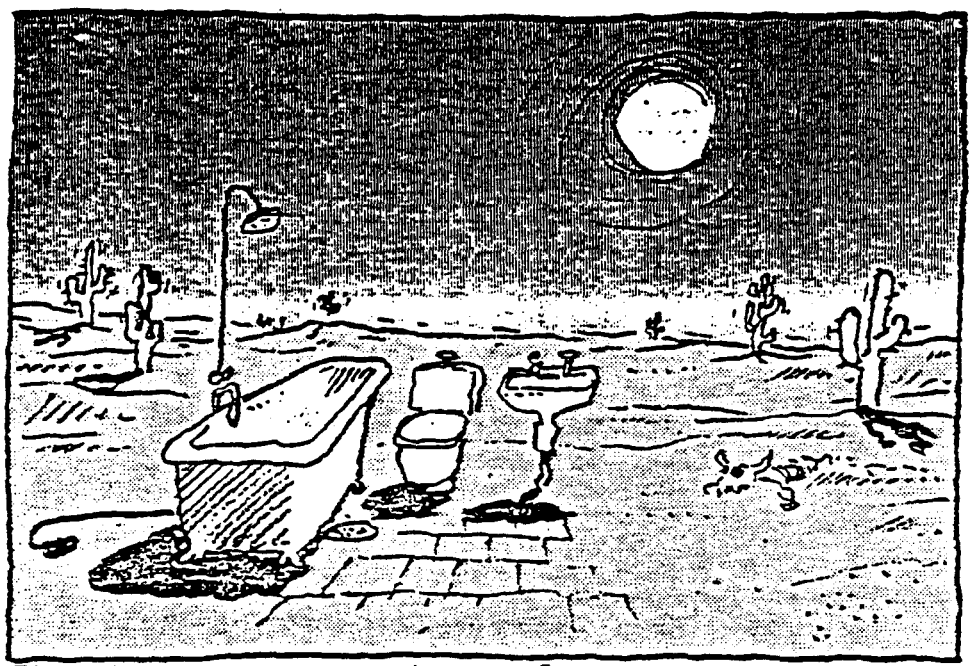
Among those, again, five organisations are responsible for major inputs at this stage. These are WHO, the World Bank, UNDTCD, UNDP and UNICEF. Each of them has its given task and scope of work. Sometimes WHO, World Bank, UNDP and UNICEF irreverently were referred to as the "Gang of Four", conveniently forgetting about UNDTCD with its lower profile. Avoiding duplication of work and unnecessary overlapping of tasks, rather prevents gaps to occur from technical or programming points of view. The co-operation and co-ordination between the many agencies, within and without the United Nations system, is now going on with a minimum of formality and based on a formidable network of institutions and personalities, a water "mafia" in the best of senses.

World Health Organisation

The oldest agency and the one with a leading role in the issue of water and sanitation for health is WHO, the World Health Organization, headquartered in Geneva. WHO from its inception had environmental health inscribed in its programme. With Environmental Health divisions at its

Headquarters and at its very autonomous Regional Offices, WHO has specialized personnel in a number of individual countries. Their function is manifold. Among the main WHO tasks are the establishment of norms for water quality for drinking water and organizational, managerial and technical advisory services to the developing countries.

WATER AND SANITATION DECADE LAUNCHED !



Illus NY TEKNIK, Stockholm, Sweden - No. 42, 1980 Teckning KAIANDERS SEMPLER

VATTNETS ÅRTIONDE

WATER'S YEAR TENS

International
Drinking Water Supply
Sanitation Decade
1981-1990

Décennie internation
de l'eau potable
et de l'assainisseme
1981-1990

Decenio Internacion
del Agua Potable
y del Saneamiento Amb
1981-1990

عقد الدولي لتوفير
مياه الشرب
والمرافق الصحية
١٩٨١-١٩٩٠

As historical development and traditional public health thinking would have it, up to the 1970s, WHO was oriented more towards piped water supply with household connections than to the lower-cost but also lower-quality types of installations. For many years until well into the 1980s, a co-operative agreement between the World Bank and WHO, had the latter organization partly functioning as adviser to World Bank-funded water supply and sanitation schemes, which would be predominantly urban.

This did not prevent WHO from promoting low-cost approaches to community water supply and sanitation. During the late 1950s two sanitary engineers, E. G. Wagner and J. N. Lanoix published the classical WHO monographs on community water supply and sanitation. Still, within WHO up to 1975, only a few voices were heard in favour of simpler and lower cost systems. Among them was D.V. Subrahmanyam, a sanitary engineer from Tirunelveli in Tamil Nadu, India (from where some other personalities in this special part of the field were hailing - that city must have had something in its water supply...). Subrahmanyam or "Sub" at an early stage did much to spread the gospel of small being beautiful, before Schumacher coined the famous phrase with his writings on Appropriate Technology. Another WHO colleague who recognized the needs to cater to the small and outlying poorest communities with all the strategies involved was David (Dave) Donaldson of PAHO, internationally also known for his efforts to sort out the definitions of rural and urban and for good measure throwing the term "rurban" in between.

Other colleagues in other organizations also were concerned with these questions but formed a minority. The low-cost approaches would rather be left with the NGOs who provided the first efforts and experiences on which the public agencies later could build. Even so, WHO did remain the main advisory body to UNICEF on technical water and sanitation matters, which was important, especially for the policy issues. The JCHP exercises were made largely under WHO supervision. The most recent forging of closer ties between the UN system and the bilateral agencies, has had WHO play a central and crucial role.

Any co-operation hinges on the individuals. There were and are many helpful forces in WHO. The Chiefs of Community Water Supply and Sanitation together with the Regional Advisers and many of the country-based sanitary engineers are too many to be listed, although they all would merit to be mentioned in a UNICEF history. Still, it is with pleasure that names like Paul Bierstein, the late Luis Orihuela, Sommuek Unakul, Ingvar Ahman, Gunnar Schultzberg, Odyer Sperandio, Gregory Watters, Fred Kent, Prescott Stevens, Richard (Dick) Ballance, Bob Novick, Mike Acheson, Ernst Becher, Adalberto Vogel, Mahmoud Suleiman, Victor Pinto, Günther Bachmann, Martin Jackson, and many others are recalled for their wisdom and helpfulness. In the WHO Regional Offices, too, people such as Hans Bahr, Vicente Witt, Guillermo Davila, Chen Kuo, Frank Go and Jean Romain would play a behind-the-scenes role. The same comes true for the WHO centres such as CEPIS in Lima, Peru, and PEPAS in Kuala Lumpur.

World Bank

The World Bank always was very urban-oriented in its function as the major financial institution for development. There was, however, a marked turn of interest towards the poorest sectors of the developing countries and the promotion of technologies and strategies to serve these, during the era of Mr. Robert MacNamara as President of the Bank. There were hopes that the World Bank would accede to a greater use of IDA (International Development Association) funds for low-interest loans with other concessionary conditions. From UNICEF's point of view this would have meant reaching a potential for giving far wider coverage with water and sanitation services than could be achieved through programmes with the limited support from UNICEF's much smaller funds.

One of the direct outcomes of the Bank's benevolent interest in low-cost approaches around the mid-1970s, was the setting up by John Kalbermatten, the unequalled Water and Wastes Adviser of the Bank, the Pillar of the Water Decade, of a series of global and inter-regional projects to study, develop and promote technologies, approaches, planning and training in the field of low-cost water and sanitation. Since the World Bank had no money, these projects were funded by UNDP. This had the utmost importance for UNICEF. We not only got involved in advisory and field testing functions to these programmes but benefitted to an unusually high degree from the weight of the World Bank prestige in its active promotion of these low-cost measures.

This World Bank interest thus greatly helped "sell" the idea of handpumps and latrines to university-trained planners and engineers, who theretofore had regarded such lowly devices with a certain disdain or suspicion. It also advanced the knowledge and the application of the technologies in a way which UNICEF never could have managed on its own. By 1985, overall World Bank policies had swung to a more utilitarian and proper "banking" attitude. It caused fears in some quarters that the accompanying downturn in annual loan volume for water and sanitation, from over US $ one billion in 1981 to around $ 450 million in 1985, would prejudice the possibilities to come a little closer to the goals of the Water Decade. This may get somewhat mitigated by a much greater acceptance from the Regional Bureaus of the Bank of the idea of the very same low-cost methods, which would provide water and sanitation to more people at much lower expenditure.

After Kalbermatten left the World Bank, the central advisory function in 1984 was incorporated with the Water and Urban Development Department. The specific water and sanitation matters there for a while were in the hands of World Bank Economist Michael Cohen, seconded for Technical Research and Development by Shaul Arlosoroff, who at the same time remained the Project Manager for the UNDP-funded Global and Inter-Regional Projects.

UNDTCD (United Nations Department for Technical Co-operation for Development)

Within the United Nations Secretariat, this Department is the one that provides most of the technical expertise to the programmes funded by UNDP in different countries. In its Division for Natural Resources there is a Water Resources Section that deals with the study and management of freshwater resources. The technical assistance from this Section normally goes to help countries organize their own hydrological or hydrogeological services or to carry out water resources surveys within specific regions, river basins etc.

During the drought in the Sahel 1972-73, when rapid mobilization of all resources was of the essence, DTCD had several groundwater projects going on in West Africa. In practical, terms this meant that there were hydrogeologists and water well drillers and that their equipment was available for immediately being diverted or to just make smaller adaptations of their ongoing work in order for the installations to serve the communities instead of just being part of a network for geohydrological observations. Further to this, DTCD shares with the hydrogeologists and hydrologists of FAO, UNESCO and WMO the largest background of knowledge in the whole UN system, especially on groundwater resources. The water resources work of the UNESCO-managed International Hydrological Programme has been headed for the last twenty years by Sorin Dumitrescu, a water resources engineer from Rumania. Closely related work is done by the Hydrological Division of the World Meteorological Organization led by Professor Jiri Nemec from Czechoslovakia. Their work is vital but for UNICEF forms more of a general background.

To UNICEF therefore, DTCD became an important partner, both in the field and in New York, where the DTCD hydrogeologists and water well drilling engineers often are consulted by UNICEF. The Chief of the Water Resources Section, the Italian engineer and economist Enzo Fano and his colleagues such as Agustin Navarro, Robert Dijon and Uri Golani, complemented much of the work of UNICEF's own water specialists. The contacts with DTCD also served to find good candidates for recruitment to UNICEF project posts for water specialists. UNICEF's Supply Division many a times found sound technical advice on water well drilling equipment and materials from DTCD drilling engineer Gerry Noyen and, later, Ante Damic.

UNDP (United Nations Development Programme)

UNDP from early on had an important function in funding TAB/DTCD assistance and supervising this in the field through the UNDP Resident Representatives. On the issue of community water supply and sanitation, UNDP came into the fore only with the preparations for the Water Decade. With the inauguration of the Decade and the establishing of the formal UN mechanism for it, UNDP assumed another and major share in this work.

Henceforth, the UNDP Resident Representative or, as they later were renamed, "Co-ordinators", were to be the focal points in each country for the Decade activities from the side of the UN organizations. Any other external bodies that would be interested, could join in this co-ordination, which was to serve the governments' national co-ordinating mechanisms.

From the beginning, the UNDP Administrator, Bradford Morse, took a great personal interest in this matter, marking this through many speeches and through appointing his Deputy, later Associate Administrator, Arthur Brown, as Chairman of the Decade Steering Committee. A special UNDP Water Decade Co-ordinator was assigned in 1980 in order to promote the Decade among the UNDP Resident Representatives and for linking UNDP's work with that of the governments and their other external agencies. For the first two years of the Decade, this was Dr. Peter Bourne, a former Adviser to U.S. President Jimmy Carter. Dr. Bourne later returned to Washington, D.C. in order to head a non-profit organization, Global Water, for promoting the Decade idea in the United States. He was succeeded in UNDP by Peter Lowes, a Canadian lawyer and political scientist with a long and distinguished UN and UNDP career. Lowes was stationed in Geneva and, seconded to WHO, which organization had the responsibility for the Decade Secretariat. This arrangement served many functions. One was stepping up the interest and action on the side of the UNDP offices in the field, backed by Lowes' own personal knowledge of UNDP and its staff. Another role was the close co-ordination and mutual reinforcement of policies and action between UNDP and the other agencies, notably WHO.

The UNDP funding of the World Bank-managed global and inter-regional projects for the development of low-cost water supply and sanitation approaches already has been mentioned, with the initial initiative taken by the World Bank Adviser, John Kalbermatten. The merit for making UNDP approve of the large allocations to this series of projects, lies with William (Bill) Mashler, erstwhile Senior Director for UNDP's Global and Inter-Regional Programmes. Bill Mashler had a powerful hand behind the scene in providing both funding and - more importantly - helping to keep policies and projects on an even keel, once the projects were underway. This man, with an ungodly tongue but a golden heart and full of common sense, gradually relinquished his direct personal involvement to his carefully selected collaborators. The first one to work intensely with the Decade involvement in project terms, was Jim Berna, one of the founders of AFPRO, a major NGO for agricultural development in India.

His successor for several years was Michael Potashnik, who now is working in the same context with the World Bank. The present and most recent UNDP team for these global projects consists of Tim Rothermel as Director, and Frank Hartveld for dealing with the combination of health and water cum sanitation projects. An important advisory role for many years has been played by Dr. Michael (Mike) Sacks. With his remarkable background of being an old China hand with UNRRA immediately after World War II, the WHO Medical "Antenna" in UNICEF's Paris Office and then for

many years an Adviser to the Director-General of WHO, he is in a unique position to truly help co-ordinate. Many others in UNDP contributed to the water works. In New York, the two UNDP technical advisers participating in some of the original discussions and preparations of project work in West Africa were Bouthros-Ghali and Roger Berthelot.

Other UN Agencies

The other United Nations Agencies, which participate in the Decade work as members of the Steering Committee, are FAO, UNESCO, UNEP, INSTRAW, ILO, and the Department of International Economic and Social Affairs of the United Nations Secretariat. They generally were not involved with the direct implementation of projects. Their part of the work rather was in the way of expertise on overall strategies, methods and ideas, although there always would be room for direct project inputs as well.

FAO would have the makings to become very active in the field of small-scale irrigation with the extensive experience available in that organization. Likewise, the development of the components of household water supply and sanitation for major agricultural projects has a direct bearing on FAO's and UNICEF's joint work. So do the various effective channels which agricultural extension can offer for health and sanitation education. On an individual level, FAO experts in the field often have been very helpful with their great knowledge and ideas, people like agricultural educationalist Bogdan Sestan or irrigation engineer Cornelis Des Bouvries in Africa (now with the World Bank). At the central level, the contacts were maintained with the Heads of the Land and Water Division in Rome, Martin Horning and Tom Mather. (World Food Programme, though, does make provisions for e.g. water well digging in some projects with their food-for-work contributions.)

UNESCO always had different sides to its water-related activities. One is the hydrological part, already mentioned. UNESCO's support to the development of scientific research and teaching on water resources is very important for the training of national specialists in hydrology and hydrogeology. Another side of UNESCO's work of immediate importance, is the expertise and experience in curricula and teaching methods for children and adults at all levels through the ordinary school system, from pre-schools all the way up to the "baccalaureat". During 1985 a lively discussion was initiated between UNICEF and UNESCO on how to combine the teaching of health, natural sciences and environmental awareness in countries with water and sanitation components of the programme. Some beginnings for practical inputs in the field have been made in Kenya and Uganda, and foreseen for Indonesia and Honduras. This is done through support to the publication of local magazines for school children as teaching aids. The first experience from about 1982 is from Kenya with a magazine called "The Pied Crow", which has proven very successful. It was set up by Professor James Connor of New York University supported by CARE and the World Wildlife Fund. In other countries this kind of extra-curricular reading already earlier was facilitated with UNICEF funding as part of Services for Children programmes, as was the case in Burma.

The most direct co-operation with UNEP for some years took place in a programme in Swaziland. The main water specialist in UNEP, with whom UNICEF co-operated closely for many years was Dr. Letitia Obeng, a Ghanaian microbiologist, (not to be confused with her daughter, Dr. Letitia Obeng, the Sanitary Engineer, working with the UNDP/World Bank team on training aids for the Water Decade, also linked with UNICEF co-operation). In later years, the water section of UNEP was headed by Mr. Laszlo David, a Hungarian water engineer.

INSTRAW (Institute for Studies, Training and Research for the Advancement of Women) during the last several years under its Director, Ms. Dunia Pastizzi-Ferencic, became the joint lead agency with UNICEF in the Task Force on Women and Water of the Decade Steering Committee.

ILO also begins to provide an essential background to the work on water and sanitation. Their main force in this context lies in the activities for Human Resources Development through vocational and other training. The special questions related to this, since the beginning of the Decade, were in the hands of John Wallace in Geneva.

The UN Secretariat through its water person in DIESA, Pierre Najlis (who worked closely with Habte Neghassi until Mr. Neghassi's untimely death), forms the link between the UN agencies, the actual field projects and - through the UN Committee for Natural Resources, ECOSOC and the Secretary-General of the United Nations - with the General Assembly. Najlis is responsible for the overall monitoring of the inputs of the UN system as well as being the Secretary of the co-ordinating UN Inter-Agency Group for Water Resources (the former Sub-Committee for Water Resources of the ACC, Administrative Committee for Co-ordination).

