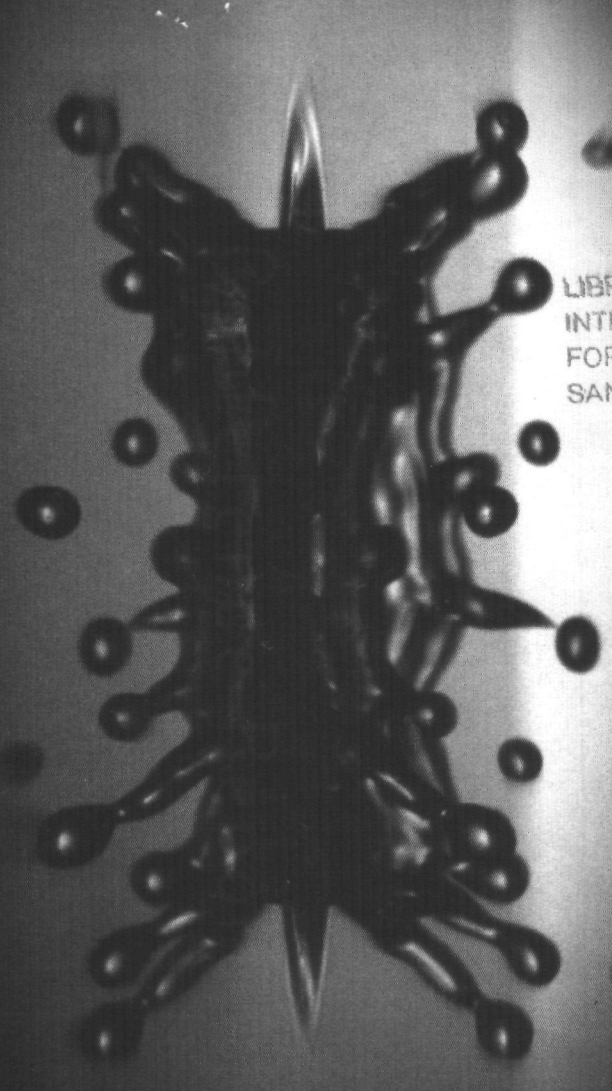
202.3 94MI

Ministerial Conference on Drinking Water and Environmental Sanitation



LIBRARY
INTERNATIONAL REFERENCE CENTRE
FOR COMMUNITY WATER SUPPLY AND
SANITATION (IRC)

March 22nd / March 23rd 1994 Noordwijk

Conference Report Volume 2 of 2

IMPLEMENTING UNCED AGENDA 21

202.3-94MI-12273
-2

NOORDWIJK CONFERENCE REPORT

COVERING

THE MINISTERIAL CONFERENCE ON DRINKING WATER AND ENVIRONMENTAL SANITATION

NOORDWIJK, THE NETHERLANDS, MARCH 1994

VOLUME 2 OF 2

LIBRARY, INTERNATIONAL REFERENCE
CENTRE FOR COMMUNITY WATER SUPPLY
AND SANITATION (IRC)
P.O. Box 93190, 2509 AD The Hague
Tel. (070) 814911 ext. 141/142
RN: 12273
LO: 202.3 94MI

12409
paper 3

Introduction

This is the second of two volumes, and forms part of the Final Report on the Ministerial Conference on Drinking Water and Environmental Sanitation held in Noordwijk, the Netherlands on 22 and 23 March 1994. The first volume contains: the Conference proceedings, the key-note speeches and special statements, interventions by delegations, the political statement and action programme (in the six UN languages), the participant list and the closing remarks of Ministers Töpfer and Alders.

This second volume contains:

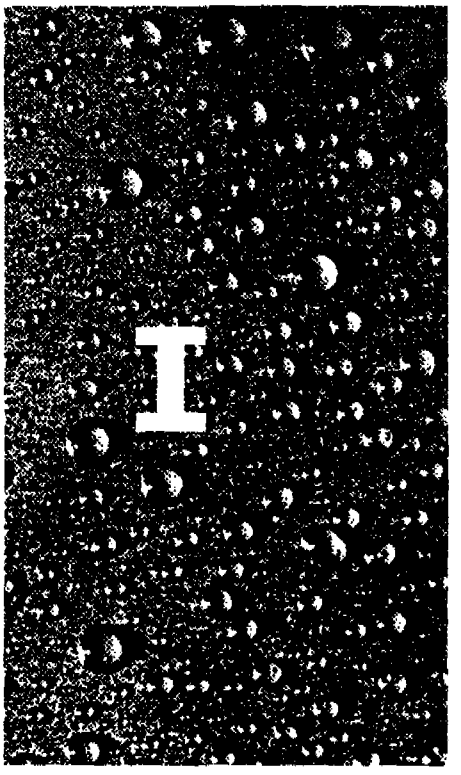
1. The six Conference background documents
2. The French Round Table - Sophia-Antipolis Recommendations
3. World Bank Report, series number 469
4. Reports by ESA's, European Commission, WSSCC, IAWQ/IWSA and the Earth Summit Watch
5. The Nigerian Country Statement

Correspondence, or other forms of communication, regarding the substance of either of the two volumes that make up this report, should be sent to the Conference Secretariat at the following address:

Ir. G.W. Ardon
Secretary to the Conference
Ministry of Housing, Spatial Planning and the Environment
P.O.Box 30945/630
2500 GX The Hague
The Netherlands

Whilst every attempt has been made to accurately reflect, in written form, what was said at the Conference, the Secretariat apologises for any errors which have escaped the attention of the editors.

Putting Agenda 21 to work



Ministerial Conference on Drinking Water and Environmental Sanitation: Implenting UNCED Agenda 21

19-23 March 1994, Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing, Physical Planning and Environment

Prepared for the Conference Secretariat under the auspices of the International Steering Committee by

MR PETER MCINTYRE

with major inputs from a worldwide network of Resource Institutions and Resource Persons

Acknowledgements

This paper has been prepared as a resource and background paper for the Ministerial Conference and beyond by Mr. Peter McIntyre, for the Conference Secretariat in the Netherlands Ministry of Housing, Physical Planning and Environment (VROM). The work was carried out under the mandate and guidance of the International Steering Committee. Overall responsibility rests with Mr. G.W.Ardon of VROM as the Conference Manager assisted by Mr. P.Kendall as Conference Adviser.

Alongside the significant substantive inputs of the International Steering Committee, a large number of Resource Institutions and Resource Persons worldwide kindly agreed to make inputs to the content of the paper. These are listed in an appendix. Ms. Maggie Black helped condense and link the inputs of the resource network.

Principal review of the paper was carried out by the International Steering Committee, supplemented by internal and external reviewers. The Authors themselves also played a significant role in cross-review of their work at various stages.

Mr. Brian Appleton carried out constructive editing, incorporation of final comments and further development of the drafts where necessary.

The overall process behind the development was managed and guided by Mr. Alexander Rotival, Adviser to VROM, and Mr. Michael Seager of the IRC International Water and Sanitation Centre, supported by an IRC team for substantive advice. Documentalist Mr. Cor Dietvorst and programme assistants Ms. Loekie Broersma and Ms. Jennifer Francis, assisted in information gathering and administration.

The inputs of these and the many others involved in the team effort behind the synthesis, development, review and production of this paper are most gratefully acknowledged.

Although this paper attempts to reflect the widest possible consensus amongst all those who participated in its development, no part of its content should be taken to imply the endorsement of any view by a specific individual, government or agency.

Contents

Preamble

This paper is Number 1 in a set of six background papers prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation convened by the Government of the Netherlands in March 1994 at Noordwijk, The Netherlands. The six papers were conceived as part of a "cascade" process, intended to help the participants of the Noordwijk Conference to convert the commitments of their governments at the Earth Summit in Rio de Janeiro, Brazil, into strategies and actions for achieving accelerated progress in the critical areas of water supply and environmental sanitation.

The Conference Secretariat commissioned individual authors to prepare the six papers, under the guidance of an International Steering Committee comprised of some 48 members representing 29 countries and agencies. A further 60 expert Resource Persons and 18 Resource Institutions from all parts of the world responded positively to requests for summary ideas and insights on the main themes. The Appendix lists all these Resource Persons and Institutions, demonstrating the authority and diversity of the inputs to the background papers. The six elements of the cascade are:

Paper 1: Putting Agenda 21 to work

A graphic account of the developing crisis and the lessons learned from past attempts to deal with it, the Advocacy paper seeks to bring home the urgency of the call for action, the validity of the new approaches proposed, and the scale of the potential benefits if prompt and concerted action is taken. It may also help ministers to convince their colleagues of the seriousness of the current situation and the need for enhanced priority.

