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SYMPOSIUM ON PERSPECTIVES ON  
OCCUPATIONAL HEALTH IN DEVELOPING COUNTRIES  
IN RELATION TO PRIMARY HEALTH CARE

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WATER- AND WASTE-RELATED PROBLEMS  
FOR OCCUPATIONAL HEALTH  
IN THE DEVELOPING COUNTRIES

by  
Martin G. Beyer

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**WATER- AND WASTE-RELATED PROBLEMS  
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Even before the famous founder of occupational health as a specific branch of health for humanity, Bernardo Ramazzini, concerns were expressed by earlier writers as to the effects of the many hazards lurking around human beings in their daily toil.

Georgius Agricola, the German classical scholar cum medical doctor cum mining engineer cum geologist cum Burgomaster of Chemnitz, Saxony, in his famous treatise on mining and metallurgy of 1556, "De Re Metallica", devotes several pages to the maladies of miners. About water, the subject of the present introduction:

"Where water in the shafts is abundant and very cold, it frequently injures the limbs, for cold is harmful to the sinuses. To meet this, miners should make themselves sufficiently high boots of rawhide, which protect their legs from the cold water; the man who does not follow this advice will suffer much ill-health, especially when he reaches old age."

Conditions over large parts of the developing countries in terms of occupational health and health hazards still correspond very much to those prevalent in the past from Greece and Rome of antiquity up until quite recent epochs.

**Needed: A broad definition of water as a factor in occupational health**

As to water in its many forms, occurrences and uses, the occupational health problems are much dependent on the quality of this fluid and - in particular - the presence or absence of the many contaminants that constitute pollution.

For practical purposes, the involvement of human beings in their productive activities with fresh water as a basic commodity, as a medium, as an environmental component, cannot be separated from the disposal of waste water and other wastes produced.

Thus an overview of the subject of water will have to be presented together with the related aspects of waste disposal. Also there are direct ramifications into the fields of air and soil pollution.

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Again the questions of water quality and how it affects people in their different occupations are of direct consequence for a great number of occupational categories. In fact, directly or indirectly, water plays a prime role in the work of most, if not all of the two billion people or so involved in occupational activities in the developing countries.

The need for integration of occupational health into both primary health care and into the planning for different sectors of productive human activities is reflected in the inclusion of the concern for water quality into the overall aspects of sectoral activities as diverse as agriculture and energy production.

Also included in this overview would be certain aspects of health and hazards, not necessarily implying water quality but directly connected with the production and drawing of water as well as the disposal of excreta and other wastes. This broadens the spectrum of health hazards to not only the chemical and biological pollutants but also the impacts on the anatomy and on the mind.

**"According to statistics, she's not working"**

In the same token, this broader definition of occupational health linked with water and sanitation includes the over one billion persons, mainly women and children, who are burdened with the daily chore - up to eight hours or more a day in the poorest areas of the world - of carrying water from remote miserable water holes to their homes.

The poster from INSTRAW, the United Nations International Research and Training Institute for the Advancement of Women, says: "According to statistics, she's not working". Yes, she is. And How! To the detriment of her family, her children, the economy of her community and herself. Lost opportunities for education and rest. The health consequences are fatigue, mental stress, exposure to many infections, including severe parasitoses, footsores, deformation of the vertebral column, the pelvis, risk for prolapse of the uterus through too heavy loads and many others.

The same goes for children, similarly not always included in the official statistics but confronted with the same harsh realities of hard work, a hostile environment and an even higher vulnerability than have adults to the many health hazards around. Water- and waste-related hazards play a great role for the almost 5 percent of the world's economically active population, made up by children under 15 years of age. ILO statistics in 1978 set the total figure of working children in the world to 52 million, 80 percent of whom or 41 million were unpaid family workers.