This leads to yet another group within the UN system, which through the first years of the 1980s became more active participants in the promotion of the Water Decade efforts, the Regional Economic Commissions. Their Water Resources Sections with their Advisors for several years now have been distributed as follows: ECWA in Baghdad with C. Ertuna, ECA in Addis Ababa with K. A. (Tony) Edwards (formerly Chief of Rural Water and Supply in Malawi), ESCAP in Bangkok with Abelardo Mañalac, ECLAC in Santiago de Chile with Terrence Lee and ECE in Geneva with Henri Dirickx. They monitor the regional state of water resources development, and promote policies through conferences and seminars.

Bilaterals and the OECD

Water always had considerable appeal to bilateral organizations and donors. Until relatively recently, the largest part of their support went to large high-level engineering schemes for urban water supply and sanitation. The contacts between UNICEF and the bilateral agencies, therefore in the earlier periods up to about 1975, were more cursory.

A first attempt to analyse the real problems of the world's unserved and underserved millions was made on the initiative of the Institute for Research and Development of OECD in Paris, headed by Paul-Marc Henri, a former Deputy Administrator of UNDP, and represented by Madame Marthe Tenzer. OECD commissioned a study on the problems of rural water supply and their extent, by IDRC of Canada (International Development Research Centre), who in their turn asked a Professor of Social Geography from the University of Toronto, Canada, Ian Burton, to undertake this work.

Burton's report was presented to the bilateral and international development agencies in 1974 and clearly exposed the enormous needs for action. Interestingly, it coincided largely in time and purpose with the first book on the social and behavioural factors of rural water supply, "Drawers of Water" by David Bradley of London University and Gilbert White and Ann White of the University of Colorado (1972). It was closely followed by the publication of the first handbook on the principles and economics of village water supply by two World Bank economists, Jeremy Saunders and Bob Warford (1976).

The time had become ripe at this juncture for the new developments and experiences in active planning and implementation and in terms of the knowledge of what made rural water supply programmes tick or not. OECD rapidly communicated the findings of Ian Burton to several of the major UN organizations, notably to the "Gang of Four".

The upshot of this was the gathering through IDRC of an informal group in order to see what could be done in order to develop Burton's recommendations in the world-wide programme activities, as supported by the international agencies. This was called the "Ad Hoc Working Group on Rural Water Supply" (AHWG) with a handful of participants from IDRC (to begin with represented by Myer Cohen and David Henry, a former UNICEF Programme Officer in India), OECD (Mme. Marthe Tenzer and Nicolas Imboden, who carried out some supplementary studies), UNICEF through Martin Beyer, WHO through D.V. Subrahmanyam and Gunnar Schultzberg, the World Bank through John Kalbermatten, UNDP and UNDTCD. The de facto Chairman - entitled "Co-ordinator" - was Myer Cohen, the former UNDP Deputy Administrator who on his retirement from UNDP was assigned as the IDRC Representative to the United Nations. Myer Cohen, as one of its Grand Old Men, being perfectly versed in the ways and means of the UN system, contributed effectively to make the Ad Hoc Working Group into a pilot operation, smoothing the way for the organization of the official Steering Committee for the Water Decade some years later.

Outwardly it seemed a gross ingratitude, when at the setting up of the Decade Steering Committee in 1980, OECD and IDRC were excluded. The intentions were not all that bad. At the outset of the Water Decade, the UN organizations felt that for political and semantic reasons, the UN as such should be seen as a homogeneous group, visibly taking the lead, after the first important initiative had been taken by OECD and IDRC.

The Ad Hoc Working Group also set the easy-going, practical and pleasant working style, since followed by the Steering Committee. Some of the meetings were held in Geneva. The long working luncheons over fresh filet de perche, accompanied by some good "Johannisberger" or "Neufchatelois", the crisp Swiss white wines, forged a sense of international co-operation and personal friendship. Later on this helped do away with many a bureaucratic hurdle. The family ambience from those days eventually was carried over to the larger meetings of the bilaterals and their co-ordinating efforts.

In the many interagency and international meetings, leading up to the Water Decade, specialists and high government officials from the developing countries took an active part. Some names will recur in the following chapter on the country activities. Here, a few should be mentioned, such as the late Secretary of the Tanzanian Ministry for Water ("Maji"), Mr. Lwegarulila, N.D. Peiris, the President of the Sri Lanka National Water and Drainage Board, and Luis Jaúregui of Argentina, who was the President of the UN Water Conference in Mar del Plata in 1977.

The promotion of the Water Decade and the supporting mechanisms concentrated on the developing countries, where UNICEF specialists became active members of the Technical Support Teams. These were to work as external counterparts to the National Decade Committees, which in their turn are inter-sectoral bodies, representing a wide spectrum of government ministries and agencies. During the first years of the 1980s, there was mounting concern for the effectiveness of the bilateral and international inputs. The feedback from the country programmes to the headquarters of the international and bilateral agencies contributed to every organization taking a hard look at what was really happening and where the real problems and possibilities were to be found.

In October 1984 this led to a meeting in the Federal Republic of Germany between most of the bilateral organizations from the OECD (DAC) countries at the technical level. It was arranged jointly by WHO and BMZ, the Federal German Ministry for Economic Co-operation. The venue was on the northern slope of the Siebengebirge Hills, remnants of young volcanoes that had erupted through a fault-line of the Rhine Valley Rift only some 15 million years ago. The municipality was Königswinter and this particular meeting inevitably was referred to as the "Oktoberfest".

The conclusions and recommendations from Königswinter were officially ratified five months later, in March 1985, at a meeting of the DAC countries in Paris. They constituted an agreement to orient the policies of the bilateral organizations more towards the poorest sectors of the populations with an integration of low-cost technical social and health components. This corresponded precisely to what WHO, the World Bank, UNDP, UNICEF and the United Nations had already been promoting for decades. The other part of the agreement was the decision to co-ordinate the inputs between all the organizations to a much larger degree, already at the planning stage. One immediate consequence was the rapid succession of regional consultations, held in 1985 and 1986 at the Regional Development Banks in different parts of the world, with UNICEF invited by the organizers, WHO and BMZ/GTZ.

During the Water Decade, the bilateral organizations have become much more active in their participation with UNICEF in project work. Funds that bilaterals would have spent truly bilaterally themselves in major water and sanitation projects, are now to a larger extent channelled in a multi-bi-fashion through UNICEF. The rationale is that since UNICEF already has an organization in the project countries, with its field offices and technical specialists on the spot, the bilaterals find it more cost-effective to let UNICEF manage their inputs then to establish a new field organization of their own. DANIDA applied this principle to the tubewell programmes in Bangladesh. SIDA of Sweden did likewise in India. USAID recently joined forces with UNICEF in Benin, where USAID takes care of a major health education component linked with the water and sanitation programme of the government. Under UNICEF supervision, a water well drilling and handpump installation project is going on in the southern-central parts of the country. This means that USAID will now help keep the handpump installation going, while the health education component, already started up by UNICEF health educator Bill Lawrence, will be strengthened by USAID.

Non-governmental organisations (NGOs)

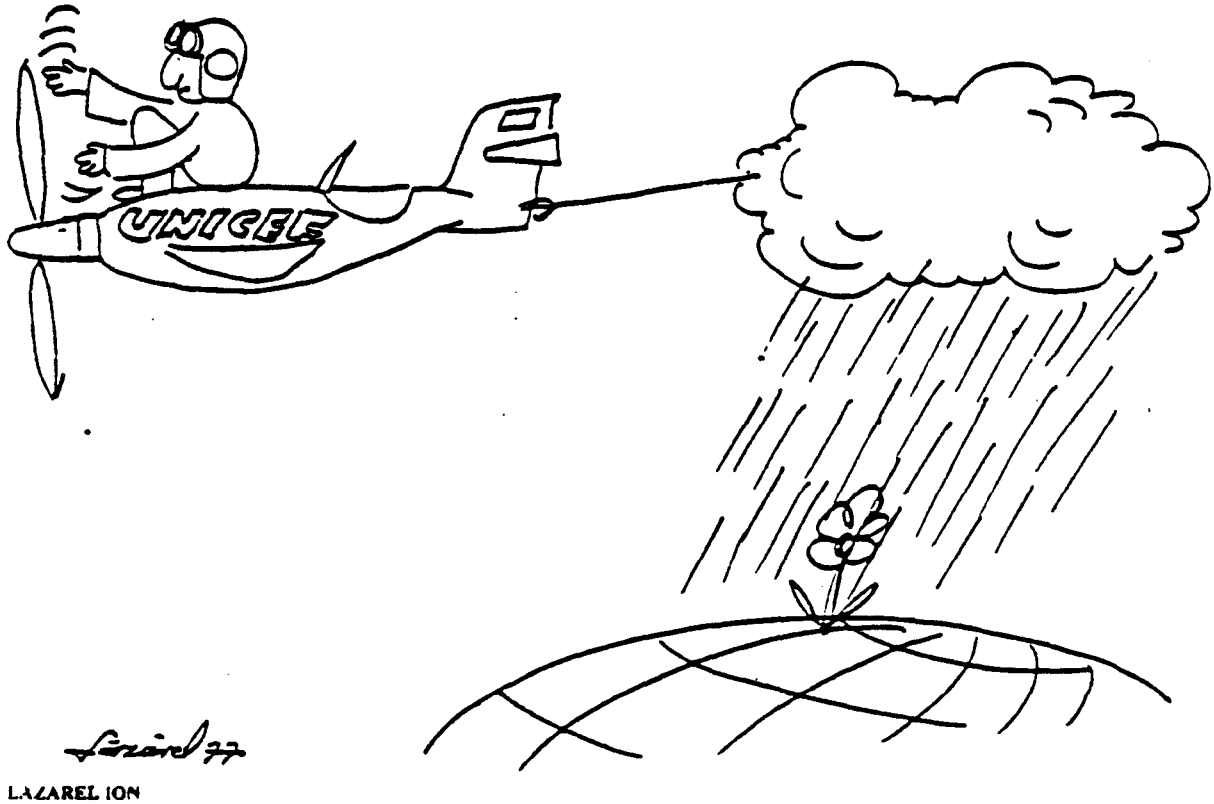
Rights be, in this chapter the NGOs should have been mentioned first. When the Water Decade began in 1981, the total investment in rural and peri-urban water and sanitation projects in the developing countries by the NGOs was estimated to amount to a total of US$150 million per year. The great strength of their action was in their input areas. Their own limited resources forced them to concentrate on low-cost methods and technologies, while most of the large international and bilateral organizations still were on the high-technology, high-investment and urban-oriented tack.

When UNICEF, at the end of the 1960s, expanded in the field of water supply, our organization could draw heavily on NGO experiences and practices. Many NGOs enhanced the effects of water supply and sanitation inputs through making them parts of rural development schemes with emphasis on help towards food production. This was the case, e.g. in India with organizations such as War-on-Want, who in northern Maharashtra had developed the "Jalna" handpump, the first forerunner to the India Mark-II handpump. An intermediate design was developed by another NGO, the Swedish Sholapur Mission in southern Maharashtra. The Water Development Society, a wholly nationally-managed group, is based in Hyderabad, Andhra Pradesh, and headed by Mr. J.S.D. David. Recently this brought its use of qualified technology even further by establishing a full-grown manufacture of down-the-hole hammer drill rigs, now even marketing these for export from India.

Close co-operation with NGOs in many ways helped bring UNICEF in immediate contact with the local beneficiaries. In Guatemala after the earthquake of 1976, it was local NGOs who did all the work with UNICEF-supplied materials. In Karachi, Pakistan, the thousands of pit

latrines dug in the slum areas, the "kacha abadias", would have remained undug and unused, had it not been for the implementers being local NGOs. With the construction work going on, they would talk to their own countrymen - and women - in their own language and in their own way. Thus they would get the ideas across much more efficiently than it had been done exclusively through official public agencies.

The support with funds and encouragement through UNICEF by large international NGOs such as the Zonta and Rotary Clubs, always was well received. In some cases, this type of input recently has gone one step further in the direct operational co-operation by the local branches of these international NGOs, backed up by their own brother or sister organizations in the wealthier parts of the world. The most recent example is the (1986) ongoing one with the Soroptimists in Senegal. The process is not an easy one, but the recent clearing of one hurdle after another is highly encouraging. The hope is for this experience to be spread to many other parts of the world. Few other forms of international co-operation give the individual participants and contributors in the developed countries such a feeling of direct involvement. The active sharing of the worries over all the constraints that professional development workers may be used to, rarely otherwise touch benevolent but remote and technically-organisationally uninvolved donors. With this direct engagement, the donors are actually part of the work, a challenging but stimulating and highly useful exercise.



LAZAREL ION

Dibujante y caricaturista rumano. Colabora en «URZICA» («Ortiga»), revista rumana de humor. Colabora, también, en «Cutezatorii» (editada en rumano) y en «Jobarat» (editada en húngaro, para la minoría de este idioma), que son dos publicaciones rumanas de la Organización nacional de Pioneros (organización para los niños que existe en todos los países comunistas). Al pedirle si era tan amable de dedicar una caricatura para la revista de UNICEF-ESPAÑA, dibujó la que publicamos.

There is much technical and programmatic contact and co-operation between many of the NGOs and UNICEF (and other UN bodies). Especially in emergency operations, OXFAM has made a name for itself, both through its actions and through its innovative technical developments of prefabricated water supply and sanitation (excreta disposal) systems, especially suitable for refugee and other emergency situations. Among the many names of dedicated technical specialists in the NGOs, Jim Howard of OXFAM should be mentioned, along with Wigglesworth and others of War-on-Want in the 1960s or Oskar Karlsson of the Sholapur Mission and their work to develop a viable handpump design.

Other great NGOs with both feet on the ground and many pumps in the ground, with considerable co-ordination and contacts with UNICEF, for many years now have been e.g. Catholic Relief Services, Luthern World Federation, World Vision, CARE and others. NGOs with an official bilateral backing also were most important in order to help bring UNICEF's material and programme inputs to good local use. The US Peace Corps volunteers in Liberia were the ones who materially helped join the UNICEF assistance with that of UNDTCD. Swiss SATA/Helvetas and Japanese Peace Corps volunteers largely were drawn upon to provide technical backstopping to the gravity feed schemes in Nepal.

4. DEVELOPMENT THROUGH THE DECADES - LEARNING FROM THE EXPERIENCES

Introduction: 1946 through 1986 - the three main phases

The involvement of UNICEF in water and sanitation throughout more than three decades went through three phases. These, again, can be seen against three more or less distinct successive periods in time. There is a logical sequence of the types of action during the different phases, which at the same time constituted a process of trial and error. Also they reflect the major shifts and trends of UNICEF basic policies and activities:

Phase	Period	Characteristics	Annual UNICEF Funding US $ millions
I	1946 - 1967	Demonstration projects	Less than $ 2 million
II	1968 - 1980	Development of technologies, targets and policies	$ 2 - 50 million
III	1981 through 1986	Clarification of objectives and links with PHC and CSDR	Over $ 50 million

Phase I (1946 - 1967) began with small scattered efforts in the rural areas of a few countries, when it was realized that child health was dependent on safe water supply and adequate sanitation. There was a close collaboration with WHO at the country level, on which organization UNICEF depended heavily for the technical backstopping. The volume of work and the number of beneficiaries was small. The total outcome of this work probably led more towards gaining technical experience for the UNICEF field offices than to provide any definite lead in the development of national policies or to facilitate programmes for water supply and sanitation on a national scale. Nevertheless, it was during this period that the first two WHO/UNICEF JCHP studies on water and sanitation were prepared. They laid the ground for the same joint policies which today govern UNICEF's action on a much larger scale.

Phase II (1968 - 1980) saw a rapid development of new technologies, targets and policies world-wide, among governments, international bodies and other organizations. The first major national scale programmes came into being. The social approaches began to be recognized, developed and introduced. Slowly, the international and bilateral organizations began to rally. This was the period of the great international conferences that provided the framework of the far more concerted actions of today. UNICEF established quite a pioneering role in helping to make low-cost, community-based options for water and sanitation operational and acceptable to users and governments alike.

Phase III (1981 through 1986) constituted the first and crucial half of the International Drinking Water Supply and Sanitation Decade with an overall systematic closing of ranks and increasingly fruitful co-ordination between all parties concerned. Within UNICEF, the new drive towards infant and child health through the single measures in the framework of CSDR did accelerate the better integration of sanitation and water supply with other health measures. New scientific insights into the nature of diarrhoeal and other water-, dirt-, feces- and hygiene-related diseases did contribute to improving technical and programme designs.

1946 - 1967: The demonstration projects
(by Maggie Black)

"In the heyday of the disease control campaigns in the 1950s and early 1960s, when Unicef was still functioning very much as the junior partner of WHO in the health field, it had become evident that two very important groups of diseases whose major victims were infants and children were not being tackled by the onslaughts on tuberculosis, yaws, malaria, and leprosy. These were gastro-enteric infections, or diarrhoeas; and parasitical infections, or intestinal worms. A bout of diarrhoea in a small child - as long as it was not cholera or typhoid - did not appear to pose the same threat to life and health as malaria or tuberculosis. Appearances deceived: statistics from underdeveloped countries which had such statistics showed that gastro-enteric infections, which were especially lethal in association with poor nutrition, were so numerous that they often accounted for more than half the deaths of children under one year. Taken together, the disease rate from all causes associated with bad water and poor sanitation was much higher. Apart from gastro-enteric infections, trachoma and skin diseases such as scabies and yaws were easily spread by lack of personal hygiene in places where water for washing was in short supply. Other diseases were caused by parasites which lived in water, and were either imbibed - such as the guinea worm; or entered the skin through cuts or abrasions such bilharzia or schistosomiasis, carried by water snails. Another group of water-related diseases were spread by flying vectors whose habitat was a swamp or a river: malaria, carried by mosquitos, and river-blindness, carried by flies.