Paper 2: Achievements and Challenges

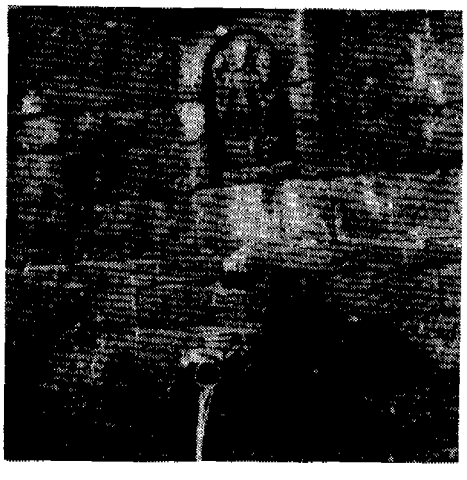
A scene-setting paper, reviewing progress achieved during the International Drinking Water Supply and Sanitation Decade (1981-1990), summarising sector professionals' own analyses of past successes and failures, and linking these to the urgent needs recognised in Rio.

Papers 3 to 6: Policy/Strategy for Action

A group of papers addressing three key areas of concern: Paper 3: *Effectiveness;* Paper 4: *Finance;* and Paper 5: *Collaboration,* leading to Paper 6: *A Synthesis* of recommendations designed to provide the basis for immediate action by national governments and support agencies. In the Policy/Strategy for Action papers, the aim has been to operationalise the Rio rhetoric, and to develop fundamental new approaches, taking advantage of the knowledge and expertise of the world's leading specialists in the water and environmental sanitation field.

Paper 1: Advocacy
Author: Mr Peter McIntyre

Peter McIntyre is a professional journalist specialising in health and related services. A graduate of Oxford University in Philosophy, Politics and Economics, he spent his early years in Malaysia. He has done writing and filmscript work for UNICEF, the IRC International Water and Sanitation Centre and health authorities in the UK, and is editor of several professional newsletters.



Executive summary

Governments don't solve problems, people do. The environment is everyone's business and its protection ultimately depends on individual and group actions on a daily basis. Yet the ability of men and women to protect their environment is often thwarted by a counter-environment - of poverty and powerlessness, disabling bureaucracy and confounding legislation, outdated policies and vested interests, waste and ineffectiveness. This is particularly the case with what is for millions the biggest environmental issue of all - access to and protection of water.

Who can change this counter-environment? Never before has the survival and development of the world's peoples depended so much on the leadership and effectiveness of a relatively small group of national and global leaders - leaders who can release the problem-solving energy and resources of millions by even a few simple actions. That group met in Rio de Janeiro in June 1992 and a significant part of it is meeting here in Noordwijk. The men and women of each country, the stakeholders in planet Earth, the voters, are interested to know what the members of this group are doing to implement the commitments of Rio. In some countries, effective action is already in progress; in others not much has happened. In either case, this conference, and especially the subsequent country level actions, provide an important opportunity to demonstrate and reassure the people that their leaders meant business at Rio.

For *the cost of not taking action is very high* indeed - not only in wasted resources and perpetuated human drudgery and disease, but also in irreversible damage to the limited water resources of our planet, resources that sustain life itself. The cost can be catastrophic in political terms, too, as environmental inaction brings an increasing risk of electoral rejection. "Business as usual" is certainly a losing option!

There are two visions of the future. In one, water and sanitation problems are overcome, and sustainable development becomes possible. In the other, they are not tackled. The prospect is conflict, disease and political instability.

Putting Agenda 21 to work

The Ministerial Conference in the Netherlands was convened as the first international political opportunity to take forward drinking water and environmental sanitation issues from the 1992 Rio de Janeiro UN Conference on Environment and Development - The Earth Summit. In Rio, human needs were placed in a broad environmental context of protecting ecosystems, meeting agricultural food targets and improving public health.

Rio was an important turning point in the way that politicians, water professionals and all those concerned about the environment view mankind's continual abuse of previously bountiful water resources. Two changes in particular bring renewed hope for the 1.7 billion people who presently lack even the most basic means of personal sanitation, and through them for the reversal of present patterns of unsustainable water use and environmental contamination. First, the Summit's action programme Agenda 21, approved by the world leaders, firmly establishes that, beyond the needs for survival and human health, improved water and environmental sanitation services play a critical role in economic and human development and in the sustainability of aquatic ecosystems. Second, the leaders agreed that all nations' freshwater resources need to be managed in a holistic way, with long-term sustainability for use by future generations controlling today's strategies for urban and rural development, land use, industrialisation and agricultural output.

Agenda 21 suggests that each country set targets to reduce waterborne disease, and to make significant progress towards meeting the water and environmental sanitation needs of urban residents and the rural poor. These targets are a challenge to nations which signed up to Rio, and a tacit admission that the original aim of the International Drinking Water Supply and Sanitation Decade of 1981-1990 (universal safe water and sanitation) would not be met by the year 2000.

"Water is needed in all aspects of life. The general objective is to make certain that adequate supplies of water of good quality are maintained for the entire population of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities within the capacity limits of nature and combating vectors of water-related diseases."

UN Conference on Environment and Development Agenda 21 Chapter 18.

A developing crisis

Water is essential for life, for health, for food and for human development. It is essential for agriculture and industry and to sustain the environment. It determines the quality of the land, it is the natural habitat for fish, which provide 23% of the world's protein. It sustains natural

The penalty costs of depletion and pollution

Depletion and pollution of water sources always costs more than prevention. The bill arrives eventually.

Mexico

For years water has been pumped from the Mexico Valley aquifer to meet the needs of Mexico City and of the surrounding agriculture. The water table dropped and land subsided. Water is now pumped 180 kilometres and up 1,000 metres from the Cutzamala river at a cost 50% higher than before. Plans to extend the supply involve a longer pipeline, an elevation of 2,000 metres and still higher costs. Faced with the threat of exhausting supplies by the end of the century, Mexico placed contracts costing US $1.5 billion with Anglo-French consortia, to improve water and sanitation in the city, where a quarter of water meters no longer work and only six per cent of the costs of providing water are recovered from consumers.

China

Beijing and Tianjin, which have a combined population of over 17 million people, are exhausting their traditional water sources. Water for Tianjin already travels more than 200 kilometres. The next source will involve pumping water more than 1,000 kilometres from the Yellow River. The cost of supplying water to the city of Shenyang is expected to rise by almost 200% by the turn of the century, since the Hum river, is now so polluted that it can no longer be used for domestic water. These costs prompted a new look at conservation. In Beijing it is estimated that industry can save a third of current water use, mainly by recycling water for cooling, while 15% of domestic use could be saved through increased efficiency, reducing leaks and recycling water in air conditioning.

Sources: Water Resources: Problems and issues by Rita Cestti, When the Cup is Half Full by John Briscoe, (drawing on World Bank sources), Observer Business News, November 1993.

wetlands which determine the character and viability of many environments and provide natural water treatment and flood control functions. It is the same finite water with its vulnerability to pollution and misuse that meets all these needs.

The earth is so blessed with water that its surface land mass would fit into one of its oceans. Even the tiny fraction of water that is fresh and accessible is enough to meet human needs twice over, if it could be properly collected and protected. The bad news is that, the way we abuse it, the water is not sustaining the population.

We fail to collect water properly, fail to protect what we have collected and we pollute it daily with waste from agriculture, from industry and from our own bodies. Municipal and industrial pollution and environmental disturbance from giant water development projects have devastating impacts on aquatic ecosystems, damaging fisheries, coral reefs, wetlands and watersheds.

These failures, together with the rise in world population and a rush to the cities, confronts humanity with a crisis more immediate than global warming or the hole in the ozone layer. The human victims from these other important environmental threats are few so far, compared with the millions - including four million children - who die each year because they lack clean water and effective sanitation.

The amount of wastewater discharged in the world was set to double between 1980 and the year 2000, and this is in addition to the two million tonnes of human excreta which daily pollute rivers and groundwaters. Yet sanitation is still the forgotten factor in development planning. A recent study of 120 World Bank-backed water projects found that only 58 included a sanitation component. In Latin America up to 98% of sewage is discharged untreated.