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The effects on growth and development of children of the social, labour, physical and mental disadvantages of unprotected work are detrimental and are strikingly illustrated in a recent ILO report (Bequele et al. 1988). Water- and waste-related health hazards are exemplified in case studies from gold panning in Madre de Dios, Peru, leather tanning in Cairo, Egypt or from the wood and clothing industries in the Philippines.

Not only the direct impact of water quality from water as a work medium or waste products but equally the lack of adequate drinking water supply and sanitation facilities are high on the list of adverse factors affecting these children. They suffer from malaria, fevers, cold, anemia, piodermis, gastro-intestinal diseases, accidents, including drowning, dehydration from working in too hot an environment, the onslaught of chemicals in solution and malnutrition.

Add to this their living in congested and unsanitary conditions and no access to safe drinking water and sanitation facilities in their workplaces, and you have a terrifying picture of a work force of millions of children, exposed to all the risks and having to forego the normal chances for development, physical and mental, which would be their natural right. Water- and waste-related hazards underlie this anomalous inhuman state. Any action to improve conditions for such working children as well as their adult counterparts, would have to begin with a strong element of improving water supply and sanitary conditions.

#### Health hazards related to water and wastes

In the following four tables, an outline is given of:

- 1) Water- and waste-related occupational health hazards.
- 2) Pollution of water resources as components of the hydrological cycle.
- 3) Contaminants.
- 4) Sources of contamination.

Table 1.

EXAMPLES OF  
WATER- AND WASTE-RELATED OCCUPATIONAL  
HEALTH HAZARDS

HEALTH HAZARDS	Physical - Mental <small>Skeleton, Muscles, Tendons, Skin, Lacerations, Stress Fatigue</small>	Chemical  Irritating - - Toxic	Biological  Infections - - Vectors
<b>OCCUPATIONS</b>			
<b>WATER SUPPLY</b>			
Exploration Well digging, drilling Construction	Mechanical injuries Drilling dust Noise	Drilling fluids Asbestos, cement, pipes Lead in plumbing	
Operation/maintenance		Water treatment Chemicals (Chlorine → THM)	Exposure to raw water
<b>WATER USE</b>			
Industry Mining/metallurgy Machines/tools Paper, pulp Consumer goods Chemical etc.		Mineral-beneficiation media Industrial waste waters	
Energy production		Process and waste waters	
Oil, gas, coal Nuclear Hydro		Process and waste waters Potential radiation from leaks, cooling etc.	
Household/Services Agriculture/Husbandry Forestry Fisheries	Energy loss Fatigue, Stress Skeletal deformation		Exposure to infections and vectors: e.g. Guinea worm, Schistosoma etc.
Food handling			
<b>WASTE DISPOSAL</b>			
Sewerage systems Excreta handling Solid wastes	Soiled internally	Leachates	

TOXICOSES AND CANCER,  
ILLNESS, INVALIDITY  
AND DEATH

Table 2.

**POLLUTION OF WATER RESOURCES  
AS COMPONENTS OF THE HYDROLOGICAL CYCLE**

ATMOSPHERE	Natural: Volcanic ash etc. Manmade: Fluorocarbons, Carbonic acid etc. (below)
PRECIPITATION	Acid rain: Carbon dioxide + water vapor → → carbonic acid. Sulfur dioxide, hydrogen sulfide, nitrogen oxides, hydrogen chloride [RADIATION]
SURFACE WATERS	Salt water intrusions
RIVERS	Domestic wastes
LAKES	Animal wastes
SOIL AND GROUNDWATER	Agricultural wastes Industrial wastes
[BIOSPHERE]	
OCEANS	

SEE ALSO 'SOURCES OF CONTAMINATION'.

Table 3.