"The great gains over the previous century in public health in the industrialized countries had proved that only the massive provision of uncontaminated drinking water and proper disposal of human excreta, accompanied by public understanding of the virtues of cleanliness, could decimate the disease and death rate from water-related causes. Campaigns against specific diseases formed a highly visible and important part of public health; but taken over the longer term, essentially a smaller part than water and sanitation. The subject first came before the WHO/Unicef Joint Committee on Health Policy in 1952, and the following year the Committee made recommendations about how far Unicef should enter the field of water supply and environmental hygiene.

"The enormity of the task to be done in cleaning up the rural Third World was even more daunting than that of tuberculin testing all its children or eradicating malaria. Given the limitations of Unicef's resources, it was not thought possible for the organization to do more than dabble its toe in the pool. In the early 1950s, certain actions were taken within carefully defined parameters: water supplies and sanitation in health care facilities and schools, where the absence of clean water and latrines radically curtailed their contribution to child health and welfare. Some of the earliest programmes were in Macedonia, Greece, and in Central America; one of the first projects to receive pumps, pipes, and some stipends for the training of sanitarians was in Panama in 1954. Within five years, UNICEF assistance - in the usual forms of supplies and training stipends - and WHO technical approval had been given to thirty-three projects, eighteen of which were in Latin America and the rest in Africa, the Middle East, Europe, South-East Asia, and the Pacific.

"In 1959, the World Health Assembly adopted a policy of greater emphasis on community water and sanitation facilities as a key to health, and WHO began to put pressure on Unicef to do more. The 1960 Executive Board addressed the question, and immersed the Unicef foot a little more deeply. Not only health centres, but water supply schemes serving a community could in future receive support. The context must continue to be a health programme, but a building at which medical care was dispensed as the site of the supply was no longer an absolute criterion. Nevertheless, Unicef was still tentative about expanding its aid to water and sanitation. Their importance was self-evident, but it was hard to see how to make substantial progress without involving Unicef in huge expense; perceptions about water and sanitation schemes were still highly coloured by the notion of large public works. Into such schemes, Unicef resources could easily vanish like the drop in the proverbial bucket. This, all were agreed, was to be avoided. Therefore, any project to be assisted must belong to the familiar conceptual category of "demonstration" and "catalysis": the input would help establish a model for a much larger programme funded from the national budget or better-endowed bilateral or multilateral sources.

"In some countries, the strategy worked. In Peru, a WHO/Unicef supported demonstration project in one small area led directly to government adoption of a national scheme to bring piped water by gravity into every village, financed by the government with the help of external loans. A similar outcome blessed a similar project in Taiwan. In Kenya, a modest programme with documented health and economic benefits among village children was taken up with great local enthusiasm, and looked set to move in the same direction. But not everywhere were results so impressive. A thorough survey undertaken at the request of the 1965 Executive Board included on-site evaluations in eight of the eighty countries with whose water authorities Unicef was by this time co-operating. In West Pakistan, an over-ambitious programme to provide water to a thousand rural communities had overstretched the resources of an inexperienced public health engineering department, and much of the equipment brought in by Unicef was lying around unused. This was particularly embarrassing because this was the largest water programme Unicef had ever supported; it had been launched with great fanfare following the 1964 Bangkok Conference on the Needs of Children in Asia, and by 1969, it had consumed 30 per cent of the $16.7 million Unicef had spent on water and sanitation over the ten year period.

"Some adjustments were needed in the criteria for assistance in the public-health field. In certain countries, it was unrealistic to expect that a demonstration project on a small scale could blossom into a national village water grid. Some governments simply did not have the necessary resources, nor did they attach a high priority to rural water works and excreta disposal. Even if they were committed, there were simply not enough trained sanitary engineers and inspectors, and cadres took time to train. Too many assumptions had been made about dovetailing sanitation and medical services. While both were critical to improved health, they required very different kinds of personnel who were often employed by different authorities. The paths of doctors and nurses running hospitals and health centres might never cross those of the engineers and surveyors constructing and supervising water systems and latrines. At a lower level in the public health hierarchy, who did the sanitarian report to? Was he a technician or a health person, or was he both? Co-ordinating water with health at a conceptual level was easy; at a practical level there were all sorts of problems. And without such co-ordination, the health education which was vitally needed to persuade villagers to use a new water supply hygienically and dispose carefully of waste had a tendency to fall into the gap between the doctors' efforts to cure the sick and the engineers' efforts to build the means of sickness prevention. This dichotomy between water as engineering achievement and water as bringer of health haunted water supply and sanitation schemes then, and has continued to do so down the years.

"Meanwhile, the customers for pipes and pumps, the villagers of the developing countries, were usually keen - sometimes desperate - for water. Water is life, more immediately essential to human survival even than food. The water schemes of the 1960s gave great currency to the terms "self-help" and "community participation", originally coined by the community development enthusiasts and becoming key tenets of development thinking. To cut down costs, free unskilled labour for digging wells or trenches for water pipelines and carting stones for catchment dams were designated as the villagers' contribution to "their" schemes. Usually, enthusiasm for water was such that they willingly co-operated. In a parched land where the only stream is miles away across a burning plain or down the sides of a steep mountain gorge, and where every precious drop must be carried on a woman's head or, at best, a donkey's back, the benefits of a well or a standpipe in the village were keenly appreciated.

"Such receptiveness on the part of most beneficiaries - a receptiveness the more welcomed because the meeting of minds between would-be helpers and would-be helped in the circumstances of many development projects was relatively rare - engendered high morale among government officials and those helping to drill, pump, and gravity-feed. Unfortunately, the well-deserved sense of achievement sometimes obscured the fact that the villagers' appreciation usually had little or nothing to do with whether the children had diarrhoea or intestinal parasites. To the customers of the new supply, water was a convenience, not a health aid. In some places, people only used the new well in the dry season; when the open water course nearby their houses was still freely flowing, they continued to draw their water from there just as they had always done, however many cattle wallowed in it or other sources of pollution floated down from upstream. Some people objected to the tastelessness of

clean water or found its strange temperature upsetting - even, in their opinion, unhealthy; they might only use the new source for bathing and other non-drinking purposes unless the hazards of the old source were satisfactorily explained to them. And if the villagers in many water-short communities had a tenuous sense of the connection between dirty water and health, still less convinced were they of the value of confining ordure to a special place within the family compound. Excreta is not a popular subject in any culture. The harbingers of public health began to discover that there were few places in the world where people could be easily persuaded to attach social caché to a latrine. They had a point: its aerobic ambiance tends to compare unfavourably with that of the open field, the sea shore, or the ditch.

"The mixed results of the assistance offered by WHO/Unicef to water and sanitation schemes came under scrutiny in 1969. The persistently unhygienic behaviour of the Third World's farming people was noted in a call for more training for sanitarians and more emphasis on health education. There was still some hesitation about how far Unicef's resources should be invested in this branch of public health, but by now the die was cast. The Indian hard-rock drilling programme was under discussion, and other circumstances were gradually propelling Unicef towards deeper immersion. Many countries and bilateral and multilateral donors were waking up to the heavy economic toll poor water supplies were exacting from the agricultural labour force in terms of sickness and low farming output. Health authorities were also lamenting the severe drain on their thinly-stretched budgets represented by the need to cure preventable water-related disease. It was also becoming clear that some alternatives to the large-scale public works approach to mass problems of water and sanitation shortage were in urgent need of development, in order to fill the technological gap between faucets and water closets laid on to every household, and nothing but the stream and the bush. Some pioneer work in small-scale rural drinking water and irrigation works had been undertaken by various voluntary organizations. But they did not have the resources for anything other than the micro-scale enterprise: a few wells here, a series of small catchment dams there. Missionaries with a mechanical bent were turning old automobile engines into prototype irrigation pumps for school vegetable gardens. But such efforts were truly localized. A lacuna in international co-operation with an important bearing on maternal and child health had become visible, and Unicef - with its practical bent - was ready to do something about it.

"The changing climate of opinion was connected in part to the awareness awakening world-wide about the fragile relationship between mankind and his environment. The word "environment", like "development" before it, was beginning to take on an expanded conceptual significance. Not only population pressure, but urban growth, industrial pollution, the depletion of fossil fuels, the disruption of eco-systems by the use of pesticides and artificial fertilizers: all were beginning to cause a world-wide panic. Some of the pioneers who brought the world's attention to its planetary constraints, notably the British economist Barbara Ward, regarded "environment" and "development" as two sides of the same coin. Rain water, sea water, river water; water for energy and for agriculture as well as for health and domestic comfort; water in all its life-giving power was an obviously overlapping concern. Since time immemorial, mankind had disposed of his wastes into the streams from which he also

drew his drinking water. The cycle of biological reaction between fish, plants, oxygen, and bacteria, meant that moving bodies of water had remarkable natural self-cleansing powers. But, as was so clearly demonstrated in Bangladesh, population growth had begun to overstretch those powers. Drinking water supplies which might once have been "safe", at least for a population which used them regularly and had developed some immunity to their particular hazards, were now becoming heavily polluted. This phenomenon began to concern not only the health specialists, but a new breed - the environmentalists - anxious to prove their credentials for improving life on earth. The human reservoir of knowledge about natural resources, their value, their preservation, and their utilization, began to increase sharply.

"The drought- and flood-related crises of the early 1970s certainly helped to trigger the upsurge in demand for Unicef's involvement in water supplies and sanitation; but these other forces were also at work. In Afghanistan, Malawi, Bolivia, Burma, Tanzania, Sudan, Guatemala, Mexico, Nepal, Sri Lanka, Mongolia; in mountainous areas and in plains; in scrubland and in semi-desert; in sprawling slums and shanty-towns; clean water was a problem independently of whether drought or epidemic might suddenly dramatize its deficiencies in quality or quantity. By 1973, references to the need for clean water and better sanitation were surfacing more forcefully within Unicef. They stemmed in part from the striking affirmation of water's key role in rural development emerging from the Lomé Conference, held in Togo under Unicef auspices in May 1972 with the aim of strengthening the capacities of West African governments to "plan for the needs of children".

"The statements of national priority presented at Lomé by the planning ministers of eight francophone countries - who had tried hard to remove themselves from international orthodoxies - placed water supplies at the top of their lists. Interestingly, the village tap they all thought was critical to the needs of children rated attention less because of its relationship to health than because it was a determining factor in the whole environment affecting women's and children's conditions of life, economic situation, and nutritional status. Millions of women throughout Africa spent hours of back-breaking labour every day hauling water in pots, jars, and enamel basins from distant streams and open wells. Water's scarcity and the labour involved in fetching it meant that far too little was used for washing children and keeping domestic utensils and environment clean. Bound to a daily cycle of incessant drudgery, women had too little time and energy to spend on such matters. Nor on other domestic tasks, including cultivation of the family's food which, more often than not, was their exclusive responsibility. Without water in the village, the Lomé Conference suggested, not only was the drinking supply stagnant, but the entire rural economy.

"This, within Unicef, was a new perspective to add to the health imperative for water supplies. It made another dent in the earlier resistance to large-scale support. In 1974, soon after Martin Beyer had set up his advisory service in Unicef headquarters and begun to travel ever further afield, Unicef expenditures on water supply and sanitation reached nearly $12 million for the year. Water was becoming more popular, both with aid donors willing to give special contributions, and

with recipients. As the requests piled up, a new breed of technicians were joining Unicef's staff: hydrogeologists and master drillers. The survey requirements for hard-rock drilling and the operation of the new high-speed rigs required special technical and operational skills. As yet, such skills were mostly available only in countries with advanced technology. A new chapter in Unicef programming had opened, and its heroes were the rugged personalities prepared to work in remote and sometimes dangerous conditions in waterless corners of the globe."

1968 - 1980: Going to scale - the new technologies and setting the targets

This was the period, during which UNICEF took off to become one of the major, if not the major external agency in promoting the new technologies and strategies to help the poorest areas in the world to obtain safe water and sanitation.

A number of major trends could be noted:

* Most of the large government programmes with UNICEF inputs began with relief operations for emergency situations. These rapidly were turned into rehabilitation of the affected areas. Finally, the installations were carried out in a way to serve longer term goals. The ground was laid for achieving nation-wide coverage, eventually codified under the targets of the Water Decade.

* During the latter part of the period, environmental sanitation, notably excreta disposal, began to win greater acceptance among people and politicians in some major countries. Single limited country experiences in health education as linked with water and sanitation began to spread to other countries.

* The feasibility and acceptability of low-cost technologies was established for both water and sanitation. A technical revolution in water well drilling methods was accompanied by new concepts for handpumps and new materials and standards. Likewise, waste and notably excreta disposal were influenced by new ideas and new understandings of disease transmittal. All this made possible a more rapid spread of water and sanitation among the millions, nay, billions of people, who urgently needed such services.

* From haphazard and improvised starts, the obtaining of technical, social, planning and programming experiences from an increasing number of national programmes. These experiences then were incorporated with the joint UNICEF/WHO policies with their gradually more systematic application to other programmes.

* The international world with national governments, international, bilateral, voluntary and other organizations began to become organized and co-ordinated.

Originating in ad hoc joint groups, and following up on a series of conferences, official international mechanisms for policy promotion and programme support were created towards the end of the period. A suitable division point in time is the end of the year 1980. This was marked by a one-day session of the United Nations General Assembly on 10 November 1980, which was dedicated entirely to the inauguration of the International Drinking Water Supply and Sanitation Decade 1981 - 1990. The same year also was the first year of the new regime of UNICEF under Mr. James P. Grant as Executive Director, which signified a considerable change in priorities and strategies for all of UNICEF activities. In many ways this did affect the activities for water and sanitation.

UNICEF involvement through emergencies

The year 1968 in its turn saw the beginning of a more purposefully planned large-scale involvement of UNICEF in water supply. This was the year when the Government of India came with its first request for large-scale assistance from UNICEF's side to the then newly conceived India village water programme. It was prompted by the drought in the East-Central India States of Bihar and Orissa in 1966 - 67. This drought catastrophe which carried with it a widespread famine, threatened the lives of millions of people. As in other droughts, the effects were caused by an unholy combination of the absence of rainfall for consecutive years, a deterioration of the soils and the vegetation through overworking by a steadily increasing population, and the absence of technical means and know-how, in trying to tap the underground water resources.

The Bihar and Orissa drought was only the first one of a series of emergencies that during an eight or ten-year period through 1976 would draw UNICEF willy-nilly, to a much greater extent than had been foreseen originally, into assisting water supply and later sanitation programmes. As was noted earlier, UNICEF's engagement came about, both out of concern for the plight of children and from the fact that UNICEF was the only major international organization that would be equipped in many respects to respond sufficiently quickly to the problems and willing to do so.

The drought in India in 1971 was followed by the horrors of the liberation war in Bangladesh, with widespread destruction of whatever scanty infrastructure had existed in the earlier East Pakistan. The situation was further aggravated by the enormous floods that a short time after independence killed another half million people and further destroyed housing and water supply in the coastal areas.

In 1972, flooding by the River Indus in the province of Sind, in lower Pakistan, destroyed water wells in wide reaches outside of the normal river bed. That gave rise to the second larger scale handpump programme in that country from which further developments then took over. In the Sahel belt across West Africa and continuing into Ethiopia and the upper parts of East Africa, that drought emergency in 1972 - 73 prompted a great expansion of UNICEF's inputs there. Finally, the aftermath of civil strife and war action in countries such as Sudan, Mozambique and Angola again called on UNICEF's capacities and growing experiences for relief and rehabilitation.

The emphasis, to begin with, was throughout on water supply. In the emergency situations, the first concern was survival. A more regular planning for medium- to long-term implementation and permanent use of the facilities with their upkeep would have to come in later. Nevertheless, with the experiences gathered throughout the years, attempts were increasingly made to channel the relief action from the beginning to become a nucleus for rehabilitation and lasting measures. The only exception to this would theoretically be interventions in refugee situations, where refugee camps would be regarded as hopefully only temporary installations. Unfortunately, in many countries most refugee populations were forced to stay on in increasingly permanent, confined living situations, requiring correspondingly permanent installations.

It was only towards the end of this period of going to national scale in many countries that sanitation and health education in some important project countries began to be recognized as a definite need. Consequently, action in this field was more limited than for water. The constraints are well-known. Sanitation is not as palatable as water to local populations nor to politicians and planners. There was a definite improvement, especially in the Asian countries during the 1970s, but the discrepancy in coverage still remains, to this day, although the understanding, the promotion and action in the field is steadily on the increase.

India: A case in point - the first major challenge

The development in India is probably one of the best cases in point, and it merits a somewhat more detailed description. For one thing, UNICEF's inputs in India were chronologically the first ones with a government that, from the outset, was aiming at providing its poorest populations with reasonable access to safe water supply on a nationwide scale within a given time frame. It was also in India that the first coherently planned for water well drilling cum handpump installation programmes took shape. The India village water programme since then has served as a model, both technically and from a programming and strategic point of view, for similar developments in other countries with similar conditions.

This model also implied the quite logical succession of programme development phases as dictated by technological and social factors:

1) Water well drilling, as foreseen in the national fourth Five-Year Plan.

2) Development of handpumps (in the fifth Five-Year Plan).

3) Sanitation and community motivation/health education.