The economic costs of water pollution and misuse are visible everywhere. The International Commission on Irrigation and Drainage estimates that two fifths of irrigated land across the world is at risk, or already affected by waterlogging or salination. Toxic contamination renders groundwater unavailable for generations. Three quarters of Poland's rivers are too contaminated even for industrial use. Two thirds of China's rivers are seriously polluted, while 40 rivers in Malaysia are devoid of fish or other aquatic life. In Manila it is estimated that 60-70% of the flow of the Pasing River is untreated sewage.

The crisis finds its most acute expression in countries which do not have the resources for piped water and sewerage systems to every home. Yet no country is exempt from the need to preserve water sources and to prevent

contamination by human, agricultural or industrial waste. In western Europe there is increasing concern about the cost of maintaining drinking water quality. In eastern Europe systems are poorly maintained and unreliable, and pollution of rivers and groundwater has gone unchecked. The Aral Sea, once the fourth largest lake in the world, has shrunk in size by half since the 1960s, and the salinity of the water has tripled, mostly because water from feeder rivers was diverted recklessly to irrigate cotton and rice.

Immediate challenges

Today, the urban challenge is perhaps greatest. Soon, more than half of the world's population will live in urban areas, many squatting on the edge of megacities, without land rights or basic services. Already many poor families pay up to 20% of their incomes to private water carriers, with no guarantee that the water they buy so dearly is free from contamination. Prospects for explosive large-scale disease are high, reminding us that nineteenth century Europe only acted to protect water supplies from human pollution when cholera epidemics threatened rich as well as poor.

For many cities, the waste disposal problem, including the mountains of household and municipal solid wastes they have to deal with every day, is the single greatest threat to sustainable development. It is in fact a multiple threat. As well as fostering the spread of water- and vector-related disease, and creating squalid living conditions in crowded urban settlements, untreated wastewater and unmanaged solid wastes contaminate the rivers and groundwater which are the city's precious water resources.

In rural areas the daily experience of too many women is a treadmill of fetching water, part of a struggle for survival that also leads to children missing out on schooling and any hope of escape from poverty and squalor, so that they can help to collect their families' water.

In many developing countries the greatest threat to clean water is human waste. Today we know that efforts to provide clean water only succeed if they go hand in hand with efforts to mobilise communities, technical experts, policy makers and fundholders for safe sanitation, an area of cultural sensitivity where behaviour change is as important as digging latrines. Yet, despite some recent progress, sanitation remains a low political priority.

As population growth, industrialisation and general socio-economic development push up water demands exponentially, and pollution and salination degrade rivers and groundwater, costs of meeting future demands become prohibitive. In these circumstances - and two-thirds of

Talking to communities + appropriate technology + appropriate pricing = success

VIP latrines with mesh filters to prevent flies and vent pipes to take away smells, work well when properly constructed. However, many schemes fail because the latrines are relatively expensive and difficult to build.

In Lesotho in 1983 a Technical Advisatory Group, with funding from UNDP, UNICEF and the Government, was set up to introduce sanitation into a rural water project.

It spent a year getting to know local people, and adapting designs and building methods. Sanitation messages were integrated into primary health education, taking into account local customs.

The government paid for men and women to train as latrine builders, and these village people now earn their living by providing a range of latrines at a range of prices. 90% of the latrines have been paid for in full by householders.

District sanitation teams use home visits and community meetings to talk through problems, supported by 4,000 village based health workers.

The UNDP-World Bank technical adviser pulled out ahead of schedule because the programme was so secure. A study showed lower rates of diarrhoeal diseases in children of families with latrines.

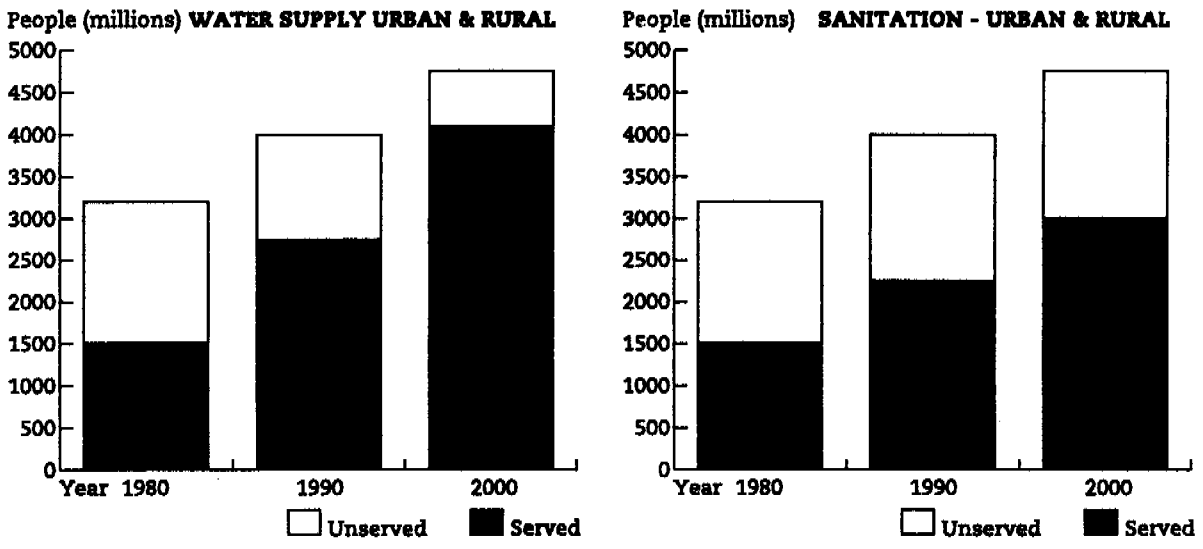
Source: Rural Sanitation in Lesotho. UNDP, World Bank and PROWWESS 1990

Africa now faces the threat of severe water scarcity - the availability of water resources and their protection have to be the starting point of national development plans. The international challenge is equally demanding. According to some definitions, 26 countries in the world already have less water than they need, and another 40 nations will join them within 30 years. Dozens of countries share important water sources and river basins. United Nations Secretary-General, Boutros Boutros-Ghali, has warned of water war in the Middle East. The challenge to political leaders is to turn regional potential for conflict into joint action to deal effectively with environmental pollution and to protect the world's most valuable and vulnerable resource.

Lessons of the 1980s

During the International Drinking Water Supply and Sanitation Decade (1981-1990), drinking water was made available to 1.2 billion people and 770 million gained access to safe sanitation. Millions survived childhood because of these successes. Yet the gap between those with services and those without remains high and will grow unless there is a change in approach to meet the needs of increasing populations, particularly in urban areas.

Water Supply and Sanitation coverage - 1980 - 2000



Despite progress during the International Drinking Water Supply and Sanitation Decade, universal coverage will not be achieved by the year 2000. Even assuming steady progress in the 1990s, the number of people without sanitation is likely to increase. These figures substantially understate the problem, because they do not account for schemes which failed or were rejected, and there is no accepted definition of what being 'served' with water or sanitation means. Improving data at country level about coverage, behaviour and usage, is a political priority.
Source for data: Report of the UN Economic and Social Council (1990)

In all, more than a billion people still lack safe water, while some 1.7 billion (one person in three in the developing world) lack adequate sanitation. The global numbers are so large they may sound empty. Yet they represent private, individual, struggles for water that families and communities have to win every day to survive.
In strictly numerical terms, the water and sanitation decade was not an outstanding success. Where it did succeeed was in mobilising professional water sector specialists throughout the world in an unprecedented concerted effort to find solutions to the seemingly intractable problems. Those solutions have been found. The lessons of the 1980s have been converted into "principles", "concepts", "approaches", . . ., and through numerous global gatherings have emerged in UNCED's action programme Agenda 21, as a blueprint for correcting past failures and delivering sustainable services quickly and cost-effectively.

As Agenda 21 makes clear, the water supply and sanitation problems of the world are no longer technical; they are political. The solutions depend on governments adopting holistic approaches to the management of water resources, allocating water for different uses according to sustainable development principles, and providing the means by which local communities, private sector agencies and non-governmental organisations can work in partnership to provide the kind of services that people want and are willing to pay for.

If governments will implement the necessary changes and undertake the social mobilisation programmes recommended by the sector professionals, turning themselves in the process from providers of services to enablers, the lessons of the 1980s and the soul-searching of the early 1990s will become the success stories of the next generation. The needs are urgent; the opportunity presented by Noordwijk must not be missed.