**CONTAMINANTS**

<b>MICROBIOLOGICAL CONTAMINANTS</b>	
VIRUSES	
BACTERIA	
PARASITES	
<b>SUSPENDED SOLIDS</b>	
CLAY	} <i>Inactive in themselves, can carry other pollutants</i>
OIL	
MINERALS : <i>Asbestos etc.</i>	
<b>INORGANIC SOLUTES</b>	
METALS : <i>Ba, Cd, Cr, Pb, Hg, Ag, Be, Co, Cu, Mg, Mn, Mo, Ni, Sn, Va, Zn.</i>	
CHLORIDES, SULFATES, FLUORIDES ETC.	
<b>ORGANIC COMPOUNDS</b>	
CHLORO ORGANICS :	
POLYCHLORINATED BIPHENYL (PCB) : <i>Dioxin etc.</i>	
POLYNUCLEAR AROMATIC HYDROCARBONS	
HERBICIDES	
PESTICIDES	
RADIOACTIVE MATERIALS : <i>Plutonium etc.</i>	



Table 4.

## SOURCES OF CONTAMINATION

### NATURAL SOURCES

Plant and animal wastes, organic acids  
domestic wastes.

### RUNOFF, SPILLS AND ACCIDENTS

Point sources

Non-point sources (farmland): E.g. fertilizers  
pesticides

### INDUSTRIAL DISCHARGE

Metals, inorganic solutes,  
Synthetic organics etc.

### LANDFILLS

Leachates.

### SEWAGE TREATMENT

Remaining organic wastes

### WATER TREATMENT

Chlorine → Trihalomethanes

### RADIOACTIVITY

Mining and processing of radioactive  
materials.

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This overview does not aspire to any completeness nor any great detail, which anyway is available in a vast array of literature. It rather is intended as a background for the continues discussion on how to approach the question of occupational health in the developing countries for combatting the many hazards, causing misery and death for hundreds of millions of men, women and children at any given period in time.

The economic costs involved as direct consequences of water pollution and unsatisfactory waste disposal are staggering. As an example, one of the worst parasitoses in its effects on the human body and the communities afflicted, is dracunculiasis. This is caused by a nematode, Dracunculus medinensis or guinea worm. It settles under the skin of the infected human beings, frequently causing total invalidity and contributing to malnutrition and death. Some 200 million people in large areas of West and Central Africa and Southern Asia (northern India and Pakistan) suffer from dracunculiasis. The cycle of this abominable parasite has the adult worm from inside the human body spawning its larvae into water bodies, such as the large open "step-wells" (ancient lined dug-water wells with steps leading into the water) of southern Asia and the Middle East. Via an intermediate host in the form of a Cyclops (a microscopic crustacean) the larvae are re-ingested by human beings only by way of drinking the infected water.

The good news is that, since the only transmission route of Dracunculiasis medinensis is by way of drinking from polluted sources, this disease can be totally eliminated through providing drinking water from safe sources, notably handpumps and educate the communities to take their drinking water from such sources alone. There is the present world-wide commitment to provide potable water supply and sanitation for all as part of "Health for All by the Year 2000", following the recommendations of the World Health Assembly. In this lies the potential to have dracunculiasis the second infectious disease to be totally eliminated after the successful eradication of smallpox through the work of the World Health Organization.

What this means in terms of occupational health, can be gauged by the results of a recent evaluation from Nigeria. Work of the last five years in some dracunculiasis districts in eastern Nigeria has led to almost complete reduction of this disease, accompanied by a 20 percent increase in the local production of rice, the staple food over large parts of the country.

#### The occupational hazards: What can be done?

Even the industrialized countries with their higher levels of income, education, quality of life and other resources, in terms of water resources and their management, have not been able to completely control and manage their water resources. A high degree of water pollution exacerbated by accidental spills is still prevalent in many river basins. The experiences from e.g. the river Rhine in Europe or the Ohio River in the United States are but two of a great number of rather recent examples.

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The developing countries are even worse off in terms of effective management and control of their water resources and their quality, or rather the lack of it. Suffice it to mention the murky waters of the Hooghly River at Calcutta, the Red River at Hanoi - the waters of which are rather black - or the Huang-P'u Chiang through Shanghai. Know the hidden dangers to the Egyptian farmers of the Schistosoma-infected Nile or the apprehensions for the same infection risking to spread through the new dam lake above the giant hydroelectric plant at Itaipú on the Paraná River between Paraguay and Brasil.