Among the many problems besetting rural water supply in India were, and still are, the hydrology and hydrogeology of that country. Surface water, which a priori would be contaminated, that would be available all years round, in this country is limited to relatively few and far-between rivers. The same rivers are used both for water supply and as deposits for all sorts of waste. There are, over large parts of the country, small and large dams ("tanks"), which serve for irrigation, cattle-watering and household purposes. These are normally filled during the monsoon period, but most of them would be empty after a few months of use with easily another six months to go to the next rains.

For more permanent use, the largest part of the India rural population would dig open wells. Many of those are so-called step wells, some of them very large and could be likened to inverted pyramids. Many of them are very old, some probably pre-historic. They were excavated when the population of this sub-continent was far less numerous. The tribal people were still excavating wells in the 1960s by building fires on the rock surface at night and dousing it with water at dawn, thus "cracking" their way slowly down to the water table.

There was then much more vegetation and soil cover to protect the water that had infiltrated from the rains and surface waters into the ground, from evaporating. The groundwater was not being tapped at the rate it is today. The land had not been de-forested to the extent it is now and there was no over-pumping with modern power pumps by larger farmers and small industries. Thus, the water table lay much higher and could reasonably be relied upon for an all-year-round supply.

With the tremendous population increase, especially during the last 40 to 50 years, the forests largely were felled to yield room for increased acreage and for construction and fuel wood. Modern industries, large and small, were introduced, many of them also in the countryside. Farmers who could afford it had deep wells drilled and power pumps installed in order to increase their crops. All of this contributed to drawing down the water table catastrophically for the open wells and the communities using them.

During the early 1960s, attempts were made to develop methods with light-weight drill rigs ("bench drills") that would be applied horizontally to the rocks at the bottom of the open wells, in order to open new channels for whatever groundwater would be available around them ("revitalization"). This was a temporary success but still did not really alleviate the overall situation. Another negative factor was the evident pollution of the water in the open wells by hundreds of villagers every day, climbing down into the well water in order to fill their jugs and jars, thereby increasing the contamination.

Yet another factor was that these open wells, with the lowering of the water table, could not be dug down deeper with the few hand-tools that would be available to the villagers. There is a direct relationship between the level of the water table and the boundary between the hard rock formations, which underlie the largest part of India, and their very irregular cover of softer, weathered and alluvial soils. When the

drought in Bihar and Orissa hit these unfortunate states, it was just exacerbating a situation which already caused problems all over the country. People would have to try to get to deeper occurrences of ground water. Short of blasting shafts into the underlying hard rock, which is an exceedingly expensive and difficult process, the only possibility was to drill water wells.

Up to about 1960, the only means available to do so was with very slow drilling methods. One was the so-called "calyx" method, slowly rotating steel pipes into the ground with steel shot added for wearing down the rock. It could take a year or more in one hole to reach the required depths. The other method was cable-tool drilling. With the old-fashioned equipment, with all too soft steel in the machinery and the drilling tools, such "tubewells" in India could take three to four months to drill to the average depth of 50 metres (150 feet).

Just in the nick of time, the worst effects of the drought in Eastern India could begin to be stemmed through new drilling methods, the result of a technical revolution. What happened was that at the beginning of the 1960s, for the first time a few drill rigs driven by compressed air that would act on the rock through percussion hammers, were applied to drill water wells. Such machines had been used since the end of the last century for drilling blast holes for mining and engineering construction. It was, however, only now that new advances in metallurgy, especially for the drill bits and drill steels, and in the field of pneumatic and hydraulic technology, allowed for the length or depth of boreholes to make them effective for water well drilling. Such machinery and methods had just been developed, used and proven feasible in some industrial countries with similar geological conditions, such as Sweden, the United States, and Canada.

In India, several non-governmental organizations, which dealt with agricultural development: War-on-Want, AFPRO (Action for Food Programme), the Betul Movement and others on a modest scale had imported a few of these rigs from different manufacturers. One of the first - if not the first - uses of down-the-hole hammer equipment was introduced by the Reverend John McLeod, a Church of Scotland missionary in the early 1960s, who was later succeeded by Chris Wigglesworth. They successfully drilled water wells with a speed that eventually would allow 50-metre wells to be drilled within a shift of eight hours in hard rock, such as gneiss or granite. At the same time, some of these non-governmental organizations had pioneered new types of handpumps that would stand up better to the wear and tear of the hundreds of villagers using them at each water point.

During the drought in Bihar and Orissa, the non-governmental organizations rushed their drill rigs to those unfortunate States and began water well drilling in order to provide drinking water to the famished populations. Even though this represented only the literal drop in the bucket, these drilled wells were an instant success. Among those who brought in drill rigs, were persons such Malcolm Kennedy, the New Zealander who in those days worked for AFPRO. In Bombay, a young Indian

mechanical engineer had just set up his own contracting firm with two very small drill rigs, intended to drill relatively shallow wells in the backyards of Bombay households. Hardly had he established his business, when he was engaged by UNICEF to bring his small rigs to Bihar - along with their compressors and to begin punching holes in the ground and install handpumps in some of the worst affected areas. This was Kumar Jagtiani, who thus became one of the two pioneers, with Malcolm Kennedy, of UNICEF for low-cost water supply for villages in hard rock areas.

This instant success led UNICEF in 1967 first to airlift eleven small air hammer drill rigs from the United Kingdom to the drought areas. A short time later this was followed by the plans by the Government of India for a nation-wide village water supply programme. It aimed, in the first instance, to fill the water supply needs of the approximately 125,000 "minimum needs villages", which formed the absolutely poorest and most under-served or totally unserved communities in India, as against a total of 650,000 villages in the entire country. For helping to get this programme off the ground or - rather - the borewells into the ground, UNICEF in New Delhi took the initative to provide 70 or 80 air hammer drill rigs to the Government of India.

UNICEF had no expertise of its own in that field, and first approached WHO for a "second opinion" in the form of an assessment of the situation and proposals for how to continue with the entire programme and the assistance to it. WHO was requested to set up a fact-finding mission of specialists to go to India for an overview of the situation and consecutive proposals. Given the circumstances with completely new technologies involved, it took WHO a very long time to find and mobilize these specialists. With the imminent need and very urgent request from India, which foresaw a contribution of some US$ 5 or 6 million to be spent within a period of three years from 1970 onwards, UNICEF could not wait all that long. By a series of sheer coincidences, a Swedish firm, Terratest AB, consultants and contractors for minerals and groundwater prospecting was assigned to carry out that assessment. The ensuing report from that mission was to serve as background information to the Executive Board in 1970 for its final decision on the whole project. It was all the more remarkable, as with a then total budget of around $70 million per year, this would be UNICEF's largest programme input anywhere up to that point in time.

The Terratest team consisted of Martin Beyer and a senior drilling engineer from the same company, Alge Messing. There was very little time available. The whole work was to be concluded within nine weeks, including field visits and meetings with UNICEF staff, government officials, NGOs, and everyone else through ten of the 24 States and territories of India. It included a major report with proposals for the operation, to be delivered to UNICEF before the very end of that period. All this hurry was in order to get the material across to the members of the Executive Board on time before they were to meet in New York.

The objectives were quite clear, although the targets in those days seemed formidable. No one had ever been confronted with a situation that already for the first two or three years of the programme foresaw the drilling of over 8,000 wells in the State of Andhra Pradesh alone, not to

speak of some vague plans for 25,000 more wells in Orissa. Nobody then could foresee that something like 100,000 wells for handpump installation would be drilled annually in India. The risk that UNICEF took by supporting this first really major part of the programme, was considerable.

The Government of India had foreseen to handle the rest of the programme all on its own, with the exception of a handful of expatriate master drillers to be brought in by UNICEF for some years in order to train national water well drillers. One of the crucial points in the whole exercise was that of the handpumps. No one in the world had had much experience in the use of handpumps by larger village populations at this unprecedented scale. There were a few water well drillers and handpump manufacturers in the world that had come up with relatively good solutions at a much earlier stage. Among them was the Craelius East African Drilling Company (an affiliate of Terratest AB) with the so-called "Uganda" handpump. It was made of standard hardware and had a giant mahogany handle and could be repaired and maintained locally. Other sturdy pumps were manufactured, e.g. in Belgium, but had a very high cost. Most of the handpumps available in India and manufactured there in those days, were cast iron pumps of the traditional type as developed in Europe and North America for single-farm households. They were fine for families of a few persons and a total use of a few minutes per day but would break down when handled daily by hundred of users. No provision to speak of had been made for any organized maintenance and repair of such pumps. Everyone just went optimistically into this whole programme.

Martin Beyer had returned to other business for Terratest AB after the exercise in India, then joined UNICEF in April 1972 as Deputy Regional Director in the Americas and got back partly into water only in 1973, with an urgent call to help UNICEF plan for water supply in the Sahel. In December 1973 he was transferred to New York Headquarters, in order to form the nucleus of what later became WET. One of his first visitors in New York was the Executive Director of Rädda Barnen, the Swedish Save the Children Fund, Mr. Hakan Landelius. Landelius told Beyer that he had just been in India and had been terrified by the amount of handpumps that a short time after their installation under this programme had gone out of order. Landelius indicated that a large proportion of the pumps he had seen, and from what he had heard from other parts of India, did not function. In the meantime, UNICEF in India from the outset, headed by its Regional Director, Gordon Carter, had been monitoring the whole situation and were working hard on solving this problem. With the widespread installation of handpumps throughout the country, the very few project specialists that were in UNICEF's employment or were just coming into it, could not cover the whole country with their monitoring effectively and were initially met with considerable resistance to any changes in handpump design, notably from the traditional handpump manufacturers in the country.

All of this prompted UNICEF to strong action, especially in order to remedy the handpump situation. Two convergent approaches were chosen. One was to improve the materials and design of the handpump. The other

was to secure proper operation, maintenance and repairs of the pumps, which was a matter requiring major improvements in the social approaches to the villages and the villagers. Eventually it lead to the development of the India Mark-II Handpump and its adoption as a national standard. This whole development, jointly with the social approaches, have been described in detail, e.g. in a recent study for UNICEF by the TATA Economic Institute.

The persons who mainly contributed to the India Mark-II development were Rupert Talbot, a young British engineer, who is one of UNICEF's most experienced specialists in water well drilling cum handpump programmes, and who is now chief of UNICEF's inputs in the drilling operations all over India, and an Australian rural water supply specialist, Ken McLeod (now a consultant to UNDP/World Bank). They took a handpump that had undergone several developments in different NGOs, the design of which was based on the use of mild steel in standard elements, and which had a number of technical design features which were quite innovative (steel handle, ball bearings for the fulcrum, circle quadrant and chain to link the handle with the pump roads, angled spout etc.). Talbot and McLeod went on to develop the latest version of this pump, which had undergone stages from the so-called "Jalna" Pump of War-on-Want, over the Sholapur Pump of the Swedish Church Mission in Sholapur in Southern Maharashtra, to the present standard Mark-II design. This development work was in its later phases carried on jointly with the Mechanical Research and Development Organization of the Government of India, MERADO, and the engineers and management of the government-owned steel manufacturing company, Richardson and Cruddas, both in Madras.

It was not a coincidence that much of this development took place in the State of Tamil Nadu. Tamil Nadu has one of the best state organizations for water supply, the Tamil Nadu Water and Drainage Board, serving rural and agricultural development in that particular state. It also led to the development of innovative social approaches to the villagers, particularly in order to create a viable maintenance system. This was the responsibility of Mr. Francis, Assistant Director of Agricultural Development of the State of Tamil Nadu. In the surroundings of his hometown Tirunelveli, Francis developed the so-called "three-tier system". It is based on village handpump caretakers in the "tier" at village level. They would be responsible for the regular maintenance and supervision of the pumps. The caretakers are reinforced by roving mechanics who each would have 100 village pumps to inspect and help the caretakers with minor repairs, the second "tier". Finally, the third "tier" consists of a district-based maintenance team with a truck and a tripod for pulling out the rather heavy rising main.

The handpump caretakers are selected by the Block Development Officers, and given a crash course of two or three days in handpump operation and maintenance. In their training, increasingly an element of health education was introduced. During the 1980s, this was strongly focused towards oral rehydration and other Child Survival and Development measures. Also to a progressively greater degree, women would be engaged for this work.

From 1976 onwards, the India Mark-II Handpump went into production on a large scale, which in 1986, amounted to some 150,000 pumps per year. The manufacture is carried out by some 40 officially recognized manufacturers, who have agreed to submit to the very crucial quality control UNICEF has had outside firms (such as Crown Agents and Société Générale de Surveillance) carry out on the lots procured by UNICEF, in order to ensure the proper functioning of these pumps.

Even though the organized maintenance of the handpumps still only reaches a minor part of all the pumps installed, it is remarkable how high a percentage of the pumps are functioning. A recent evaluation shows that the average number of pumps functioning at any given time in four sampled areas throughout India, amounts to about 85% of all the pumps. This is not the ideal figure of 100%, but under the circumstances it might be called acceptable. Most of the maintenance carried out seems one way or the other to be spontaneous. Thus, in 1984 in the State of Andhra Pradesh alone, 86,000 India Mark II Pumps had been installed, but only 6,000 handpump caretakers had been trained in the officially arranged courses. Yet the pumps do function. This is a sign that the local populations give a high priority to the pumps and try to keep them up, as they would do with their trucks or bicycles.

Sanitation in India: The Gandhi Legacy

The need for proper environmental sanitation, notably excreta disposal, was known all the time. Simply, there seemed to be no viable way to really get people in the communities as well as in the government agencies and at political levels, to accept the concept of the needs for proper sanitation . Not that India would be completely strange to the idea of sanitation. There were traditions and there were also some NGOs, notably in Maharashtra, which did dedicate part of their tasks to rural and urban sanitation on a voluntary basis. There was the tradition and strong political promotion from the side of the Mahatma Gandhi. Somewhere in his memoirs he gives a vivid description of how impressed he was as a small child, when one day his father, who was the vizier or Prime Minister of the Maharaja of Porbandar in Gujarat, got fed up with the filth of his own rambling house and forced all the family members to participate in a total scrubbing and cleaning up of the household. Gandhi's own promotional work may not have reached very far towards national coverage with sanitation facilities, but it did constitute an additional valid argument in the more large-scale approaches to such activities.

What the UNICEF WET advisers did was to discuss what could be done with their colleagues in the WHO Regional Office for Southeast Asia in New Delhi. Somebody said, "Oh, we tried to introduce latrines in Uttar Pradesh 25 years ago and it failed utterly. Forget about it." Still, with the WHO colleagues, we felt that we should not give up that easily, particularly since the problem increased every day with the risks for the further spread of diarrhoeal and other communicable diseases through

indiscriminate defecation. The discussion resulted in the secondment from WHO's Regional Office of an energetic sanitary engineer from the Philippines, Alberto (Bert) Besa, who moved the few miles over to the UNICEF Regional Office. Then, for five years, he worked practically day and night on the promotion of the ideas and policies towards nation-wide environmental sanitation. Many of the UNICEF colleagues wondered what Bert Besa did during his incessant travel throughout India, since the rate of latrine construction did not rise immediately, and Besa's work did not seem terribly tangible. In reality, however, Bert Besa, with his good knowledge of the country and with his close links with the professional engineering and public health colleagues all over the country, through insistent campaigning started to encourage trends that were latent and to get the ball rolling.

In 1978 the Ministry of Works and Housing, then responsible for rural water supply in India, jointly with the Ministry of Health, called a major conference on environmental sanitation in Patna, the capital of Bihar. There the chief engineers and their assistants and representatives of health authorities from all the states of India gathered, in order to work out a national plan for sanitation. Previous experiences were demonstrated, such as those of communal latrines in Patna itself and from Ahmedabad in Gujarat. Local NGOs had installed these latrines, which gained rapid popularity through their being equipped with shower facilities. For a few paise anyone could go in there, relieve themselves, and then have a good shower with a small piece of soap provided by a paid attendant who would keep the place clean.

Apart from Besa's campaigning, a major factor prompting not only the meeting in Patna, but specifically the new national plan resulting from the meeting, was the defection of the Harijan "scavengers". These were the casteless people who until the end of the 1970s, made up a large corps of night soil carriers. Each night they used to empty and transport away the night soil from the bucket latrines that constituted the largest part of the sanitation facilities of the Indian towns and cities. With the scavengers-harijans gaining political influence (again one of the Mahatma Gandhi's major achievements), the night soil carriers got better job opportunities and would defect en masse from the defecating. They were hardly to blame, but the situation became both inconvenient and dangerous. The city and town dwellers were left almost literally up to their necks in the muck and something had to be done quickly.

Thus, the Patna meeting set out to discuss both means and modalities to change and improve the sanitation conditions in India. With this, also UNICEF jointly with WHO got a far better atmosphere to work in, in terms of the possibilities to develop support to sanitation. This took quite a few years and is still a process under development. Nevertheless, the awareness of local people started spreading also into the country-side and could later on, in the 1980s, be combined with other ways to combat e.g. diarrhoeal diseases in children through ways and similar measures.

The water and sanitation components in UNICEF's programme inputs in India grew almost from scratch in 1970 to the present roughly $15 million. Yet now they form only a very small part of the overall present input with an annual Government of India budget of $650 million for this purpose. In 1985 there were in India 3,000 water well drill rigs of this rapid-operating type and thousands of engineers, water well drillers, administrative staff and others involved. It also required a corresponding build-up of the water and environmental sanitation support staff in the UNICEF offices. Although the work is being done entirely by Indian nationals in the different states, the international and national UNICEF specialists in India still make up one of the largest project support sections in UNICEF anywhere. This is for the reason of a continued need to assist in planning and training in a technical field under constant further development, both of drill rigs, water well construction methods and handpump designs.