People, not pumps, are the answer

Access to fresh water and a safe means of disposing of human waste depends on wells, pipes, tanks and latrines. But these are not the whole solution. In too many cases, within months they become monuments to wasted effort. It has been estimated that 30-40% of water systems in developing countries are broken at any one time, and that a third or more of piped water in towns and cities is lost before it reaches the tap. A UNICEF review at the end of the 1980s showed that a third of spending was keeping existing schemes going, instead of starting new ones. The human solution almost never starts with a pipe or a latrine, and is more likely to begin with a discussion among women to

Guinea worm disease - a success story

Dracunculiasis, better known as Guinea worm disease, is an unpleasant and debilitating water related disease, affecting 20 million people.

For years it was under-reported and neglected. In Nigeria alone it is estimated that 50 million days a year in the cultivation of rice, cassava and yams, were lost and that children missed 40 million days of school. People needed to know (and act on) key messages:

- Guinea worm comes from contaminated drinking water;
- infected people should not contaminate water sources;
- Guinea worm wounds should be cleaned and bandaged;
- drinking water should be filtered or boiled.

In Nigeria and Ghana a village by village search for cases, and the training of village health workers, were linked to action on a national and global level, with support from former US President Jimmy Carter. The village search in 1989 identified more than 800,000 cases in the two countries. In both countries the number of cases has fallen by more than 90% in five years.

Source: US Department of Health and Human Services

find an alternative to walking kilometres to fetch water; or talking to families about how to remove the smell and filth of raw sewage from their streets.

There is compelling evidence from the intensive efforts of the 1980s that women's involvement in the planning, implementation and upkeep of water and environmental sanitation projects makes a huge difference to the sustainability of the resulting programmes. There is a danger that adoption of the broader framework of the sector, in the context of integrated water reources management, may further marginalise women. That must not happen; gender analysis has been shown to be a helpful tool for project planning and appraisal, and that message must not be lost.

In the Gorkha district of Nepal, Save the Children found that 80% of taps in a rural piped water system were dry two years after installation because of broken pipelines or sediment in tanks. The system was a 'gift' from aid agencies. When they stopped working, Nepalese villagers went back to their old sources.

In Malawi handpump caretakers were trained and communities took over the responsibility for looking after pumps. The breakdown rate fell 75% and annual maintenance costs fell from $140 per pump to $16.

Maximising health gains

Improving public health reduces malnutrition and improves productivity, education and the prospect of meeting population targets. Yet health benefits from water and sanitation schemes often prove marginal, because pumps and latrines are not enough on their own. Communities need to understand how disease spreads so that they can change their behaviour, while other assets of sanitation, including privacy and prestige, should be promoted. At the very least communities need to know that typhoid, cholera, hepatitis A, polio, and dysentery are water-borne diseases, spread via human faeces. They need to know about worms which enter the body through water, causing dracunculiasis (Guinea worm disease) and schistosomiasis (bilharzia), and that where humans pollute drinking water with their waste, these worms flourish.

They need to know how to protect themselves against diseases spread by insects which live or breed in water, including malaria, yellow fever, trypanosomiasis (sleeping sickness) and onchocerciasis (river blindness). Every community should know that poorly maintained pump areas are ideal breeding grounds for mosquitoes, and should have the means to protect children.

These diseases sap the economic strength of nations. In India three children die every minute from diseases associated with polluted water, which cost the economy 73 million working days each year. Guinea worm disease disables people during the planting season, affecting agricultural production. River blindness typically strikes at people in their 30s and 40s when they are the family breadwinner or provider.

Disease also damages attempts to slow down population growth, since women and men limit their fertility only when they are confident that their children will survive.

Although the main effects of disease are in developing countries this is not exclusively the case. There have been waterborne hepatitis A outbreaks in Riga, Latvia, and high nitrate levels are believed to be the cause of an increase in child deaths in Romania. In the Russian Federation 60% of the population is exposed to unsafe drinking water, while in OECD countries as a whole 40% of the population (330 million people) are not served buy a wastewater treatment plant.

There is great potential for change. The World Summit for Children (Sep 1990) was attended by more than 100 heads of state. Most have endorsed the declaration whose Plan of Action states: "As today's children are the citizens of tomorrow's world, their survival, protection, and development is the prerequisite for the future development of humanity. Empowerment of the younger generation with knowledge and resources to meet their basic human needs and to grow to their full potential should be a primary goal of national development."

Is water a free good?

If you stand in the rain with your mouth open, water is a free good. Water which has been piped, pumped, cleaned or conserved has a cost which is paid by somebody, even if it is presented as a free gift.

Politicians who promise free water for all, usually deliver highly subsidised water for the better off, insecure and unreliable supplies for many, and no water at all for some. UNICEF estimates that governments subsidise 70% of the operating and maintenance costs of water supplies to high income urban populations, while a 1993 World Bank Report, Investing in Health, says:

"The net result has often been bloated public agencies with low accountability to their customers and few incentives for improving efficiency; a middle class that is increasingly well serviced with subsidised services; a poorer class that receives little or no service; and a ripe environment for political patronage."

People would rather invest in their futures than be held to ransom

Poor communities often pay more for water than middle class suburbs. This money would be better used to invest in the future.

- In Lima poor people pay US$3 for a cubic metre of contaminated water delivered by bucket by a private vendor, while a middle class family on the subsidised municipal system pays 30 cents for tap water at home.
- In the dry season in Onitsha, Nigeria, the poor pay 18% of their income on water, while upper income households pay 2-3%.
- In Jakarta, one in seven households is connected to the municipal system. Some people pay street vendors 25 to 50 times more, depending how far they are from a tap.

In Honduras willingness to pay is translated into positive action. UNICEF makes community loans for water supplies. People pay a quarter of what they used to pay private vendors, and can still repay loans in five years. Better-off people pay a voluntary 'solidarity fund' to support new projects.

Sources: UNICEF, World Bank, various.

Water for sustainable food production and rural development

"While significant expansion of the area under rain-fed agriculture has been achieved during the past decade, the productivity response and sustainability of irrigation systems have been constrained by problems of water logging and salinisation..."

"Soil erosion, mismanagement and over exploitation of natural resources and acute competition for water have all influenced the extent of poverty, hunger and famine in the developing countries. Soil erosion caused by over grazing of livestock is also often responsible for the siltation of lakes. Most often, the development of irrigation schemes is supported neither by environmental impact assessments ... , nor by the assessment of social impacts on people in river valleys."

UN Conference on Environment and Development Agenda 21 Chapter 18.

Communities are taught to think of public supplies as free and second-rate, while they pay out large sums for supplies from unofficial vendors. Drinking water pricing is a complex issue, which involves political choice. All viable choices, however, recognise that costs have to be covered if a scheme is to be sustained. The way forward involves solutions that the community understands, has agreed and will continue to support, so that a water supply or sanitation scheme is well used and maintained, and so that its maintenance and operating costs are fully covered.

Cost recovery must be based on real costs, but take into account ability to pay. If subsidy is essential then it should be explicit. Communities may vote with their feet if they believe they are being asked to pay too high a price for clean water, returning to muddy pools or impure wells, where water and disease are indeed free. Pricing policies may include contributions in labour rather than cash. Providers may offer a basic service at low cost with higher charges for those who want more. Most importantly, if cost recovery is a principle for drinking water, then clearly the same principle must apply to competing users, including agriculture, industry, and tourism. It is inconsistent to argue that water users in town should pay for clean water, while farmers, who earn an income from growing crops, pay little or nothing, and thus have no incentive to use water efficiently and to keep it clean.

Water allocation: a development priority

Almost everywhere in the world there is intense competition for water. Irrigated agriculture accounts for approaching 70% of the water used every day throughout the world, and 85% of water use in developing countries; industry uses about 20-25% globally (10% in DCs), with domestic water accounting for less than 10%. As competition grows, water allocation among the users, and conservation and protection of all available resources become more and more critical.

Development of agriculture, industry and tourism depends on governments establishing a strategy to meet competing needs for water, adopting sustainable pricing policies, and enforcing legislation to ensure that tariffs are collected and that polluters pay.

Expanding populations need to be fed. Food security is an important political goal in many countries and that usually means more irrigated agriculture. In the past, agriculture has traditionally taken supplies freely from rivers and canals. In recent decades, as agricultural intensity increased to meet demand for food production, the amount of water used and polluted also increased. The 'green

revolution' assumed a plentiful and free supply of water for irrigation, and promoted water guzzling plants such as cotton, rice and alfalfa. Most irrigation schemes are intrinsically inefficient with up to 70% of the water never reaching the plants, because of evaporation and run-off.