The awareness among workers, the communities and the governments of all these problems is there only in bits and pieces, the question is, how to achieve better protection for the workers exposed to the hazards of contaminated waters and wastes and emissions. By implication, given the nature and effects of pollution, the necessary action largely would have to coincide and be co-ordinated with ongoing similar actions for the total of the populations of the developing countries.

The problems and the ways to attack them are manifold and need a multi-pronged approach. This would have to involve awareness and determination at the political levels, public information, including education of labour and management as well as changes in technological and workplace practices. There is an absolute need for control of effluents and for overall management with regulation of surface and ground water resources. It involves farming practices and changes in personal knowledge, attitude and practices.

A set of factors and actions would be needed to bring about improvements in occupational health as related to water and wastes. An outline of these is given below, covering the actors, the fields of action and the external support to this. The task ahead is staggering in its complexity and magnitude. It requires careful planning, ideally the elaboration of a Master Plan at national level.

### **The actors**

Primarily it is on the national level that the actors are to be found: Governments and government agencies, communities, individuals, agricultural, forestry and fishery production units and organisations, industries and external support agencies. While recognizing the absolute priority for the action to be held within the national context, country by country, it would lead too far in this presentation to dwell in great detail on this level.

For the discussion at hand, the role and possibilities to assist in the process of improving the occupational health situation as to water and wastes as to actions by the so-called External Support Agencies (ESA:s) should be somewhat elaborated.

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The large group of organisations within the United Nations System, each of which have been given their mandate through the General Assembly, have an overall role as politically impartial and universally recognized bodies to help stimulate policies, co-ordinate and monitor development and - in certain cases - assist with the part funding or financing of national efforts seen in a global perspective. Each of them have their specific tasks and include, among others, UNDP (as co-ordinating development agency at country level), UNEP (environment), ILO (labour), WHO (health), FAO (food, agriculture and forestry), UNIDO (industrial development), IAEA (atomic energy), INSTRAW (women), UNESCO (education and science) and UNICEF (children).

An important group of organisations with closely linked activities are the international and inter-governmental financial institutions, providing a large proportion of funding for development, such as the World Bank, the Regional Development Banks and the Arab Fund for Economic and Social Development (AFESD).

The bilateral organisations such as CIDA, USAID, SIDA, NORAD, JICA, Direzione Generale per la Cooperazione allo Sviluppo and others, have an important role to play, both in the direct bilateral cooperation and in their ramifications with the multilateral system. As to their direct cooperation, not the least in connection with support to the building of the productive capacity and infrastructure for the developing countries, the concerns for water quality and waste in the environment will have to be included from the earliest stages of planning.

A likewise important role as partners in the work towards better conditions for occupational health as part of the development process is played by the numerous non-governmental organisations, concerned with humanitarian and development issues, from the Anti-Slavery Society to Zonta International. They all provide good channels for stimulating and participating in the work for occupational health very closely in liaison with all the other bodies involved.

There are co-ordinating mechanisms between all these organisations that could be used by any of them individually for both exchange of experiences, promotion of policies and more rational utilisation of the generally scarce and often quite specialised resources of the individual organisations. In the field of water resources there is the Intersecretariat Group for Water Resources of the United Nations Administrative Committee for Co-ordination (ACC). This Group recently at the request of the Economic and Social Council (ECOSOC), initiated a project for formulating a global strategy for better management and conservation of the world's water resources as a somewhat belated follow-up to the "Mar del Plata Action Plan", resulting from the United Nations Water Conference in 1977. A proposal for this strategy is to be presented to ECOSOC by early 1991 and is intended to serve as a vociferous promotion of action on the side of both the governments and the United Nations system, including strong support to the environmental and qualitative aspects of the world's water resources.