There is also still the need for certain support in terms of the monitoring and the very intricate commercial and industrial aspects of the handpump manufacture. Likewise, the States and state governments who are the executing agencies with the funding and central planning, monitoring and advice coming now from the Ministry for Rural Development (previously the Ministry of Works and Housing), still have a considerable need for UNICEF technical and programme involvement. This also pertains to the efforts to introduce and develop sanitation methods and approaches, which led to the development of a UNICEF staff group of sanitation and health education specialists.

During the period through 1980, the WES Section in New Delhi, with project staff outposted in different parts of India, was strongly supported by the Regional Directors. The first one to be confronted with the drought problems in Bihar and Orissa was Charles Egger. His successor, Gordon Carter, was the one who urged on the major component of UNICEF contribution for drill rigs and who supervised the beginnings of this large input. This continued during the periods of John Grun and Glan Davis. For several years, through to around 1974, Malcolm Kennedy was heading the Water Section, succeeded for two years up to 1976 by Rudi Stoelzel, a German vehicle management adviser who eventually was transferred to Cairo. In 1976, a young American hydraulic engineer, Dr. John Skoda, with a background of some years in Ethiopia and a scant nine months with UNICEF in Bangladesh, was appointed co-ordinator for the whole effort, and remained in this post through to the first years of the 1980s.

There were more and more engineers and master drillers involved from UNICEF's side. Some names already have been mentioned, including Rupert Talbot. Valery Petukhov, a metallurgical engineer from the Soviet Union, worked for many years as Skoda's Deputy and dealt with the many mechanical, industrial and organizational aspects of the programme. There were a couple of Swedes, including hydrogeologist Ake Möller and master driller Erik Lindgren, which later led to a myth about a Swedish water "mafia" in the UNICEF context. Some senior water well drilling

colleagues tackled specific technical problem areas. The difficult boulder formations in the Himalayan valleys were expertly taken care of by Vyatcheslav (Slava) Ryazanov (USSR). Another technical troubleshooter was Daryl (Bart) Bartholomew, who had left his contracting firm in the state of Washington, USA, in order to help the children of India with his technical know-how.

There were very senior and experienced national Indian colleagues, such as Ajit Singh, with a distinguished career from the Ground Water Board of India, and other national authorities. A colourful colleague for a couple of years was one of the pioneers of compressed air water well drilling in India, Arden Godshall from the United States, an experienced water well driller cum minister who ran a combined mission and water well drilling organization with two drill rigs in Southern India, when UNICEF started coming onto the scene. Godshall was employed with UNICEF for some years for his practical experiences, and did outstanding work to help train national drillers and to organize water well drilling in some of the South Indian states. The support staff should also be mentioned, notably in the Secretariat, with Ms. Hazel Diaz and Ms. Joan D'Silva as some of the early pioneers.

The government responsibilities at different levels were, and remain with the protagonists of this whole development. The most crucial persons were the advisors of the responsible ministry in Delhi. The originator of the ambitious village water programme was A. K. Roy. He later rounded off his distinguished career by becoming the chief advisor for the World Bank for the field work in India of the UNDP/World Bank Global Programme for Low Cost Water and Sanitation. His successor was T. S. Swamy from Hyderabad, for many years ably assisted by B. B. Rau. Their supervisors, the Joint Secretaries, were very important from both a political and operational point of view. An outstanding and highly motivated one was Mir Nasrullah, a jurist and journalist cum civil servant from Kashmir (presently Chief Secretary of Jammu and Kashmir). At a crucial moment in the development of methods and approaches in the early 1970s, he did much to facilitate this development. Also, his successors have been very material in support and promotion of the whole programme, including Mohammed Butt. Equally important were and are all the Chief Engineers and Executive Engineers at the state level. There were many great names who each in their State became pioneers for the new methods. The Tamil Nadu Water and Drainage Board was probably among one of the best managed entities in the programme. In present Karnataka, the former Mysore, a nationally well-known and beloved engineer who helped very much in the beginning of the entire programme, was Mr. Vishweshwaria Rao. Another one of these pioneers was Mr. Jaghannath Rao in Madhya Pradesh, not to forget Executive Engineer Umamaheshwara Rao, who enthusiastically helped the handpump programme gain early momentum in Andhra Pradesh.

WHO's Regional Office in New Delhi was very supportive, especially of the sanitation efforts. The Regional Director during all of these years, Dr. Gunaratne, bent over backwards to facilitate the secondment of Bert Besa. Very close contacts were kept during that time with the sanitary engineering advisors, notably Sonmuek Unakul, who later, during the 1980s for a number of years, was the chief contact person for UNICEF in WHO's Headquarters. Another one was Mike Acheson, who likewise later on came to WHO in Geneva as advisor and eventually as the World Health Organisation's Chief of Community Water Supply and Sanitation.

Let every year be the International Year of the Child

1981-1990 IDWSSD

FROM THE UNICEF WATERFRONT

A note from the Senior Adviser, UNICEF WET, New York, NY 10017

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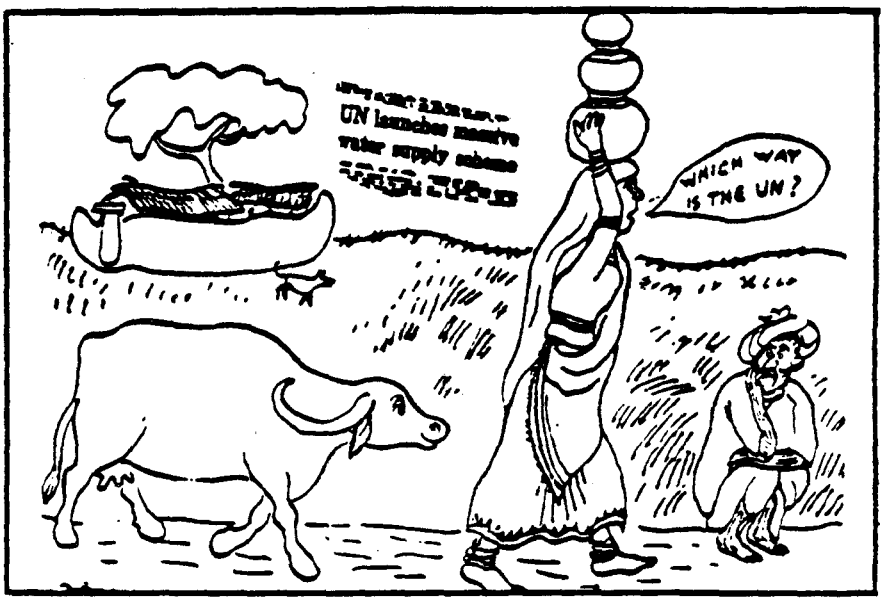
WHICH WAY ⇄ ?

Immediately after the launching of the International Drinking Water Supply and Sanitation Decade, the Indian Express launched this fully self-explanatory cartoon.

The chances that the lady with her empty water jars will manage to walk all the way to the UN are not very good. However, chances are better that the India Mark-II hand-pumps will one day be set up in her village. Sturdy enough to even withstand the scrubbing of the buffalo cow against it.



Bangladesh - a sponge that wasn't one

The parts of the delta of the Ganges and Brahamaputra with their main joint arm, the Padma River, and the many ramifications through Bangladesh, were like a sponge when it came to groundwater occurrences. Or so the water specialists thought. UNICEF, to a modest extent, had already begun to support community water supply with handpumps in that country when Bangladesh was still part of Pakistan, before the war of liberation in 1971. It was only, however, in the aftermath of that terrible war and the flood soon after that, when UNICEF's inputs began to accelerate in earnest.

The soil and groundwater conditions of Bangladesh correspond to those adjoining parts of India that form West Bengal. Almost all of Bangladesh is underlain by the soft and relatively permeable sediments of the great rivers that come silt-laden from the Northern India plain, and the rapidly rising Himalaya Mountains. In the first years of the 1970s, the water table in large parts of Bangladesh still was only at a few feet from the rather flat surface of the country. The coastal areas, in terms of fresh groundwater, were somewhat different. There, the groundwater close to the surface, through the nearness to the sea, was contaminated with salt water being pressed up through the estuary channels of the many rivers, and was unfit for human consumption. Fortunately enough, in the outer southern reaches of Bangladesh, there are sand layers isolated from the higher saline groundwaters through clay strata. These lower beds at greater depths down to 900 feet (300 metres) carry fresh water fed from infiltration zones further inland. With the softness of the sediments, these layers can be reached even at such depths with relatively simple means of hand operated or very simple engine operated drill rigs ("jet drilling"). Once such a well has been completed and installed with casing pipe, filter screen and rising main, the fresh groundwater rises to within a relatively short distance from the surface and can be reached by handpumps.

In the rest of Bangladesh, nearness to the groundwater table, in combination with the soft soils, allows for tubewells to be sunk through an incredibly simple method, the so called "sludging" method of drilling. This is carried out by hundreds of local contractors with nothing else but a few bamboo poles for a derrick, a string of galvanized standard 1-1/2 inch iron pipes, and a chain to link these pipes to a bamboo lever laid across a rung in the derrick, which looks like a ladder. One man from the drilling crew perched on top of the derrick, acts as a human valve, while the other members of the crew pump up the sludge of water and sand and silt in the drilling process. Once the drilling has reached the necessary depth. normally 90 feet (30 metres), the hole remains open for the twenty minutes or half hour that is sufficient for them to permanently install a string of plastic pipes with a screen (slotted pipe) at the bottom end and a handpump attached at the top.

In those days for the largest part of the country, it was sufficient to install so-called suction pumps with the entire pump mechanism above the ground surface. Such pumps were manufactured in the country by local

small foundries all over the place. With the need for much larger quantities of pumps to be manufactured, UNICEF's water specialists had to look for possibilities to both help increase the production and to improve the pump design.

The pump design was very complicated, in spite of the seeming simplicity of such suction pumps. In contrast to India, cast iron could be maintained as the basic material for the handpumps in Bangladesh. The number of users per handpump is smaller in Bangladesh, as the individual villages rather are hamlets with relatively fewer households and people which would lower the rate of wear and tear on the pumps. Also, the foundry technology was well established. There are very competent metallurgical engineers in Bangladesh, and incredibly skilled foundry workers who worked with simple cupola ovens in an ambiance that would recall iron foundries of 18th-century Europe. There were no modern safety precautions but it was impressive to see these barefoot workers nimbly skipping over the sand floor of the foundries, two of them each time with a stretcher load of white-hot glowing molten iron in a heavy crucible between them, and then their carefully pouring the melt into the molds laid out on the sand floor.

The government agency responsible for this handpump programme, which rapidly entailed the installation of some 90,000 suction pumps per year, is the Public Health Engineering Department. Their local offices throughout the country became the focal points for a nation-wide action with UNICEF seconding national project officers to them in order to assist with the planning and logistics in this unusual major effort. The result was a phenomenal network for the supervision and directing of the hundreds of contractor teams, who now for years have sludged their way down into the ground and installed the handpumps and plastic pipes and screens provided by UNICEF.

After several years of development of the handpump design, finally a standard was set for a pump that was derived from a local pump type, the so-called, "No. 6 Pump", which for quite a while was called the "Bangladesh New No. 6 Handpump". For a brief period in the beginning of the 1970s, UNICEF was considering a cast-iron handpump model that had been developed for USAID by the Battelle Memorial Institute in Columbus, Ohio. The intention was to introduce this as a universal village handpump. After USAID had spent some $125,000 over a ten year period for the development of this pump and UNICEF had spent another $60,000 to further develop it specifically for Bangladesh, the Battelle model was abandoned by UNICEF as being too heavy and not functional enough. For UNICEF's part, this money was still not wasted. A most important outcome was the development and application in Bangladesh of the foundry experiences by the Battelle metallurgists, which definitely was worth that whole expenditure.

The first Project Officer of UNICEF's in Dhaka to start up the entire massive input was one single man, but a lion. This was a young American civil engineer, Richard (Dick) Phillips, a U. S. volunteer who in his low key, religiously strongly motivated ways with unending patience managed to get the whole UNICEF input operational. Around 1974, he was joined by another young American, Tim Journey, who dedicated a lot

of energy and inventiveness to give the final touches to the New No. 6 Handpump. Tim Journey's many letters and detailed accounts for the design development are still in the WET files and bear witness of the painstaking and conscientious efforts to develop a pump that would really be appropriate for the country. Journey later joined the World Bank and is continuing with the development of the new direct-action PVC "TARA" ("Star") handpump in Bangladesh and the modifications of the India Mark-II handpump with its in-hole PVC components.

A remarkable "universal tool" for the maintenance of the New No. 6 pump was developed by UNICEF's spare parts and logistics officer, Philippe Heffinck. Two simple devices, costing a few dollars for each set were provided to hundreds of thousands of handpump caretakers, replacing much costlier sets of tools, which would have run the risk of disappearing with truck drivers and other mechanical-minded persons.

When the activities grew, UNICEF yearly was delivering thousands of tons of pig iron, coke and limestone to the foundries in Bangladesh as raw materials. A Water and Environmental Sanitation Section was established in Dhaka with a U.K. engineer, John Shawcross as Project Manager, and in charge for the years 1974-75. John Shawcross, in his turn, was briefly followed by John Skoda, later Water and Environmental Sanitation (WES) Co-ordinator in India and Regional Adviser for East Africa. During the latter half of the 1970s, the Section was headed by a national engineer, Abdul Awal, the dean of a whole group of highly competent and effective Bangladeshi engineers, some of whom later left their country in order to take up international posts with UNICEF in other parts of the world. Among his countrymen on the engineering side were Mesbahuddin Akhter, Zahirul Karim and Jahangir Kabir, and later joined by the Jamaican Civil Engineer Stanley Hall.

Karim was the one who at the end of the 1970s developed an important side-line of the handpump programme. The main UNICEF thrust in Bangladesh is the provision of household water, including drinking water supply. With the spread of both private and village handpumps in Bangladesh, however, a number of farmers with very small holdings above the high water mark, were in need of means to increase their rice harvests. Normally, they would only be able to get one harvest per year, watered by the monsoon rains. The availability of relatively low-cost (about US$ 45 each) handpumps on a large scale now enabled them to irrigate their lands with the help of handpumps all year round, thus facilitating another one or two harvests of rice during the year. Karim took the opportunity to have UNICEF support a pilot project for the spread of such handpumps with the financing on a loan basis, through the local Grameen Bank, a rural credit institute. The back-breaking task of actuating a handpump for hours on end, in many cases was made easier by the farmers themselves through attaching treadles to operate them by foot. The increase in harvest through this so-called "MOSTI" (Manually Operated Shallow Tubewell Irrigation) programme did a great deal, not only towards increasing their income but to even cause a kind of agricultural revolution in the country. At least the trade journal, "World Water", in 1982 ascribed quite a deal of the merit of alleviating the food situation in Bangladesh to this pilot project headed by UNICEF and Karim.

For this project, UNICEF provided the seed money for a total of 30,000 handpumps. That money then was to be retrieved through the credit institution. It would be returned to UNICEF, in order to be plowed back into other UNICEF-assisted programmes in Bangladesh, such as health and education particularly. In New York, Martin Beyer had a faint echo of this when one day the UNICEF Comptroller, Mr. Gian Cavaglia, came up to his office, visibly agitated, and said, "What is this? We are all of a sudden getting one million dollars back from Bangladesh from the water programme!". Through some accounting channel, the funds being returned to UNICEF in Bangladesh had come back to our Comptroller's office. He had not been informed of the whole operation and of course found the whole matter quite irregular, especially when UNICEF was supposed to provide funds to Bangladesh and not to extricate them from the country.

Pakistan - e pluribus unum

After the initial handpump programme back in the 1960s, which never reached fruition - probably too early an attempt - the first major effort to assist Pakistan with village water supply came about as a consequence of the floods of the Indus River, in 1973. This mighty river had exceeded its normal bed and inundated large parts of adjoining agricultural areas in the Province of Sind, all the way down to the delta east of Karachi. Thousands of villages had had their wells and pumps destroyed and the old pumps had be be replaced with new ones with a rehabilitation of the wells. Thus a project for the installation of some 8,000 handpumps was launched, partly financed by UNICEF, partly by USAID. The actual supervision was to be carried out through a government agency, called People's Work Programme, which had been set up to provide employment opportunities in the countryside of young Pakistanis with a university background. A local handpump manufactured in Sukkur was to be used. It was built of standard galvanized iron pipe components, and might be termed moderately successful, since it was relatively easy to repair and replace. This project was begun in 1974, then for the first years headed by a Programme Administrator from the U.K., Garry Hampton. Somehow this first programme, relatively large as it was, never made a big splash.

Generally, any action in Pakistan would be dominated by the great diversity and administrative independence between the different provinces and areas. Any programme, apart from receiving a vague general blessing in those days on the side of the central authorities in Islamabad, would have to be planned and implemented with each provincial authority. Gradually the individual province projects were worked out on a larger scale. Most successfully this was done in the northern reaches of the country. They were gradually helped along when Fausto "Nino" Bertoni was transferred from his long-time work in Afghanistan to Islamabad in order to head the UNICEF water inputs in Pakistan. With Nino Bertoni came the Yugoslav hydrogeologist, Stephen (Steve) Radojicic. Jointly they began to build up UNICEF's capacity to support the different regions.