It has often been argued that agriculturists pass the unused water back into the system, but today rising levels of fertiliser and pesticide make it expensive to clean up. Even the natural organic matter in agricultural runoff can be a problem, resulting in undesirable by-products like chloroform when the water is disinfected for drinking. Developed as well as developing countries count the cost of cleaning up pollution which washes off the land. Because of salination and water-logging, agriculture is unable to make the same kind of productivity gains seen in previous decades.

In response to the modern approach of integrated water resources management, agricultural water users are committed to improving the efficiency of water use, and to switch where practical to less water-demanding crops. Technological improvements and more rational charging structures are being used to improve irrigation efficiency. Even a small improvement in irrigation efficiency would release large amounts of water for industrial and domestic use. Realistic agricultural water pricing is one major step towards that goal.

Industry demands a secure and regular water supply to ensure continuity of production. In developing countries haphazard water and power supplies can put up manufacturing costs by 20%. Some large companies secure their own water, which may deplete drinking water reserves for nearby towns. Countries trying to attract industrial development, jobs and capital, may not be inclined to calculate the full cost of supplying water to industry. However, industrial wastewater, especially from textiles, pulp and paper carries heavy levels of organic waste.

Pricing water correctly will allow developing countries to avoid the expensive mistakes of the developed world, where industry is not the major consumer of water but is the major source of pollution. Recent developments in eastern and central Europe have revealed some extreme examples of the devastating effects of quenching industry's thirst without controlling its wastes. Few industrialised countries, east or west, can afford to be condescending about such problems. Most have learned costly lessons themselves about the need to balance industrial growth with appropriate management of water resources. For developing countries seeing rapid industrial growth as the key to future prosperity, the warning signs must be noted

Industry will pay the true cost

Historically the water tariff to industry in Mexico was 6% of the true cost. Factories used drinking water for industrial cooling, rather than recycling.

As part of a reform package, the Government granted a 10 year licence to a company to rehabilitate a treatment plant, and to remove 200 litres of waste water a second from the Mexico City main sewer.

The plant supplies member companies with 60 litres of industrial quality water per second pegged at 75% of the water tariff (which is rising). It provides 30 litres per second to the state as payment, and plans to double its capacity within five years.

Sources: Rita Cestti, Water Resources, Problems and Issues, (1989) and International Finance Corporation, Business Opportunities in Developing Countries. (1992).

now. Cleaning up after mistakes is very much more expensive than avoiding the mistakes in the first place; and the resources saved can then be put to much more productive use.

The Rhine, flowing through the industrial heartland of Europe, was fouled during the post-war economic boom, and in the 1970s earned the title "the most romantic sewer in Europe". The resulting Rhine Action Plan to clean up the river is a fine example of international collaboration and is leading to a significant improvement in the water quality. It is also expensive. Yes, clean-up is possible; but how much better it is to avoid the contamination in the first place.

The price of progress

Big problems cost big money. During the 1980s, governments and donors invested a total of $133 billion in bringing new water services to 1.2 billion people and improved sanitation to 770 million. Fortunately for those faced with the task of at least doubling that rate of progress in the coming years, there are several other resources at their disposal.

First, there is the considerable amount that the unserved and the badly served already spend on their own behalf to have enough water to survive. No estimates are available, but the prices charged by water vendors - 20 or more times the cost of public supplies - give some idea of the willingness and capacity to pay for reliable services. That capacity can be mobilised by giving local communities better access to credit, and promoting community management of rural water and sanitation services as a cost-effective alternative to utility-based services.

Next come the huge potential savings if governments and donors move away from high-cost megaprojects to more appropriate schemes providing affordable services to those in greatest need. Planning on the basis of what people want and are willing to pay for means both less expensive projects and more revenue.

Realistic water pricing for all uses also yields multiple benefits. By deferring expensive development of new sources, it avoids increasing debt. By encouraging water conservation and protection, it makes water available for serving the unserved; and it brings in money from users. High water losses in urban water systems offer another fruitful source of savings. Better leakage control and more efficient metering and billing can yield substantial extra revenue. Again deferred investment is an additional benefit.

If the approaches of the 1980s were continued, estimates show that it would cost some $30-35 billion a year to bring acceptable water and environmental sanitation services to all people in the foreseeable future. But, business as usual is not the message of Rio. With the alternative approaches to planning, programming and community mobilisation suggested here, the gap between needs and available funds can be brought down considerably.

Five key messages

Bringing water and sanitation to the top of the agenda is a political opportunity as well as an imperative for protecting health and the environment, alleviating poverty and achieving sustainable development.

The key messages for Governments are:

- Fresh water is a finite and vulnerable resource under multiple threats. Growing populations, rising consumption and increasing pollution are leading to an escalating water crisis in more and more countries. Change is needed, and time is running out.
- Water is both a human right and an economic good, which places responsibilities on everyone to protect it, conserve it and keep it clean for themselves, their neighbours and future generations.
- One of the most serious threats to fresh water comes from inadequate human sanitation. Protecting water requires effective sanitation facilities to be in place and to be used. Provision of new facilities has to be accompanied by the hygiene education needed to change human behaviour.
- In the end, people solve problems - not governments. Central government's primary role is to create the right conditions and policies to create involvment and partnerships among all the "stakeholders" in sustainable water use (communities, public and private sector agencies, NGOs, professional associations, and all tiers of government).Building the capacity of men, women, and communities to solve local problems is a major step towards effective water and environmental management.
- Just as water is limited, so are the financial resources needed to solve the world's water problems. They are limited, but they can be made to go very much further. Mobilisation of community resources is one significant way of bolstering government and donor inputs. Another is redirection and effective use of those available resources. If development funds are focused on providing the least-cost affordable solutions wanted by the urban

Counting the cost of Cholera

The economic impact of water born disease is shown by the cholera outbreak in South America.

- In Peru, where the outbreak was at its most severe, tourism disappeared and it became impossible to export fruit and vegetables onto the world market. These two items alone cost the Peruvian economy US$1 billion in ten weeks. The total economic cost to Peru was more than three times the total invested in water supply and sanitation during the 1980s.
- In neighbouring Chile earlier concern about typhoid in Santiago, and the need to improve the acceptability of Chilean fruit and vegetables on the world market, provided an impetus to improve sanitation. By the time cholera arrived, Santiago had 95% sewerage coverage. In Chile cholera did not spread.

Sources: Environment May 1993, John Briscoe When the Cup is Half Full; and unpublished data from Raquel Alfaro, General Manager, Santiago Water and Sanitation Company.

Does it take a riot?

Food riots in the Jhabua district of Madhya Pradesh, India, following prolonged drought, prompted intensive action on water harvesting schemes.

Farm ponds known as tanks were constructed to store enough water to irrigate 10 hectares of land, and stop dams were also built to collect water which would otherwise run off.

By the end of 1986 more than 6,000 handpumps were serving 98% of scattered hamlets. Some failed water schemes were rejuvenated because water storage was helping to replenish aquifers. In five years in the district 450 tanks and 600 stop dams were built, allowing the area of irrigated land to be doubled.

Source: Waterfront Issue no 4 August 1993. R Gopalakrishnan.

and rural unserved populations, major steps can be taken towards the Rio targets. Governments and major financing institutions can start that process immediately, by switching investments away from large-scale, high-cost water schemes and into demand-led programmes to bring low-cost water and sanitation projects to the unserved.

The political choice

Political leaders seek to make changes which show results, and they like to see beneficial results sooner rather than later. There is today a growing body of experience which can apply the lessons of the Decade so that the effectiveness of water and sanitation schemes is dramatically improved. This means that there are actions which political leaders can take today, which will begin to make a difference tomorrow, and which will still be paying dividends in ten and 20 years, winning the support of a huge and powerful constituency. Beginning to resolve the water and sanitation deadlock will still leave plenty of political challenges on other fronts, but it will remove the single most obdurate obstacle to progress.

Governments have a vital role to play in leading the process, in clearing obstacles out of the way and in creating partnerships and the legislative and administrative framework for change. They have a role in leading by example, and of ensuring that national priorities are followed when support is offered by external funding agencies.

There are big rewards for Governments which succeed in this task, as the gap starts to close between those who have clean water and safe sanitation and those whose daily lives are a gamble with disease and death.