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Several projects, most of them jointly between several United Nations Agencies, actively deal with the monitoring and control of the quality of the environment, and especially of the water resources. There is the GEMS Programme (Global Environmental Monitoring System) between WHO and UNEP. There is PEEM, a joint programme between WHO, FAO and UNEP dealing with vector control especially in an agricultural context. Certain projects and programmes coordinated by e.g. UNESCO, WMO (World Meteorological Organisation) and UNEP (such as the cleaning up of the Mediterranean) or by several governments under UN auspices, such as the concern for international river and lake basins (e.g. the Mekong and Zambesi Rivers or Lake Chad) also have definite bearings on important water resources from both a quantitative and qualitative point of view.

An especially active and important co-operation for drinking water supply and sanitation with direct consequences for the environmental qualities of life and work, has developed during the last ten years between governments and the external support agencies from all over the world as a consequence of the International Drinking Water Supply and Sanitation Decade 1981-1990. Even though the lofty goals of "Water and Sanitation for All by 1990" would not be reached everywhere by that year, there is now common consensus to more realistically reach at least adequate supply of safe water for all as part of the goal of "Health for All by the Year 2000".

#### Fields of action

A brief listing of some of the fields of action will here have to take the place of any more elaborate attempts at working out any strategies or suggestions for a real action plan. Such attempts will remain theoretical unless placed into a real country context, national or local.

##### Political awareness and commitment:

This requires policy promotion to be linked with ongoing work for the establishment of Primary Health Care (PHC) and the different concerns for the quality of the environment with water resources as one of the basic ingredients.

##### National planning:

In order to achieve the inclusion of water quality concerns into the national planning for occupational health, a data base is necessary. It might exist already wholly or in parts with different government agencies. The national planning should include or lead to the appropriate legislation, implementation and controls for both the environment, including standards for water quality as well as guidelines for preventive measures as to protection of the working population.

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**Upkeep of the quality of water resources at work places:**

This involves the technological processes in production and in waste management, overall management of individual work sites along with co-ordination of production sectors and groups of activities and geographical units (regional planning etc.). It has to include the important concern for Human Resources Development from information, motivation and training at high administrative and technical level all the way through to functional education in primary schools and even for pre-school tots. Many different types of activities are involved exemplified with some possible ways of action:

- \* **Agriculture/husbandry/forestry/fisheries:** Combine the works of agricultural extension with the development of PHC including a strong element of health/sanitation education. Special consideration for the protection against the effects of pesticides, herbicides and fertilizers.
- \* **Industry including energy production:** Prevention of pollution with cleaning of effluents and emissions. Measures for safety at the work places and protection of the individual worker, involving a considerable educational element there, too.
- \* **Hydropower:** With the impact of dam construction on the potential spread of specific infections (e.g. schistosoma) and other health and social impacts, the need for careful planning as to environmental, social and economic consequences.
- \* **Transport:** Health impacts of emissions from engines as well as from herbicides and chemicals used on roads and railroads, which go into solution also into surface and ground waters.
- \* **Human settlements:** Water and wastes as connected with housing conditions and infrastructure. Special attention to work sites connected with household production and treatment of sewage.

This all presupposes a heightening of the general awareness of the entire population for the protection of the environment and their own health. Again this presupposes an accelerated increase in the general level of functional education. A major step towards the distant goal of universal functional education including female literacy is planned to be taken through a major campaign to be jointly initiated by UNESCO, UNICEF and the World Bank at an international conference in the fall of 1989. This will be akin to and closely linked with the world-wide movement towards universal Primary Health Care and would provide an important vehicle for the concerns for occupational health expressed above.

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**Conclusion: Achieve the impossible within the frame of the possible**

It is easy to forward magnanimous statements and - often unasked for - good advice to poor neighbours. It is a different matter to really achieve all these desirables and literally making ends meet. There is still a tremendous discrepancy between the humanitarian concerns for people at their work places, their many and urgent needs for protection, and the knowledge and willingness closely coupled with the financial means to bring about the required changes and improvements.