In Sind, a first attempt was made to provide water to some outlying villages in the Thar Desert, which on the Pakistani side of the border with India is part of the Tharparkar District. UNICEF's Lebanese Master Driller, Moubadda Khoury, had a long and a difficult time to get his drilling equipment released and brought into the area. There were adverse hydrogeological conditions with salt water or even brine alternating with pockets of fresh water in the underground, and long and sandy transport roads to get to the drill sites in that bleak part of the world. Eventually UNICEF had to move the rigs from Tharparkar in order to concentrate its assistance to other parts of the province, closer to the Indus River, north of Karachi.

A later, more positive development was the introduction of sanitary latrines to the Kacha Abadias (slum areas) of Karachi, but this is an effort that partly falls into the later years. In Baluchistan, a first beginning was made to assist water well drilling for a number of villages, but that effort also became more active after 1980. In the North, the most populous province of Pakistan, Punjab, took the longest time get started up in. The other provinces and areas were more ready for the provision of rural water supply for their populations. Bertoni and Radojicic thus primarily would concentrate on the North West Frontier Province (NWFP), the Northern Areas with their Shangri-La type of valleys of Gilgit and Hunza, Azad Kashmir and Swat. Government responsibles, such as the chief engineer for North West Frontier Province, Mr. Naemullah, and the local population, eagerly grasped the opportunity for the help from UNICEF's side. Many of the systems installed for water supply consisted of protected springs, or intakes of water from mountain streams and small dams in the higher valleys of the Hindukush and Karakorum ranges. In other places, heavy cable tool rigs had to work they way slowly down into the gravel and boulders of valley fills for water wells with engine pumps. In most cases, water then was conveyed through pipelines to the villages at lower levels.

Towards the very end of the 1970s, the first attempts were made to introduce sanitation with health education, a near impossible task, heroically carried out by Margarita Cardenas from Paraguay. Her work and that of her later colleague, Chit Chaiwong, is described elsewhere.

A technical curiosity was the first use in UNICEF's history, following an idea of Nino Bertoni's, of horizontal water wells drilled into the mountain sides with special machines. This was attempted in order to tap groundwater from the mountain sides, closer to the valley bottoms where the villages are. The distance of pipe-laying could be shortened and a more even supply of water secured throughout the year. The method had been used for tapping groundwater e. g. in Arizona and Texas in the United States and in the mountain terrain in Norway, but never had been practised on a large scale in developing countries. It led to a study carried out later for UNICEF by Per Engebak, who made a survey of such activities in the whole world, including an assessment of the different types of machinery available for such a purpose. There may yet be quite a future for this drilling method, although it requires a wider reach in terms of penetration into the mountain sides than was possible with the equipment used in the first UNICEF-sponsored experiments in Pakistan and Sri Lanka.

Afghanistan - the Atomic Energy connection

The major activities of UNICEF in Afghanistan in support of the Section for Rural Water Supply of the Ministry of Health, were carried out in the years up to 1980. The needs for safe water and sanitation, both in the rural areas and in the cities, not the least Kabul, were evident. This pertains both to the quality and safety of the water, as well as to the quantities that would be available, as a function of the distances of transport to the communities. In many cases, at first the local populations would be rather indifferent to any proposal to provide water supply e.g. by gravity feed schemes, through pipes from protected springs to the villages, replacing the trek of often several miles for the women up and down the mountain sides. Since in the traditional Afghan society the men were the ones to decide and the women only the carriers of water, the latter would not have any say in terms of convenience or other points of view, nor participate in the decisions of the communities. In some villages, the entire population would even run into the hills when the first survey teams from the Government and UNICEF project staff arrived. They thought it was the tax collector!

Once, however, the first few installations had been made, the convenience and advantages of it were not only clear to the people who benefitted immediately, but caused villagers in a wide periphery around the first project areas to come in with their petitions to the Government and to UNICEF in order to obtain installations of their own. These documents were rather remarkable in themselves, written in Darí, the local language, and signed with scores of thumb prints indicating the low level of literacy.

As so often happened, UNICEF also in Afghanistan was the major organization that would reach a hand from the outside and provide quite substantial assistance to water supply. Where it was possible and springs were available, there would be gravity feed schemes. In many valleys and in some communities out in the Northern Plain, water wells would be drilled, some installed with handpumps, others with engine pumps where the size of the community would so motivate.

In the late 1960s and early 1970s, UNICEF sought to give the Afghan handpump "cottage" industry a boost. Improvements were made to the "Jangalek" pump, which was locally manufactured in a medieval foundry. It was purchased by UNICEF for local schemes in addition to imported pumps. In the last few years before 1980, one major scheme was being discussed to provide water to a great number of villages in the Northern Plain, around the town of Mazar-i-Sharif. This was to be fed from the outlet of an enormous underground river in a mountain valley close to the plain, and then built out with a network of some 150 kilometres of pipelines branching out towards the border with the Soviet Union in the North. One curious feature was the plan, for the first time in UNICEF's history, to co-operate with the International Atomic Energy Agency, for the purpose of isotope tracing of the water in this underground river. This would serve to know where it came from, in order to design the scheme properly. Later events unfortunately prevented this scheme from coming into existence.

Working together with the chief engineer of the Ministry of Health, Mr. Mohammed Shah Aga, the handful of UNICEF specialists between Nino Bertoni, Steve Radojicic, the senior U.S. drilling superintendent, Elmer Ring (who in retirement met a tragic death by murder in Wyoming), Mr. Omar and some other Afghan engineers, did amazing work to spread the benefits of safe water supply in this large and very mountainous country. Steve Radojicic, the Yugoslav hydrogeologist who had been taken over by UNICEF from UNTCD, practically single-handedly established the hydrogeological map of the whole country. He did this by tramping the mountain sides and valleys of all of Afghanistan, year in and year out sounding wells and sampling rocks. Radojicic's work thus provided the necessary knowledge both of the hydrogeology and of the villages and their needs throughout the country. Based on this one-man geological survey, Nino Bertoni and Elmer Ring with Afghan colleagues then could plan for the UNICEF assistance to Mr. Shah Aga's department.

These UNICEF colleagues were all very experienced people, singularly equipped - as the other WET colleagues in UNICEF - to work independently under difficult circumstances. All are also personalities in their own right. Nino Bertoni now lives in retirement in Florence, Italy. A massive man, a warm-hearted condottiere of drilling rigs and pumps, straight out of a renaissance painting. In his own vineyard outside of Kabul, Bertoni produced the best red wine east of Lebanon. He started his active life as a mechanical engineer and water specialist in the beginning of the 1930s in the Sudan, built the first water supply system in the city of Mukalla, South Yemen and blazed a trail of water installations in the southern reaches of the Arab World. When he joined UNICEF, around 1975, he already had a long career with the UN behind him, including a five year stint with ICAO as spare parts manager of Aryana, the national Afghan airline which in those years obtained substantial support from the United Nations.

Nepal - backpacking

This mountainous country, contiguous with India, is dominated by the Himalayas and their foothills. The southern third of the country, which forms part of the Indian Plains, the Terai, has water conditions more akin to those of the adjoining parts of the Ganges plain, including West Bengal and Bangladesh. Those latter conditions are the basis for a larger scale installation of simple handpump schemes, identical to those of Bangladesh. The majority of the population - notwithstanding a massive migration from the hills into the terai as a result of the frightful soil erosion and destruction in the hills and mountains - still lives in the higher two-thirds of the country. The city of Kathmandu and larger towns like Bhaktapur and Biratnagar, have an influx of migrants from the countryside, as do other cities in the world. UNICEF's inputs in the towns, however, were very limited and also would fall rather into the last five or six years of the 1980s.

The main activities in water and sanitation in Nepal began in the hills and mountains. What was and is being done, is the protection of springs and the installation of gravity feed schemes, and pipelines from the same springs to the villages down the mountain slopes. If any set of

projects is illustrative of a how water supply close to their homes can relieve women's drudgery, it is in these parts. Women in Nepal are hardly better than donkeys in terms of the loads that they are requested to carry. These ladies of small stature, under-nourished and worn out, are seen carrying cement bags of 30 kilograms or backpacking loads of firewood or water containers with similar weights, for miles and miles on end in a dramatic topographical setting with height differences of thousands of metres. The advent of piped water supply in any village saves each woman hours of back-breaking work and an energy expenditure of over a thousand calories per day.

The distances, the mountains and the very thin roadnet, or absence of any roads, caused a very special set-up of the UNICEF-assisted operation in Nepal. During the 1970s a whole network of field offices was established by UNICEF to house its young engineers, both expatriates and Nepali nationals, who would locally plan and supervise the implementation of the individual projects. Water supply also gradually, more so in the 1980s, would be accompanied by pilot projects for sanitation, i.e. latrine construction.

In 1972 when Hallvard (Hal) Kuloy, the eminent Norwegian historian, arrived in Nepal as UNICEF Representative, there were only five systems that had been started with PVC pipes. Out of these, only three were eventually completed and two were abandoned for a variety of reasons - the most important being the lack of proper communication with the communities which were supposed to benefit. The first task which Hal accomplished in Nepal was to quickly to make a switch from PVC (polyvinyl chloride) pipe to HDP (high density polyethylene) pipe. Durability, transportation and the ease with which the pipes would be joined in the field, were some of the reasons. This was actually quite a major battle, which the UNICEF office in Nepal eventually won. Since then, HDP has been universally used, replacing in many cases not only PVC but also galvanized iron pipes.

For many years, from 1973 on, this whole operation from UNICEF's side was headed by a Canadian geologist, Leo Goulet, under the firm supervision of UNICEF Representative, Hal Kuloy. Working with communities in Western Nepal, where in extreme cases it would take two weeks to reach from the nearest roadhead on foot, Leo directed the first assistance for these villages to obtain their water supply. During the first two or three years, this implied helicopter transports of the heavy and unwieldily coils of HDP pipes and other materials. Many villages were so difficult to reach that even the Sherpas, who helped conquer Mount Everest and other mountain giants, simply refused to lend a hand in carrying these pipes. The helicopter transport was cost-effective, and it gave real meaning to UNICEF's policies of supporting and assisting the most disadvantaged groups - socially, economically or geographically. At the time, it also had a splendid effect on decision-makers and public opinion, and helped to generate the sort of grassroot support needed for water supply programmes, and later sanitation programmes.

There was a mix of international and national colleagues, including the Nepalese engineers such as in the early days Sundar Gurung, Naresh Gurung, Prabhat Bangdel and Raghu Bir Joshi (all still with UNICEF). The network of field offices in Nepal was in fact started with these four engineers, who later became attached to the Local Development Department office, and eventually paved the way for the system which exists today. They were joined by Bhai Raja Sakya, Bijaya Rajbhandari and many others who intensified the way for UNICEF to work as an integral part of the country effort. All of this was carried out in close co-operation with both Government and other expatriate groups, such as the Swiss Technical Aid (SATA), and the Japanese and U. S. Peace Corps. The Nepal experience became, to a quite a degree, normative for UNICEF's inputs in spring protection and piped water supply in other countries. Through Tom Jordan, a young United States Peace Corps volunteer, the technical experiences were recorded in the form of a handbook for gravity water supply that recently found its final form as a book, published by Intermediate Technology Group in London.

There were two Nepalese officials who more than anyone else made this success story possible. In 1972, Tara Dev Bhattarai was the Director-General of the newly established Local Development Department. Mr. Bhattarai had a very able deputy, Mr. Santa Bahadur Rai, who was later to become Director-General and later Secretary. Mr. Bhattarai and Mr. Rai made a superb team and it was remarkable how they managed to overcome innumerable obstacles to achieve approximately 400 water schemes either completed, in progress or in an advanced stage of planning by 1979.

Bhutan

UNICEF was the first UN agency to have any substantial programmes started in Bhutan. Water supply was regarded by the Government of Bhutan as one of the great achievements of UNICEF's early involvement. However, there were many problems. In the beginning, UNICEF did not have its own technical staff and in 1973, after considerable discussion, it was agreed that the Public Works Department (PWD) would be responsible for the rural water supply programme. The first years were quite problematic - with poor implementation, conflicts with villagers and very sloppily constructed systems. The situation prevailed for a number of years and eventually the Government realized that it was necessary to deal with water supply in a different manner.

The programme in Bhutan was a straight-forward water supply programme, but it was linked-up with providing water to schools and health centres, and also went hand-in-hand with the conversion of dispensaries into Basic Health Units. The latter are another innovation for which credit is due to UNICEF. The Health School was established in Thimpu, and water and sanitation was an important part of the curriculum from the very start. The Pre-school Teachers' Training Centre in Paro was established entirely by UNICEF initiative. In the training of local pre-school teachers at the Centre, a great deal of emphasis was placed on hygiene and sanitation .

Sri Lanka

In Sri Lanka in 1972, a major phase in the UNICEF-assisted programme was launched for a five-year period, with the ambitious goal to have 100 village water supply systems installed in a more traditional way. This was the question of large villages with their water supply being obtained from surface sources, mainly rivers, through intakes at their bottom, under the river gravel. From there, the water would be pumped up without much further treatment, except for chlorination, to an overhead tank and from there passed out into the communities through a piped system with public standposts at some 200 metres distance from each other. It was implemented by the National Water Board of Sri Lanka, under its dynamic and internationally well-known president, Mr. N. D. Peiris.

In 1980 this programme was phased out after about half the planned 100 systems had been installed. A number of delays had been caused, more for local political than technical reasons. In its whole nature, this series of projects was beyond what UNICEF would normally would do. In reality this type of system would have lent itself more for house connections and a recovery of the costs through normal water fees with the corresponding possibilities of financing through loans, e.g. from the World Bank. That notwithstanding, the overall cost for the systems, including UNICEF's contribution even for only half of the goals fulfilled, still was in the range of some $30 or $40 per capita, which is a fairly normal cost for this type of water system.

At the end of the 1970s, UNICEF in Sri Lanka entered into assistance to areas with low-income populations with a development potential. This included participation in the large Mahaveli Ganga irrigation scheme, intended for the settlement of eventually two million people, farmers, mostly from the drier areas in the north. Since both this and other components of low cost systems with other methods were to be implemented during the 1980s, the account for Sri Lanka is saved for the next chapter.

Burma - 3,000 wells and more

In 1976, (Mrs.) Daw Aye was the Officer-in-Charge in her own country, Burma, and Ulf Kreuger was Chief of the Asia Section in UNICEF Headquarters. For him personally Burma was an old love - understandable for any one who ever had the privilege of spending some time in that gentle country - Kreuger had worked there earlier in his life. When the government of Burma turned to both of them requesting a massive assistance from UNICEF's side to a major water well drilling programme in the "Dry Central Zone", this plea fell on sympathetic ears. Many a UNICEF Representative would have balked at the magnitude and complexity of the planned programme. Not so Daw Aye and Ulf Kreuger. They first called in Martin Beyer, who happened to be close by in India. For safe measure, given the special hydrogeological conditions, Beyer brought alone a British consultant on drilling technology, Raymond Rowles. The outcome of this first hasty visit was a general recommendation to go ahead with strong support from UNICEF and an outline of how to go about this. The result was the supply of eleven large rotary drill rigs - they

were largely over-dimensioned for the task, but then relatively little was known of the actual hydrogeology of Burma, and much greater depths to water were assumed than was really the case. Rowles wisely had counselled to introduce more modern lightweight drill rigs but a number of other reasons made the choice a more conventional one. Nevertheless, the equipment brought in by UNICEF, combined with the older drill rigs already in use in the country, were utilized to the fullest extent in the years to follow.

The Dry Zone - a sandy dry wooded expanse around the bed of the mighty Irrawaddy River - extends from Magwe, a small town on the river, situated some 500 kms. north of the capital city, Rangoon. This area stretches northward beyond the historical former capital, Mandalay, with a total length of about 500 kms. Its east-west breadth is 150 kms. between the Shan highlands in the east and the Arakan Range in the west.

This area has ten million inhabitants, most of them in the countryside. The water table in the deep sands, clays, silts and sandstones is too deep down to be reached with dug wells. The distances to alternative water sources are very large, up to 25 kms. away from some of the villages. Water used to be transported in jars, carried by women on their heads, or in wooden vats on oxcarts. The problems of child health as affected by the lack of safe water in sufficient quantities was evident.

The government programme to alleviate the water needs of the most affected villages was, indeed, ambitious. It was planned for a total of 3,000 wells in order to serve a target population of 2.5 million to be implemented during a five-year period. It was therefore necessary to provide up-to-date water well drilling equipment and adequate pumps. Since so many people were to be served by each system, sometimes over 1,000 users per pumps, it was necessary to supply engine pumps. For each pump, a cistern with a number of taps would be constructed. The villagers would then take care of the operation and maintenance. A payment system was instituted with payment of a few copper coins per jar filled. A high price as yet, but much less than when water of much lower quality would have to be fetched from far away.

Fortunately enough, the government agency responsible for the programme, the Rural Water Supply Division (RWSD) of the Agricultural Mechanization Department (AMD), was eagerly prepared to take on this huge task. The Director of RWDS, U Ngwe San, a determined and well-organized engineer had a core staff of young and interested engineers. With his Technical Director, U Saw Oo, and geologist Donald Aung Ba, U Ngwe San wanted to get going with his department of water well drillers. The political support was guaranteed by the highest government levels. Invaluable encouragement was given by the Director-General of AMD, Colonel Hlaing Myint (later Vice-Minister of Agriculture, in charge of forestry), who had his engineering degree from Massachusetts Institute of Technology and who was generally known as "DG". There was also a far-reaching co-ordination with a major assistance component from the Australian Development Assistance Bureau (ADAB), with the engineering firm of Coffey and Partners as their project contractor.