Two views of the future

What would life be like if the lessons of the water and sanitation decade were applied?

In the cities efficient water systems reach the poor as well as the rich. Water is carefully stored and reused. People pay a fair and adequate tariff for water. Industry pays its way. A variety of sanitation schemes cope with the increase in human waste, and hygiene is an important part of every child's education. There are water and sanitation committees in every community. The threat of mass disease is lifted from the cities.

In rural areas people understand the need not to pollute water sources with human or agricultural waste. Latrines offer privacy and prestige and are popular. Farmers value water harvesting and conservation techniques, knowing that this reduces the cost of their crops. Local people manage and maintain wells and pumps, and monitor water levels.

At government level the old divisions between water supply, agriculture, forestry and river conservation have disappeared. An organising body of high prestige meets regularly in the Prime Minister's office, overseeing legislative programmes and pricing policies. The Cabinet regularly demands to hear how cost recovery programmes are going. Finance Ministers look to their Environment colleagues with new respect, as their reputation for effectiveness grows. The President has an important ceremonial duty tomorrow - conferring a high award on a latrine engineer who has made another design breakthrough. The media will be there in force.

Internationally, water treaties are high on the agenda. Countries which share river basins find common interests, understanding that everyone downstream has a stake in what upstream communities do. Countries which succeed in making agreements find their international prestige growing.

Ceremonial visits and treaty meetings have become less embarrassing in one respect. Today every Government department, at national, regional and district level, must meet the highest standards for its own latrines.

The alternative scenario

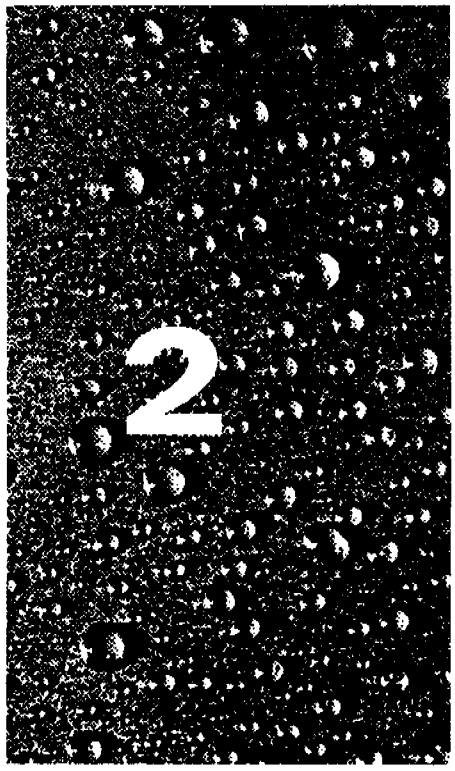
Politicians exist to exercise political influence on behalf of a constituency, and there is no bigger or more important constituency than the millions of people who make up the rural and, increasingly, the urban poor.

Rural communities which cannot overcome their water shortages will never be able to provide the stable food supplies that they and the cities need.

As for the urban areas, many moved here to improve material conditions and educational opportunities for their children. They knew that the streets would not be lined with gold, but they were not expecting them to be lined with sewage. These people represent hope and fear for the future. They are open to new ideas; having already opted for change, and are likely to be open to radical solutions, and willing to work with others in the community.

If their needs are not met, and their hopes for their children are dashed, then every major city in the developing world, and many in the developed world as well will be ringed with a disillusioned and brooding population with nothing to lose. Hopes for development and fear of civil breakdown both point in the same direction: political support and action now.

Achievements and Challenges



Ministerial Conference on Drinking Water and Environmental Sanitation: Implenting UNCED Agenda 21

19-23 March 1994, Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing, Physical Planning and Environment

Prepared for the Conference Secretariat under the auspices of the International Steering Committee by

IRC INTERNATIONAL WATER AND SANITATION CENTRE
compiled and written by
AMIN KASSAM

with major inputs from a worldwide network of Resource Institutions and Resource Persons

Acknowledgements

This paper has been prepared as a resource and background paper for the Ministerial Conference and beyond by the IRC International Water and Sanitation Centre for the Conference Secretariat in the Netherlands Ministry of Housing, Physical Planning and Environment (VROM). It was compiled and written by Mr. Amin Kassam, with supporting inputs from Dr. Martin Beyer. The work was carried out under the mandate and guidance of the International Steering Committee. Overall responsibility rests with Mr.G.W.Ardon of VROM as the Conference Manager assisted by Mr.P.Kendall as Conference Adviser.

Alongside the significant substantive inputs of the International Steering Committee, a large number of Resource Institutions and Resource Persons worldwide kindly agreed to make inputs to the content of the paper. These are listed in an appendix. Ms. Maggie Black helped condense and link the inputs of the resource network.

Principal review of the paper was carried out by the International Steering Committee, supplemented by internal and external reviewers. The Authors themselves also played a significant role in cross-review of their work at various stages.

Mr. Brian Appleton carried out constructive editing, incorporation of final comments and further development of the drafts where necessary.

The overall process behind the development was managed and guided by Mr. Alexander Rotival, Adviser to VROM, and Mr. Michael Seager of the IRC International Water and Sanitation Centre, supported by an IRC team for substantive advice. Documentalist Mr. Cor Dietvorst and programme assistants Ms. Loekie Broersma and Ms. Jennifer Francis, assisted in information gathering and administration.

The inputs of these and the many others involved in the team effort behind the synthesis, development, review and production of this paper are most gratefully acknowledged.

Although this paper attempts to reflect the widest possible consensus amongst all those who participated in its development, no part of its content should be taken to imply the endorsement of any view by a specific individual, government or agency.

Contents

Preamble

This paper is Number 2 in a set of six background papers prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation convened by the Government of the Netherlands in March 1994 at Noordwijk, The Netherlands. The six papers were conceived as part of a "cascade" process, intended to help the participants of the Noordwijk Conference to convert the commitments of their governments at the Earth Summit in Rio de Janeiro, Brazil, into strategies and actions for achieving accelerated progress in the critical areas of water supply and environmental sanitation.

The Conference Secretariat commissioned individual authors to prepare the six papers, under the guidance of an International Steering Committee comprised of some 48 members representing 29 countries and agencies. A further 60 expert Resource Persons and 18 Resource Institutions from all parts of the world responded positively to requests for summary ideas and insights on the main themes. The Appendix lists all these Resource Persons and Institutions, demonstrating the authority and diversity of the inputs to the background papers. The six elements of the cascade are:

Paper 1: Putting Agenda 21 to work

A graphic account of the developing crisis and the lessons learned from past attempts to deal with it, the Advocacy paper seeks to bring home the urgency of the call for action, the validity of the new approaches proposed, and the scale of the potential benefits if prompt and concerted action is taken. It may also help ministers to convince their colleagues of the seriousness of the current situation and the need for enhanced priority.

Paper 2: Achievements and Challenges

A scene-setting paper, reviewing progress achieved during the International Drinking Water Supply and Sanitation Decade (1981-1990), summarising sector professionals' own analyses of past successes and failures, and linking these to the urgent needs recognised in Rio.

Papers 3 to 6: Policy/Strategy for Action

A group of papers addressing three key areas of concern: Paper 3: *Effectiveness;* Paper 4: *Finance;* and Paper 5: *Collaboration,* leading to Paper 6: *A Synthesis* of recommendations designed to provide the basis for immediate action by national governments and support agencies. In the Policy/Strategy for Action papers, the aim has been to operationalise the Rio rhetoric, and to develop fundamental new approaches, taking advantage of the knowledge and expertise of the world's leading specialists in the water and environmental sanitation field.

Paper 2: Drinking Water and Environmental Sanitation: Achievements and Challenges

Prepared by IRC, with principle inputs by Mr Amin Kassam
IRC is a leading international resource centre in the field of water and sanitation, which is celebrating its 25th anniversary in 1994.

Amin Kassam is a development journalist, formerly managing editor of Inter Press Service (IPS), a leading international development-focused press agency. He covered the Rio Earth Summit for IPS and has written numerous articles on sector issues.

Executive summary

Every day in the 1980s an average of 330,000 people in developing countries gained access to a safe supply of drinking water, according to the official statistics of the International Drinking Water Supply and Sanitation Decade. About 210,000 people a day achieved improved means of excreta disposal. The rate of implementation of improved water supply and sanitation was more than double that achieved in the 1970s. The figures would be highly impressive, if it was not for two other considerations.