There are many ways in which the great family of external support agencies can be helpful. One prerequisite is to do so in well co-ordinated and concerted actions. These again would have to assist in many ways:

- \* **Education and training:** At university level introduce the elements of occupational health not only for medical specialists and other health workers but to reach all disciplines involved with human activities, including administration, economy, business, engineering, juridics and social sciences. - Make use of existing and planned professional and educational networks (including e.g. the new project for support to universities and teaching institutions in Africa for Child Survival and Development, coordinated by the new UNICEF International Child Development Centre, Spedale degli Innocenti, Firenze, Italy).
- \* **Policy promotion:** The strongest promotion is by joining actual inputs, technical, training at the work sites, financial in individual development projects with well-planned designs of industries, agricultural projects or other installations for the proper management and protection of water and the safe disposal of wastes. - An important element is to link up with and make much more use of the services of the many international institutions and organisations involved. The active participation of the United Nations organisations, as relevant to the individual type of project should be sought. This has a mutual effect of reinforcing both the practical action and the impact by the example on government policy and - eventually - a more nation-wide spread of awareness and action at the local level.

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- \* **Financing:** Occupational health presently does not enjoy a very high priority in most developing countries. The demands on already strained finances in these times of monumental national debts are a most serious constraint. If, however, there is sound planning for any development project involving human labour, there would be good chances for part of the financing to be allowed to be used for the protection of the environment. The major external support agencies are now placing high emphasis on these concerns, exemplified by the World Bank's recent strengthening of the environmental screening of projects submitted for their financing.

With our globe becoming increasingly crowded, the need for rapid and decisive inputs to improve work and health conditions is daily growing. There is a need to combine a sense of realism with a good portion of optimism. In spite of overwhelming odds, a good deal can be achieved by not shying away from the problems, by communicating and by structuring the approaches jointly. International actions such as the remarkable smallpox campaign of WHO and the - after all - promising work under the aegis of the Drinking Water Supply and Sanitation Decade show that quite a deal can be done when professionals and politicians with a heart join forces. So be it.

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# According to statistics, she's not working.



UN/Kay Muldoon

Improving statistics and indicators on women

**INSTRAW**



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# Overburdened but underutilized

Out of every 100 women living in Africa, 24 are considered to be in the labour force, according to a joint ILO/INSTRAW Global Statistical Survey\*. Yet, the study warns, current figures often mask women's economic contribution to society. In many regions, women overwhelmingly occupy the informal sector: they are growers and vendors of food, traders and unpaid family workers. In predominantly agricultural Africa, women perform 80% of the storing and 90% of the food processing, 60% of the marketing and 50% of domestic animal care—often with few or no modern aids. Women also grow most of the family's subsistence food. Yet activities in the informal sector were not earlier quantified because they were considered to be an extension of family and domestic functions.

One of the major concerns of INSTRAW is improving the collection and analysis of statistics and data so they will adequately reflect women's often invisible productive activity. An African Sub-regional workshop on improved statistics and indicators for women in development was held in Harare, Zimbabwe, in 1985, to be followed in 1986 by national and regional training seminars for users

and producers of statistics on women in Africa. The discerning use of data is essential to ensure development plans include women.

Though the obstacles women face in Africa may at first glance seem insurmountable—drought, famine, desertification, age-old patterns of inequality—African women have shown considerable ingenuity and skill in managing their scarce resources.

African women are overburdened in their daily chores, yet their full potential has been underutilized by development plans and technical cooperation programs that view women as objects, not agents of change. If development is ever to succeed in Africa, women's specific needs and contributions must be taken into account. Improving statistics is but one highlight of INSTRAW work in Africa. However, all INSTRAW programmes relate to African women, and are consistent with the Nairobi Forward-looking Strategies. INSTRAW's activities in research, training and information address both the methodological and the practical aspects of ensuring the integration of women to development.