From UNICEF's side, the first technical supervision was provided by Gerry Medina, Programme Officer and an automotive engineer from the United States. At an early stage it was clear that training of engineers and water well drillers would be necessary. For this purpose, in 1977 a senior Yugoslav drilling engineer, Dr. Bozidar ("Boza") Kojicic was employed in order to begin the updating of this specialized training. A former Professor of Drilling Technology at the Technical University of Belgrade, Kojicic knew what was needed and rapidly set up a systematic training course. His forceful, straight-forward, often blunt way of guiding the Burmese engineers and drillers through the many intricacies of deep drilling for water, won him great respect. His warm human understanding and hospitable camaraderie won him great friendship. UNICEF relations with the host countries are always good but this was quite a special case.

The same would be true for the other UNICEF colleagues. When Kojicic was transferred to WET in New York, he was succeeded by Erland Niva, a Swedish drilling engineer, with John Bertrum (Bertie) Mendis as Programme Co-ordinator. Bertie Mendis, a sanitary engineer with his roots in Sri Lanka and Canada, had worked for UNICEF first in Bangladesh. Presently he is Field Representative for Northern India. Finally, for several years, the overall responsibility for UNICEF's inputs was in the hands of Steven Allen, Programme Officer from the Untied Kingdom. He would eventually bring together the water supply component with that of sanitation and primary health care.

It was left to Bertie Mendis' professional expertise to develop the Household Latrine and rainwater collection programmes and to expand the shallow well project in the lower delta area. The Burma Household Latrine Programme is probably the largest single UNICEF-supported environmental sanitation programme in the world - and also one of the more successful ones. The project aims at providing latrines (over 400,000) in half of all the households in 50 Health Plan Townships. This is a very substantial undertaking. The basic strategy is to saturate these townships with latrines in the hope that the idea would spread, the technologies copied and the people would then expand the latrine programme on their own.

During Steve Allen's time, already falling into the 1980s, UNICEF after helping secure the completion of the 3,000 water wells in the Dry Zone, went on to support low-cost, community self-help schemes for protected, dug water wells and latrines in the geologically easier regions closer to the coast.

In the field, based in Meiktila and Mandalay, a US drilling superintendent, Bill Lee with another US colleague, Allen Bush, gave the final touches to the drilling practices and the organization of the logistics of spare parts and other supplies. The work was not always easy. The long distances, certain bureaucratic constraints, the long previous lack of efficient equipment, were inevitable hindrances. They proved not to be insuperable. The spirit of the Burmese colleagues would not let them give up, and the many difficult conditions they had to work under, had made them masters of imaginative improvision.

Last but not least, the great sense of national pride, the solidarity and coherence within the communities and the all-present beneficient dharma ("the Road") of Hinayana Buddhism, helped maintain a high level of interest and participation on the side of the communities. In the many merits accruing towards the road to higher incarnations, the one of providing water to fellow-man is among the highest. No wonder that in some individual cases, the water colleagues were regarded as reincarnations of the legendary King Anuwratha, who over a thousand years ago built dams and harnessed water to the good use of the Burmese people. The signal honour of being identified as this particular reincarnation would apply to all the water colleagues in Burma, including UNICEF's own national hydrogeologist, U Ngwe Thein.

Philippines - the Magsaysay pump

The Philippines was one of the countries which already from the end of World War II had done considerable work for its rural water supply. Manifest silent witnesses of this early development were the many handpumps of near-VLOM type, built of simple standard pipes and fittings that would still be functioning in many villages after twenty or thirty years. The pumpstand was a sold cement plinth, the handle a sturdy hardwood beam. The whole assembly was called the "Magsaysay pump" after a famous earlier President of the Philippines.

UNICEF's assistance during the 1970s went into the occasional piped system for larger villages, conventional setups with water pumped up from drilled wells to overhead tanks (cisterns on water towers) and from there onto public standposts and house connections. Community participation was lively and the National Water Board under its Director, Angel Alejandrino, was well geared to deal with this type of installations.

Towards the end of the 1970s, it was realized as elsewhere that the only way to provide water rapidly on a large-scale basis throughout a larger population, would be by handpumps. The advice of UNICEF was sought and a senior UNICEF specialist, Abdul Awal, a civil and sanitary engineer from Bangladesh, transferred there for a very successful co-operation with Philippines colleagues such as Florencio Padernal, a young engineer in charge of an essential part of the Rural Water Supply project. Eventually this part of the programme carried on until about 1980.

Viet Nam - Noxious excreta into harmless fertilizer

Another major emergency situation which did prompt a more intensive input from UNICEF's side than otherwise possibly might have been the case, was Viet Nam. Before the end of the Viet Nam war in 1975, UNICEF's activities were concentrating on the Republic of South Viet Nam. Minor inputs had been given to villages in the countryside. At the end of 1974 there was a request from the Government of South Viet Nam for UNICEF to contribute with water supply to the controversial, so-called "fortified hamlets". These were to be provided with dug wells, protected by lids

and possibly to be installed with handpumps. In the ongoing conflict situation these fortified hamlets represented an attempt to gather the populations of exposed villages in places that the Government regarded as safer. This prompted some accusations that UNICEF's assistance to these would go to provide villages with services in which people, at least partly, would have been concentrated without their own willingness or consent. Nothing came out of it, as historical events overtook all plans.

After UNICEF had more firmly established its co-operation with the Government of the Socialist Republic of Viet Nam, an office in Hanoi as opened. The first Representative on a regular basis was Dr. Francois Rémy. His successor was Bertram Collins. During their tenure the UNICEF inputs for water and sanitation became accelerated. For the first three years there was ample funding available, although it later was considerably cut down, due to political hesitations on the side of the donor countries. UNICEF's assistance went through the National Institute for Hygiene, under the famous Dr. Nguyen, an internationally known virologist. He would deal with the vast problems of his country's rehabilitation during daytime and who would do his own virological research during the night hours at an electron microscope in the basement of his Institute.

The UNICEF co-operation concentrated on three different aspects: One was the improvement of urban water supply in the cities of Hanoi and Haiphong and some other larger towns. The second one was assistance to open wells dug by the villagers themselves. These wells were constructed to protect the quality of water as much as possible: margins, good platforms, drainage and stands for the buckets so that they would not be contaminated by contact with the soil. The third component was assistance to the construction of the safe latrines, the famous Viet Nam Double Vault Compost Latrines (allowing anaerobic fermentation of the excreta into harmless, odorless fertilizer). A major part of the UNICEF contribution in those years was construction material, especially cement for these latrines, which was imported in rather large quantities to Viet Nam.

In 1979 and 1980, deliveries were made of equipment and materials for the rehabilitation of the age-old city water systems in Haiphong and Hanoi. In Hanoi, these were fed from a number of large diameter drilled wells, with great difficulty to keep the water clear, due to the excessive content of iron and a high aggressiveness of the water. The water supply system in Hanoi had been designed in 1910 for 200,000 people. In 1977 the same system had to serve 1.2 million people through its 70 year old cast iron pipes, which had been completely corroded and partly blocked by iron hydrate incrustations. This type of work was clearly beyond the normal experiences of UNICEF. A very senior Netherlands consultant (the late Mr. Mink), with similar experiences from his own country, went out briefly in order to get the work organized. We never received any evaluation of the outcome, which seemed to be somewhat doubtful. Probably the only proper thing to have done would have been to tear out the entire network and replace it with a modern pipe system. Later developments in the 1980s would direct UNICEF's assistance to much more normal low-cost solutions and adequately supported by UNICEF project staff on the spot.

Laos - light-weight latrine pans galore

As in Viet Nam, also Laos began to recuperate in 1975, after the cessation of hostilities. Through 1979 and 1980, UNICEF's assistance was limited geographically to an area relatively close around the capital city, Vientiane with the construction of protected dug wells and latrines. It was in Laos that for the first time on a large scale, water-seal latrines were installed with light-weight, inexpensive plastics latrine pans, manufactured in Malaysia. They were built in platforms with local material, mostly wooden planks, and became very popular. All the work was carried out by the Laotians themselves. A geographically wider spread of the activities became possible only during the 1980s. This work was for some years supported by John Anthony Griffith.

Thailand

For some years in Thailand, UNICEF provided assistance to the rehabilitation and re-starting of operations of small water treatment plants in villages in the dry and poor northestern part of the country. A number of these installations had been provided during the 1960s, by the forerunner to USAID, which was then called the United States Official Mission (USOM). These small waterworks had quickly fallen into disuse. Apparently the construction had been very rapid and there had not been sufficient provision of training and monitoring for the upkeep of the installations or their operation. Increasingly also from UNICEF's side, assistance was provided to some of the water well drilling and handpump installations in the same region, carried out by the Thai authorities. Technical backstopping by UNICEF was provided by a national colleague who then was both Supply and Programme Officer for Thailand, and a sanitary engineer by profession, Pricha Chulavachana.

Indonesia - underground rivers and coral islands

This country saw a beginning and increasing development of assistance to its rural water supply systems, which are the responsibility of the Ministry of Health and its Rural Water Supply Department. Throughout all these years this has been headed by Mr. Widodo, who as his technical director for many years had Engineer Soebono. The work in Indonesia was concentrated on areas with other elements of UNICEF assistance. Water and sanitation thus was brought in as a component of integrated basic services from the very beginning. Part of the work consisted of the installation of handpumps in already existing or newly dug wells which would be adequately protected. In other cases there would be spring protection and piped water supply, especially for the villages on the slopes of the volcanoes.

It was in Indonesia, where also in a few cases - as in Nepal - use was made of hydraulic rams, a kind of self-operating water pump which lifts up water through its own pressure, an ingenious invention by the brothers Montgolfier (who also invented the hot air balloon) in France 200 years ago. Two specifically poor areas on or close to Java with

particularly difficult conditions, had to be tackled in a different way. These are the southern coast of the island, in an area called Gunung Kidul, east of Yogyakarta and the island of Madura, close to Surabaya, on the northeast of Java. In both these cases it is a question of limestone areas with a very thin soil cover; They have the kind of topography and hydrogeological conditions that limestones show in moderate to warm humid climates: A rocky terrain, pitted with caves, sinkholes and enlarged fissures in which water just disappears for miles underground and is very hard to locate through drilling. Furthermore, being close to the coast, there is a great deal of infiltration of salt sea water which would render a large part of the groundwater, which otherwise could have been recuperated through drilling, undrinkable. Over much of these parts, including some outlying small coral islands, south of Java, rainwater harvesting was the only possibility. For a cost of about $300, rainwater cisterns of ferrocement for the collection of water from the often large roofs of communal or family buildings, could be installed in order to ease a small group of families over the worst part of the dry season. This type of project proved so successful that later a major loan was approved by the World Bank for the same purpose, thus giving a much wider coverage with such installations.

UNICEF support spread to projects in other parts of Indonesia, notably the islands of Bali, Lombok and Sulawesi. A share went also to the resettlement areas on southern Sumatra for the grandiosely planned scheme for the migration of populations from overcrowded Java. A modest component of sanitation promotion was included, but got an added push only in the 1980s.

The first UNICEF water colleague in Indonesia was a Swiss engineer, Dietrich Elmer, who had his previous work experience in Nepal. In a quiet, energetic way, Elmer worked in very close relationship with the Indonesia colleagues, Widodo and Soebono, and laid a solid foundation to the late, further expanded work. Some projects were quite unique. In one case, in the Gunung Kidul limestone area in the south of Java, one project called for the installation of electrical pumps in a cave about 500 metres from the entrance. After crawling for several hundred metres into the mountain on all fours, through a narrow cave that the local inhabitants had been using for hundreds of years in order to reach that water, you would reach a mighty underground river that went through a small basin before continuing its erratic way for more miles inside. Electrical pumps were installed there for pumping the water through the narrow cave passage out into the open to the villages in a few miles radius around.

AFRICA: THE CHALLENGE OF DROUGHT AND FAMINE

Before the 1970s, UNICEF assistance to Africa for water and sanitation had been very limited. On this continent the large drought catastrophe of 1972 - 1973 affected first the Sahel and then Ethiopia and other parts of Africa. This entrained the first major inputs for water supply from UNICEF's side, in many countries jointly or co-ordinated with inputs from other parts of the United Nations system, by bilaterals and NGOs. The drought-prone areas in Africa, as elsewhere in the tropical belt largely fall within the zones with an average annual rainfall of less than 1,000 millimetres (40 inches). With the high rate of evaporation from the ground and water surfaces and transpiration from the vegetation, i. e. the loss of water into the air through the heat of the sun, the lowering of rainfall for a number of years even by small amounts, can cause a drought.

Actually, the decrease or absence of rainfall is but one factor in these drought catastrophes, which cause the destruction of agricultural and livestock production and the demise of the human inhabitants through the ensuing famines. The entire process is a result of an unholy alliance between man-made and natural factors, provoked through the over-population of humans and animals, notably cattle. The access to good pasture in rain-rich years and - as was the case in northern and central Senegal - the installation of new water points through drilling of water wells and provision of large amounts of water through engine pumps, helped promote the uncontrolled increase of cattle. The absence of any type of range management caused the number of cattle to increase in an uncontrolled manner, with over-grazing as a result, and the destruction of the protective vegetation cover, even of the grassroots. This resulted in an intense soil erosion through the winds ("deflation") and the redepositing of the windblown sands and silts over other normally green areas, suffocating any vegetation.

In the absence of any effective means to foresee and monitor such a situation, the great drought in the Sahel in 1972-73, sneaked up on everyone. At the same time, the Lomé Conference (1972), arranged by UNICEF for promoting the adequate planning for children and mothers in West Africa, did find water high on the list of priorities of the participating ministers and other high planning officials of the participating West African countries. Ralph Eckert, who in those years was the Area Representative of UNICEF in Dakar, has given a description of how UNICEF found out about the drought situation: "The Lomé Declaration regarding 'water' was not 'programmed', it had not been foreseen. In 1972 nobody spoke of the drought although it was known to those who had to know in Government circles. (In the Spring of 1973, after we had come across the Nouakchott situation, I went to see the Minister of Planning of Senegal to find out whether similar conditions existed in the country, - he said: No!). The Lomé Declaration of 1972 was the first muted outcry from Francophone West Africa. It pointed to the drought indirectly, in disguise. And - nobody understood its real significance. Attention was drawn to "the whole environment affecting women's and children's condition of life". Yes, but underneath lurked the spectre of the drought which nobody dared mention. It was only a year after Lomé when "outsiders" began to discover shocking situations that its existence was recognized."

According to Ralph Eckert, "the Dakar Office became aware of the situation in February 1973 almost by accident when we found thousands of people in tents and huts, camping around the capital of Mauritania, Nouakchott, - since no water was available inland. A planeload of CSM was dispatched from Copenhagen to Nouakchott within three days. Having been alerted, we inquired in Mali and discovered similar situations, - a planeload of milk was flown from Abidjan to Bamako. Small gestures, but we were first. In the Dakar 1973 preview book, we drew attention to the drought in April 1973 and suggested a variety of measures, including a multi-sectoral, multi-country water project. The preview was discussed in Brazzaville in June 1973 with Mr. Heyward in the chair. It was the first time that the drought and its consequences, as well as its implications for UNICEF, were discussed. Martin Beyer came two months later."

Thus was the beginning of the awareness of the drought. A series of measures were very rapidly taken in conjunction with the mobilization of massive forces from all over the world once the full extent of the drought became known. In those days, the means for drought monitoring were much less developed than they are now. Probably one of the reasons why the more recent emergency in 1984-85 which was of a similar nature, could be detected earlier and somewhat better contained, was the overall alertness to the problem and also the use of such technical means as satellite imagery.

The use of satellites, particularly through the United States-based EROS with the Landsat programme, (NASA and the U. S. Geological Survey) was tried out by UNICEF in 1973-74 for locating major fracture zones in India in order to find groundwater in otherwise water-scarce areas. Likewise, UNICEF used Landsat images in Ethiopia in 1974-75, in order to monitor the food situation in the country. This was done by studying the imagery which was renewed every with the regularly recurrent rotations of the satellite over the same parts of the globe at 18-day intervals. What was studied then was the extension of cultivated areas out from the villages that were visible and which would vary according to the availability of water and seeds for food grain.

At the time of the outbreak of the great drought in the Sahel, fortunately enough there existed in West Africa an infrastructure in the form of specialists from UNTCD, funded by UNDP. For many years already they had assisted a number of countries with water resources studies in the Sahelian drought belt and in the regions to the east and south of it. A number of hydrological studies had been made of the highly seasonal river flows in the great rivers, such as the Senegal and the Niger. Rather extensive groundwater studies also had been carried out. Observation water wells had been drilled but these had not been tapped, awaiting further development.

Now these specialists could be directed to uncap the wells. From now on they were to plan their continued water well drilling and accompanying work to serve the immediate installation of handpumps for the drought-stricken communities. UNICEF thus could come in with its contributions, substantially increasing the amount of work to be done. Not that the UN staff was very numerous, but they were veterans of many decades of work in West Africa, people like Mr. Moullard, the French UNTCD project manager for a groundwater research programme in Mali and the British water engineer Gus Waters in Liberia.

The Sahel countries - joining up with UNTDCD

With the alarm being sounded as to the drought conditions from the UNICEF colleagues in West Africa, Ralph Eckert in Dakar and the Regional Director, Jean Guibbert in Abidjan, Martin Beyer was dispatched by E.J.R. Heyward, UNICEF's Deputy Executive Director (whose behind-the-scenes role - sometimes as deus ex machina - would fill an entire chapter), in June 1973 to the Western and Central part of the Sahel. Beyer was to take a rapid stock of the situation and help plan for the inputs of UNICEF for emergency water supply.