First, the population of developing countries has been growing at an average of about 200,00 people per day, as a result of which more than a billion people were still without access to safe water in 1990 and some 1.7 billion had inadequate sanitation facilities. Second, the figures take no account of the depressing number of water and sanitation schemes which are in disrepair or disuse, because of defects in design, inadequate provision for their upkeep, or simply because the people prefer not to use them.

The intensive and concerted efforts of the 1980s taught sector professionals a great deal about the way to implement successful water and sanitation programmes. They learned through failures and successes, how to involve users (men, women and children), public and private sector agencies, NGOs, local, regional and central government agencies and donors (in other words all "stakeholders") in the planning and design of programmes. They learned that schemes have to meet the real aspirations of the users (their "effective demand") so that the costs of implementing and maintaining improved services will be sustainable. They learned that water and sanitation is not an isolated sector, but an integrated part of the management of increasingly threatened water resources and of measures to reverse environmental degradation and that sanitation needs equal attention as water supply. They learned that communication and hygiene education need to be given as much emphasis as the provision of facilities, if the prime benefit - better health - is to be achieved. And they learned, above all, that political commitment, and particularly the commitment of governments to act as "enablers" rather than "providers" of services is the prerequisite for success.

That knowledge was fed into the preparatory process for the 1992 Earth Summit in Rio de Janeiro. In the form of UNCED's action programme *Agenda* 21, it now provides a

substantial basis for optimism that the formidable challenges faced by developing country governments in the 1990s and beyond can be tackled with enhanced prospects of success. What is needed now is the political will to adopt the new approaches, and a massive social mobilisation programme to develop the partnerships among all stakeholders that hold the key to sustainable development.

Water and sanitation problems are not confined to developing countries. In the newly independent countries of Eastern and Central Europe, water sources are heavily contaminated and infrastructure is breaking down. Industrialized countries are also experiencing serious pollution of water resources, water scarcity and wasteful use. The volume and toxicity of industrial waste, intensive farming, and excessive consumption all contribute to an environmental crisis requiring urgent attention.

Technical and institutional solutions exist to address all these problems. They are stalled in many places by political inaction. Noordwijk may be the place where that constraint is removed.

1 Sector Status

1.1 Introduction

The UN Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992 re-emphasised that safe water supply and adequate sanitation are vital for sustainable development. Yet, at the end of 1991, 1,000 million people in developing countries did not have access to safe water and about 1,700 million lacked appropriate means of excreta disposal.[1] All the indications are that the situation is no better today.

Water supply and sanitation coverage in developing countries increased during the International Drinking Water Supply and Sanitation Decade (1981-1990) but to some degree official figures overestimate the extent of that increase. Many projects implemented during the Decade were not sustainable and stopped operating after a while for various reasons. In some projects, such as piped water schemes shared by many users, the number of people who actually make use of the improved services is significantly less than estimated. Also, rapid population increase - averaging 2.1% per annum in the developing countries - undermined the progress made during the Decade.

Some 80 countries, with 40% of the world population, suffer from serious water shortages.[2] In other countries, enough water resources are available, but they are expensive to use. Easily accessible supplies have been depleted and new sources are more costly to tap and treat to acceptable standards. In many cases, the costs are environmental as well as financial.

In some countries, usable water is becoming scarcer because environmental degradation has affected river basins and catchments. Modern farming practices, industrialisation and urbanisation are polluting surface and ground water. The threat of climatic change as forecast by some scientists hangs over water resources. Expansion of sanitation is not keeping pace with need, substantially reducing the health benefits and adding to pollution of water resources and the living environment.

Rural-urban migration has increased in developing countries, compounding the problems of the poor in peri-urban areas. As the situation accelerates, the economies of many countries are continuing to experience severe difficulties.

1 "Water Supply and Sanitation Sector Monitoring Report 1993". WHO/UNICEF, August 1993.

2 'Water Resources: Progress in the Implementation of the Mar del Plata Action Plan. Strategies and Measures for the Implementation of the Mar del Plata Action Plan in the 1990s, Report of the Secretary General', paragraph 13. UN Economic and Social Council, 13 February 1991.

The price of unsafe water and inadequate sanitation

Waterborne diseases contribute to the deaths of four million infants in developing countries every year. That makes them the largest single category of communicable diseases causing infant mortality in these countries. They are second only to tuberculosis in contributing to adult mortality, with one million deaths per year.

It has been estimated that safe and sufficient water supplies and adequate sanitation would reduce infant and child mortality by more than 50% and prevent a quarter of all diarrhoeal episodes.

There would be 80-100% reduction in the morbidity of cholera, typhoid, leptospirosis, scabies and dracunculiasis; 60-70% of trachoma, conjunctivitis, yaws, and schistosomiasis; 40-50% of tularaemia, paratyphoid, bacillary dysentery, amoebic dysentery, gastro-enteritis, louse-borne diseases, diarrhoeal diseases, ascariasis and skin infections.

Ten per cent of the total burden of disease in developing countries is accounted for by diarrhoea and intestinal worm infections.

Source: World Health Organization

Deterioration of water and sanitation has widespread national and international effects: a vicious cycle of environmental damage is set up; productivity of industry and agriculture falls; the incidence of diseases rises, affecting the labour force and putting stresses on budgetary resources needed to strengthen the economy; the ripple-effect continues in ever-widening circles.

One of the vital lessons from the experiences of the Decade is that drinking water and sanitation are an integral part of the overall water resources environment, being affected by it as well as having effects on it. An integrated approach is necessary taking into account all the interlinks of water usage and the disposal of solid and liquid wastes. Finance is an important requirement for the adoption and success of such an approach; however, an even bigger one, in fact the key to all the others, is the translation of political will into effective sector strategy. Water and sanitation coverage can be increased if governments do more to mobilise and use efficiently all the resources available for the task.[3]

At the UN Water Resources Conference in Mar del Plata, Argentina, in March 1977, governments all over the world agreed to implement various measures that would facilitate the access to water and sanitation for their populations. Since then there have been many regional and global meetings, mainly among sector specialists, reviewing progress, analysing approaches, and identifying the reasons for success and failure. Those meetings succeeded in establishing some important common principles, which have guided the planning and implementation of water and sanitation programmes in recent years. Their limitation was that their influence stopped with the sector specialists, whereas the most critical constraints hampering effective progress required political action.

Preparations for UNCED provided an important bridge. The International Conference on Water and Environment in Dublin, Ireland, in January 1992 took the conclusions of regional and global consultations at the end of the Decade, combined them with specialist inputs from the linked fields of water resources and the environment, and formulated proposals for presentation at the Rio Summit.

The UNCED action programme, Agenda 21, endorsed by world leaders in Rio, has a chapter (Chapter 18) on the protection of freshwater resources, in which, inter alia, governments commit themselves to some important

3 Coverage in this context implies hardware that has been built, is working and is being used. It also implies that planning has taken into account the need for rehabilitation, upgrading and replacement as necessary. Such coverage should have a maximum positive impact on health, productivity, social equity, etc., and minimum negative impact on the environment.

technical and political initiatives to accelerate the access to sustainable water and sanitation services for those who currently lack them, and to conserve and protect the world's freshwater resources.

1.2 Historical Overview

Water supply has been a concern of humanity ever since people started living in organised communities. Extensive water and drainage works were constructed by ancient civilisations in cities as different as Rome in Europe and Macchu Picchu in South America.

In modern times, the stimulus towards development of water and sanitation came in the middle of the 19th century as urban populations expanded following the industrial revolution. The supply of piped water to cities resulted in greater consumption. This in turn led to more wastewater, especially after the widespread adoption of the water closet. Untreated sewage and water supplies were a major health risk and contributed to the spread of cholera epidemics in Europe until the 1890s. With abundant water supplies available, the logical solution was the construction of underground sewers. By the 1930s, cities in the industrialised countries had built water supply and waste disposal facilities for most of their inhabitants. Sewerage systems had also been exported to other parts of the world, but there they served only the affluent parts of cities inhabited by the colonial elite.

It was only in the 1950s that the international community began to focus on drinking water supply, with the World Health Organisation as a major advocate for action, emphasising the links between water supply and health.

The need for low-cost technologies to solve the water supply problems of the developing countries made this issue the prime one during the 1960s. The first actions for water supply on a nationwide basis were initiated in the Americas (the first definition of region-wide targets came from a meeting of Latin American countries in Punta del Este, Uruguay, in 1961) and in India. However, the main thrust remained directed towards water supply and waste disposal in urban areas.