\* Women in Economic Activity: a global statistical survey (1950-2000). ILO/INSTRAW, Santo Domingo, 1985.

# Imagine carrying water every day. Every day.



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to water and sanitation projects  
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# The vital connection

She is a familiar sight in the developing world: trekking across grassy plains or muddy marshes, going up and down steep hills, crowding a street corner in dusty squatters' settlements or squalid urban ghettos. And every day at dawn, noon or dusk, she is lugging pails, jugs or plastic bottles containing the precious liquid: water. Over half of the people in the developing world lack pure drinking water. In the 20th century, remarkably enough, about three quarters of the world's population have no sanitation facilities. These two most basic needs, drinking water and sanitation, are crucial in the fight to reduce mortality, morbidity and poverty. This is why the United Nations declared the International Drinking Water Supply and Sanitation Decade (IDWSSD, 1981-1990), with a simple goal: *Clean water and adequate sanitation for all by the year 2000*. Women, the main carriers, users and managers of water in the developing world, bear the brunt of not having access to pure water and rudimentary sanitation facilities. Among these, to mention just two consequences: the many hours and physical energy spent lugging heavy water pots daily; and the unbearable toll in human health. According to World Health Organization estimates, water-borne diseases, such as diarrhoea, malaria, cholera and the guinea worm, kill about 25 million people each year; most are children under five and women. Because women's domestic responsibilities put them in daily contact with contaminated water, they are more prone to those deadly diseases.

For all these reasons, women take water supply and sanitation (WSS) issues to heart. But it took many years of research to prove what was obvious, that women want and need to be connected directly to water and sanitation activities, and many years of activism and awareness to bring the proof to light. Finally, in the second half of

the IDWSSD, women are perceived as a key element in raising the success rates of WSS projects and programmes. In three fields—research, training and information—INSTRAW has been an important part of the international effort to strengthen the connection between women, water supply and sanitation. The Institute campaigns resolutely in global, regional and national fora to involve women centrally in all phases of WSS activities. Among other things, INSTRAW has sponsored WSS seminars and meetings (Cairo, 1984; Nairobi, 1985; Addis Ababa, 1986; Kenya and Ethiopia, 1987; Somalia and Sudan, 1988), and has published articles, books and a select annotated bibliography. Wherever possible, INSTRAW representatives raise the issue of women as central actors in both the social dynamics and the technical aspects of WSS systems.

INSTRAW is now making a unique contribution to strengthen this vital connection: a multimedia training package of modules called *Women, water supply and sanitation*, jointly produced with the International Centre for Advanced Technical and Vocational Training (ILO/Turin). Today, in both developed and developing countries, these training modules are creating awareness that women should be connected to water and sanitation programmes and projects: not only women as users or as health educator/hygienists, as they were earlier perceived, but women as managers and technicians, as hydrologists and agriculturists, and as community leaders in water and sanitation schemes.

The IDWSSD seeks that pure water and adequate sanitation do not remain an elusive promise for millions of people in the developing world, but becomes a tangible reality during this decade. To achieve this objective, women are needed.

INSTRAW is a member of the Steering Committee for Co-operative Action on the IDWSSD and of the Inter-Agency Task Force on Women and the IDWSSD.

- \* INSTRAW publications on this subject:
- *Women and the International Drinking Water Supply and Sanitation Decade*, INSTRAW/UNICEF, Santo Domingo, 1985, pp. 59 (English).
- *Women and Water Supply and Sanitation*, INSTRAW, Santo Domingo, 1984, pp. 29 (E).
- *Women and the International Drinking Water Supply and Sanitation Decade Bibliography*, INSTRAW, Santo Domingo, 1985, pp. 24 (E).
- *Proceedings of the Interregional Seminar on Women and the International Drinking Water Supply and Sanitation Decade*, Cairo 1984, INSTRAW, Santo Domingo, 1987, pp. 306 (E).