The few countries slated for immediate assistance were Senegal, Mali, Upper Volta (in 1984 renamed Burkina Faso) and Niger. There had not been any major water projects supported by UNICEF in any of these countries before, whereas UNDTCD, as earlier mentioned, had been very active particularly in Mali for the strengthening of the national hydrogeological and water well drilling services. It was therefore logical that UNICEF in the first hand would provide additional equipment and materials, reinforcing the DTCD-managed projects. Only much later, in the 1980s did UNICEF begin to set up its own posts for water and sanitation project staff in the Sahel countries, when the work had developed into a long-term concern.

The co-ordination of all the relief activities in the Sahel became centered on Ouagadougou, the capital of Upper Volta. The overall co-ordination of all UNICEF activities in the Sahel for a while was entrusted to Michel Bonfils, a French administrator, who in his earlier youth had lived for long periods with the Tuareg in the Sahara. The UNCTCD/UNICEF co-ordination for water supply was taken care of by a Swiss engineer, Jean Baehler, assisted by a French administrator, M. Flad. They had an enormous area with equally enormous needs to cover. In the end, in 1975, on one of his long travels by car over unending roads, Baehler's car overturned on a road in Mali, tragically killing him and his wife. This was a great loss of a capable and friendly key person in the struggle against the drought.

From then on, and with the immediate rages of the 1972-73 drought seemingly abated, the Sahel activities were dealt with more and more on an individual country basis. Unfortunately, this was reflected on a large scale also by the disintegration of the proud plans for co-operation between the countries of the Sahel, backed by the United Nations, through the organization of CILSS (Comité Inter-Etat pour la Lutte contre la Séchéresse au Sahel - the Inter-State Committee for the Struggle against the Drought in the Sahel), with its much-needed plans for improvements in range management, food storage, roads and transport.

In the years 1972-1973, the Sahel countries presented a bleak picture. Fine sand and dust, eroded by the winds from the Sahara in the north and from the overgrazed Sahelian plains, covered the ground over hundreds of thousands of square kilometres, which once had been cultivated fields and reasonably green pastures. Overpopulation and overgrazing together with the long absence of rain contributed to the drought.

An example of the kind of intervention that inadvertently had led to this overgrazing, was the bilateral assistance in the 1960s to the drilling of some 80 deep wells over central and northern Senegal. These wells tapped an aquifer (water-bearing layer) at depths between 300 and 400 metres, the famous Maastrichtian (Upper Cretaceous) sandstone, constantly fed by rainwaters infiltrating hundreds of kilometres further inland. Each well had had a powerful diesel pump installed. Big water cisterns of 300 cubic metres each were to serve the thousands of cattle tended to by Peulh and Toucouleur tribesmen. The sudden abundance of water led to a rapid multiplication of cattle, resulting in accelerated overgrazing and destruction of the protective web of grassroots.

The ensuing sudden migration by large numbers of the nomads and semi-nomads from the north with starving, emaciated and dying people by the hundreds of thousands, was a terrifying phenomenon. In many areas it increased the pressure on the sedentary population further south, who already under normal conditions would eke out a marginal existence, and who now also felt the effects of the drought. In some areas, there were furthermore political aspects and - in one or two cases - initially a great reluctance in some political circles locally to facilitate aid to the nomads from the north - repercussions of previous centuries of nomad incursions and, at times, conquest and dominance.

Tens of thousands of refugees from the drought flocked to the cities and larger towns, such as Dakar, Timbuctoo and Agadès. In Gao alone, a historical town on the middle reaches of River Niger in eastern Mali, in the summer of 1973, some 50,000 nomads were encamped in tents and makeshift huts on the banks of the Niger just outside of town. Their survival was guaranteed only by the daily airlift of tons and tons of food grain, as was the case in other major refugee concentrations, through U.S., Federal German, United Kingdom, Belgian, Canadian and other Air Force units.

The masses of people, displaced through the drought had to use whatever river water was available for the interim period of their miserable existence around these towns. Some measures could be taken in terms of improving existing dug wells and - as soon as equipment could be mobilized - drilling of wells, installing diesel-electric pumping units and setting up tanks with taps.

The major support, though, went into reinforcing the national well drilling organizations such as HER (Hydraulique Equipement Rural) in Upper Volta or OFEDES (Office pour L'Exploitation des Eaux Soutéraines) in Niger. The selection of well sites to be equipped with handpumps would aim at maintaining fresh water supply in areas where people still were staying. Often women, children and the elderly were left behind in the villages, while the men went further south with their cattle in search of greener pastures. These most vulnerable remaining groups had to be helped to survive and then to create a base for better and more secure living conditions.

The work carried out in the Sahel by a handful of government engineers and drillers assisted by even fewer DTCD and UNICEF staff in those days, would not resolve the great problems but would help to dampen

some of the worst impacts of the drought. It would also lead to somewhat improved working conditions, through the experiences gained and the constant pressure on the national politicians and administrators, which may have helped in the more rapid response to the next peak of drought, in 1984-85.

In Senegal some of the work consisted of help to improve or resink hand-dug water wells in the northern and central parts of the country.

In Mali, the DTCD/UNICEF assisted activities were directed particularly to the schist areas around Nara and Nioro, several hundred kms. north of Bamako in the western part of the country. Other areas provided with assistance were around the Bandiagara Plateau in the central-south.

Upper Volta, which received considerable bilateral and other aid, had the DTCD/UNICEF support going into the northern fringes of the country, centering on the District capital of Kongoussi with wells drilled in the hard rocks and installation of handpumps. This assistance extended to the difficult Liptako-Ngourma Zone on the border to the Niger Republic.

In Niger, the main activities were directed to the region between Zinder and Agadès in the central-eastern parts of the country, the semi-desert part, very severely affected by the drought.

West Africa South of the Sahel

In the same years of the drought, during the first half of the 1970s, other joint UNDTCD/UNICEF ventures were begun in some of the countries south of the Sahel. They were implemented in the wooded savanna and rainforest belts, with a higher rainfall but with equally difficult water resource problems. Most water resources, traditionally available in the villages would be surface water courses or shallow unprotected dug wells. Therefore, again, drilled water wells and spring protection would be the only ways to provide reasonably safe water the year round.

In the 1970s it was still too early to enter upon sanitation on a larger scale. Sanitation and health education efforts to help prepare the way, were part of the health programmes as assisted by WHO, bilateral agencies and NGOs. The important part of environmental health that is vector control (i.e. the fight against carriers of disease insects, molluscs, rodents, etc.) is not included in this history, since this set of disease control measures overwhelmingly has been carried out in the context of health programmes.

The largest ones of these were under WHO auspices, partly with UNICEF support. This was the case of the big malaria campaigns of the 1950s and 1960s. In the inner part of West Africa, the large onchocerciasis programme is still going on with the aim to eventually free the river valleys from this scourge of river blindness. One part of this campaign was to provide a water supply through new wells for the

villages built in the higher reaches of the plateaus, where the risks of infection would be less, between the creeks and river beds and along the banks of which the parasite-bearing Simulium fly had its habitat.

In the individual countries, the modest UNDTCD/UNICEF assistance was thus mainly used for water supply. In Liberia, a senior British water engineer from DTCD, Gus Waters, was the first to lead a rural water supply programme underway. He was ably seconded by young Liberian engineers and geologists, such as Bismarck Johnson, and other DTCD colleagues, notably Michael McFadden (USA). Waiting for the first light-weight drilling equipment to arrive, Waters had a number of spring protection systems built in rural areas some 50 - 100 miles north of Monrovia, the capital on the coast. The first well to be drilled, was at Totota, halfway on the main road from Monrovia to Ganta, close to the border with Guinea. This community happened to be close to the farm of President William Vacanarat Shadrach Tubman, and so this well would be a visible means of sustaining interest at the highest political level.

Closer to the Sahel is Gambia, this peaceful country, strung out along the Gambia River. With the occasional support from visiting UNICEF Programme Officers, Alan Silverman, John Spring and others, the Gambian engineers headed by Sigismund Johnson, supervised the digging and lining of hundreds of large-diameter wells.

It was during this period that similarly support was begun to a co-ordinated UNICEF/DTCD/World Bank input in Sierra Leone, more details of which are described later in in this account.

In other West African countries in those days, UNICEF had only small or no inputs. Other bilateral sources contributed strongly, e.g. in Ghana with two big drilling-cum-handpump campaigns launched by the Federal Republic of Germany and Canada. In Benin, a UNICEF-supported drilling programme was started up towards the end of the 1970s. Here the World Bank contributed financially. It was also in Benin that some of UNICEF's water specialists began their career in the organization, notably the French hydrogeologist Christian Hubert and the Dutch Master Driller Willem Heijstek (now in Kampuchea).

In Central Africa, modest activities were funded and supplied with materials, mainly for water well digging, spring protection and gravity feed schemes. This took place in the Cameroon and Zaire, with only small inputs in the Republic of Congo.

The work in Zaire was concentrated in the densely populated slopes of the Rift valley in Kivu Province, where UNICEF combined the work in water supply with that for child health, education and other social services. The response on the side of the beneficiaries was very positive and backed by the strong support from the local rulers, such as the Queen of Walungu. In the centrally situated provinces of Kasai-Oriental and Mbuji-Maji special help was given by SATA/Helvetas, the Swiss Agency for Technical Assistance through their young engineer Urs Kundert, who provided the surveys and designs for rather extensive piped water supply systems. Energetic support was provided by Zairois sociologist Kashige Bashizi out in Kivu. Bashizi worked with his countryman, a gentle and dedicated engineer named Metela, who supervised the works and who later died at a young age.

Other African countries

In some other African countries, the UNICEF involvement began during the years from 1975, notably the former Portuguese possessions. Since the most consequential part of the activities there took place from 1979-80 on, they are described in the following chapter.

EAST AFRICA

Ethiopia - from gold mining to the quest for water

The drought of 1972-73 had been in the making already for some years and extended beyond the Sahel of West Africa into Ethiopia and affected East Africa in its drier areas, such as northern Kenya and parts of Tanzania. In Ethiopia, the combination of climatic drought, malnutrition, internal strife (Eritrea, Wollo, Tigrai, Afar, etc.) and complete neglect from the side of the Imperial Government, had as catastrophic an effect on the populations as the corresponding factors had in West Africa.

In the words of a senior UNICEF colleague, "The government would not disclose the conditions that would spell famine, misery and death to millions of its people, to the outer world. The international organizations dared not speak up for fear of prejudicing the Ethiopian government against them and thus make any action impossible. Thus, when the first disclosure to the exterior was made of the real state of affairs by a young UNICEF Programme Officer, Stephen Green, the drought and its effects were already in an advanced stage. Stephen Green's courageous stance cost him his post for "raison d'état" but triggered a massive international relief campaign." The rest is history now. Emperor Haile Selassie was deposed and replaced by a military government, the "Derg" under Colonel Haile Mariam Mengistu.

Among the direct relief actions, water supply was a prime one. It was realized that any intervention for water supply would rapidly ameliorate an otherwise desperate situation. Relief in terms of water supply at the same time became a first step towards rehabilitation and strengthening of the national infrastructure on a longer term basis.

In spite of the miserable condition of Ethiopia and its people, two government-linked organizations stood out as effectively managed. One was Ethiopian Airlines, which falls outside the scope of the present history, although its good services greatly facilitated transport of people, equipment and other supplies from UNICEF. The other one was the Ethiopian Water Resources Authority (EWRA), responsible for water supply and water resources management throughout the country, now called the National Water Resources Commission. It was staffed by competent and motivated nationals such as Ato Birru Itissa, one of the Directors, and strongly assisted by a United Nations team (TAB/DTCD) . For many years through to 1980, the UN team had been headed by a Dutch hydraulic engineer, Gerry Dekker, who helped build up EWRA to be one of the best agencies of its kind in Africa.

This provided a stable base for the UNICEF-assisted activities, which were developed successively during the years 1973 - 75, and which have been maintained since. For many years, UNICEF remained rather operational with direct inputs in the most difficult areas of drought, strife and warfare. Only by early 1984 was UNICEF's role somewhat toned down to a more advisory one and one of supply elements, although the training component continues strongly.

Beginning in 1973-74, UNICEF's assistance concentrated on some of the worst hit drought areas in Wollo and Tigrai to the north and northeast of the central, more rain-rich highlands. Later on it spread to Hararge, and Ogaden, the hotly disputed border areas with Somalia. To this were then added a series of provinces in the southern part of the country, on the border to Kenya and Sudan: Bale, Sidamo and Gemmu-Goffa.

For Wollo and Tigrai with their extension into that geologically interesting but climatically speaking, hell-hole of the Danakil Depression, inhabited by the tribes of the Afar and the Issas, drilling of water wells was the only solution. Engine-driven pumps were installed to serve people, cattle and camels inasmuch as they had survived. A high priority was given to camps for the refugees from the drought and - later, especially in the Ogaden - from the border war with Somalia.

For larger camps and communities, and wherever conditions so allowed, perennial natural springs were harnessed and provided with pipelines to camps, villages and even small towns. The self-help element was encouraged, where the technologies could be kept simple enough. This was the case, particularly with the digging (manual excavation) of water wells in the south. One of the most important features of the UNICEF assistance was the training of water well drillers and engineers.

The work never was easy. Adverse geological conditions with tough basalt rocks, overburden with boulders and loose gravel and highly mineralised, hot groundwater proved to be a problem for drilling crews and water consumers alike. Add to this the long distances, few and bumpy roads, a formidable terrain and all sorts of logistics and supply difficulties. In the ports of Djibouti and Assab, imported equipment would be delayed, vying for clearance with the hundreds of thousands of tons of grain, other relief food and related commodities.

Political pressure, the severity of transport and outright danger to life and limb would make the work hazardous for the Ethiopian drillers and the few UNICEF watermen who were their instructors. At some instance, unwittingly, UNICEF's Vlado Zakula one Sunday afternoon on a road in Wollo literally came under crossfire between government troops and rebel forces. He had to dive for shelter from his bullet-riddled car into a ditch, spending some very uncomfortable hours there. It was not personally intended, so Vlado survived. Normally, otherwise, the UNICEF-assisted water supply construction would never be hampered by either side in the conflict. The sanctity of water transgressed any short-term worldly consideration and UNICEF, with its staff, was too well-known and popular to warrant any drastic hostile action.

Again, in Ethiopia as elsewhere, it was the UNICEF staff in the field, who turned the inputs into an astounding success. The real pioneers were taken over on the spot from the United Nations water resources team. The first one, and main person responsible during the first years of the 1970s was C. K. "Roger" Stapleton, the incarnate British country gentleman, a senior, highly experienced drilling engineer. Very spectacular with enormous side whiskers and a jovial authoritative way, Stapleton rapidly got two big drill rigs procured through UNICEF, recruited the first colleagues and established the links with other agencies.

A great help during the first two years also was provided by a civil engineering consultant from the UK, Peter Stern, who was connected with the Intermediate Technology Group in London. His inputs were particularly in the protection of springs and piped schemes in the north. Very efficient and timely help was further given by WHO's sanitary engineering advisor, Marianovic, who in the latter half of the 1970s would repeat the same performance in Afghanistan.

The most original and effective action in the efforts by EWRA/NWRC and UNICEF was - and still is - provided by Vlado Zakula. A Yugoslav drilling and mining engineer, Zakula began to work in Ethiopia through the bilateral Yugoslav assistance in 1960. His first assignment there was to mine gold for Emperor Haile Selassie. Later he was inducted to work with the United Nations, supervising drilling for mineral deposits with the Geological Survey of Ethiopia. He therefore was thoroughly familiar with the country and the country with him when the drought broke out. His popularity ranges from the humblest nomad in the Danakil to the highest government circles in Addis Ababa. Any attempts to have him transferred to other UNICEF assignments immediately caused government protests. Vlado Zakula has remained an institution in his own right. For eleven months out of the year, he would be found at some drill site in the outlying inhospitable reaches of Wollo, Tigrai or Eritrea, living in a small caravan with a good stock of Yugoslav wine for the occasional visitor.

Gradually, other UNICEF colleagues were added to the team. When Stapleton was transferred in order to become the first Regional Adviser for Water Supply for East Africa in Nairobi, his successor for some years was Dragutin Jovanovic, another Yugoslav engineer with long experience from Ethiopia. Those years also saw the employment of a very young Swede, Thomas Ekvall (presently chief of the massive water supply cum sanitation and health campaign in Uganda), who efficiently supervised the community-based activities in Hararge-Ogaden and, later, southern Ethiopia.

Finally, in Ethiopia as elsewhere in the world, should not be forgotten the strong encouragement and support by the UNICEF representatives. In the heydays of the emergency it was the Scotsman Alan McBain who underpinned his stimulating management with an unlimited stock of good stories and tales. He was later replaced by Haitian diplomat Marcel Fombrun, under whose aegis the emergency action turned towards longer-range goals. The new Ethiopian government then, between 1975 and 1980, consolidated its position and policies. Interesting, especially for the improvement in community participation in water projects, was the mobilization and organization of the farmers, and the forming of the women's associations. This was the first time that women in the countryside of Ethiopia were given any form of status and influence in the affairs of the community. In its turn, this would help to anchor the concepts of the provision and use of safe water and sanitation in the communities, as well as other measures for improving the lives of their children.