The concern for rural areas was brought into the forefront in the late 1960s by the OECD, which was later joined in this by UNICEF, UNDP, WHO and other United Nations organisations.

The development of appropiate technology

The development and diffusion of appropriate water and sanitation technology was a central focus of the International Drinking Water Supply and Sanitation Decade.

Two of the widely adopted pumps were the India Mark II, developed in the 1970s, and the AFRIDEV, developed in Kenya. Both pumps were designed for village-level operation and maintenance.

The popularity and subsequent expansion in manufacture of the India Mark II pump led to its production by around 50 different firms in India and by several other countries in Africa and Asia. The Tara pump, designed and developed in Bangladesh, spread to Burma, Nepal, Pakistan, Papua New Guinea, Vietnam and Bolivia.

A major contribution was made through a UNDP programme executed by the World Bank with support from UNICEF and other organisations, which tested 2,700 handpumps of 70 different types under laboratory conditions.

Source: Achievements of the International Drinking Water Supply and Sanitation Decade 1981-1990, Report of the Secretary-General to the General Assembly, July 1990

While technology was still considered the solution, the involvement of communities began to be seen as also important to the development process. There was an emphasis on training and the provision of appropriate technology such as handpumps. Sanitation was recognised as a necessary accompaniment to water supply. However, community participation only became an issue after the HABITAT conference in Vancouver (1976) and the Mar del Plata conference (1977).

For the most part, "community participation" in practice meant community mobilisation to help with the construction of projects planned and implemented and national authorities and external support agencies (ESAs). Sometimes, national authorities, too, were not consulted in the planning stages. In the later half of the 1980s, evaluation of water supply and sanitation projects that were not doing well made it clear to ESAs and multilateral agencies that their approach was undermining the capacity of people to take care of their own needs and problems, and thus the sustainability of projects.

Understanding of environmental linkages grew during the 1970s and 1980s. There is now an acceptance at the political level that water is not an infinite resource. Many countries, including industrialised ones, have experienced increased salinity and toxic contamination of aquifers and soil caused by over-extraction. There has also been a growing understanding that supply-oriented policies result in inefficiency and waste and are of benefit primarily to the more affluent sections of society. Most current discussions on water supply and sanitation emphasise the need for demand management through pricing policies that reflect the true costs and are based on ability to pay.

The attitude towards sanitation has also changed. Traditionally in small communities, sanitation was the responsibility of individuals acting as members of a particular population group. The group regulated the individual's behaviour to ensure that it did not pose a danger to others (within the limits of the group's knowledge of health dangers). As communities grew larger, and with the development and consolidation of national governments, the responsibility for sanitation was taken over by the authorities. Communities became passive recipients of services.

Only recently have planners and implementors come to recognise the importance of a multi-pronged partnership approach, involving participation by all sections of the community right from the inception of the project, and especially in making decisions. This has been especially so in sanitation at the household level.

The Mar del Plata Action Plan noted that "water is a limited and valuable resource" and called for its more efficient use generally through pricing and other economic incentives. In agriculture, reduction of water losses and the avoidance as far as possible of wasteful irrigation practices were recommended. Governments were urged to take steps to cut pollution from industrial and other sources. Generally the approach was to be an integrated one, taking into account competing uses for water, the need for action on sanitation and the links with health and the environment.

The World Summit for Children (1990), coinciding with the end of the International Drinking Water Supply and Sanitation Decade, noted the link between health and the availability of safe water and safe sanitation and agreed on the goal of "universal access to safe drinking water and to sanitary means of excreta disposal" by the year 2000.

Chapter 18 of Agenda 21, agreed to by 153 governments during the UNCED discussions in Rio, sets out seven areas for action in its section on water and sanitation: integrated water resources development and management; water resources assessment; protection of water resources, water quality and aquatic ecosystems; drinking water supply and sanitation; water and sustainable urban development; water for sustainable food production and rural development; and impacts of climate change on water resources.

The Chapter observes that in spite of "the unprecedented progress achieved during the Decade", one in three people in the developing world still lacks access to safe water and sanitation. Developing on the four guiding principles proposed by the Global Consultation on Safe Water and Sanitation for the 1990s (New Delhi, September 1990), it sets the following objectives for water and sanitation:

- Protection of the environment and safeguarding of health through the integrated management of water resources and liquid and solid wastes.
- Institutional reforms promoting an integrated approach and including changes in procedures, attitudes and behaviour, and the full participation of women at all levels in sector institutions.
- Community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes.
- Sound financial practices, achieved through better management of existing assets, and widespread use of appropriate technologies.

Chapter 18 stresses that implementation of water supply and sanitation programmes is a national responsibility. Therefore, governments should design specific strategies and programmes based on the most efficient use possible of available resources. This entails:

- The use of appropriate technology, including traditional and indigenous practices as far as practicable.
- Training of male and female professional and technical staff, and increasing the access of women to training in maintenance of equipment, water resources management and environmental sanitation.
- Planning and management at the most appropriate level and community involvement in the conception, planning, decision-making, implementation and evaluation of projects for domestic water supply and sanitation.
- Capacity building at all administrative levels down to the community. It noted that institutional capacity building and technical cooperation between developing countries are very important.

Governments also agreed in Rio to promote schemes for rational water use through public awareness raising, educational programmes and levying of water tariffs and other economic instruments. For countries with low water and sanitation coverage, the Chapter sets targets for water supply (75%) and solid waste disposal/recycling (75%) in urban areas by the end of the century.

In rural areas, the challenge facing agriculture to continue increasing food production while reducing environmental impacts and saving on water use so that it could be made available to competing users (industry, domestic consumers) is dealt with in detail. Actions are outlined to help achieve this. The Chapter also stresses that rural communities should be given access "to safe water in sufficient quantities and adequate sanitation to meet their health needs and maintain the essential qualities of their local environments".

The aim of the International Drinking Water Supply and Sanitation Decade was to extend safe water and sanitation to all by 1990 through a coordinated effort of the world community. According to official figures, 368 million urban and 980 million rural people in developing countries were provided with safe water during the Decade. Adequate sanitation was provided to 314 million urban and 434 million rural people.[4]

4 'Report of the Economic and Social Council: Achievements of the International Drinking Water Supply and Sanitation Decade 1981-1990, Report of the Secretary General', paragraph 69. UN General Assembly, 13 July 1990.

These figures, supplied by national governments, are probably an overestimation, because they do not take into account the quality and reliability of services or shed light on the actual utilisation of facilities, either as a result of unreported breakdowns or of a lack of acceptance. In some cases, they also do not include the development of water and sanitation outside the projects supported by ESAs and international agencies. However, even though the exact extent of the increase is not known, it is clear that there was a significant expansion of coverage during the Decade.

Worsening economic conditions hampered efforts during the Decade. There was a sharp drop in the prices of non-oil primary products exported by developing countries and a steep rise in real interest rates which resulted in serious debt-servicing problems. Some of the least developed countries experienced negative GNP growth, particularly in sub-Saharan Africa where countries were also devastated by drought, famine, war and other disasters. The developing world, until then a net recipient of financial resources, became a net supplier of such resources to the industrialised countries.

1.3 The Current Situation

Developing Countries

While water and sanitation coverage was widened during the International Drinking Water Supply and Sanitation Decade, the effect of the increase was undermined by population growth, particularly in urban areas. (Population growth and some other relevant statistics are given in Appendix 1).

Sub-Saharan Africa

The plight of Sub-Saharan Africa is particularly serious. Civil war and climatic disasters have taken their toll, swallowing funds, destroying infrastructure and preventing the extension of coverage. The debt burden and subsequent structural adjustment programmes have drastically reduced budgets for what are considered to be social services. The terms of trade have become increasingly unfavourable. Prices of export products have fallen, reducing the availability of foreign exchange and thus affecting entire economies. Population growth is continuing to outstrip economic growth. As economies worsen, urbanisation has increased and is aggravating the problems of already overburdened local authorities.

In spite of this, there have been some positive developments. Environment is high on government agendas and some countries have set up environment ministries. Many of the UNCED agreements relating to

The wave of the future in a troubled continent

"Many governments in Africa are presently providers of rural water supply and sanitation (RWSS) services. In the 1990s, the primary role of government should shift from provider to promoter or facilitator.

The objective should be to create an enabling environment in which sustainable services can be provided, taking maximum advantage of the capabilities of central and local government, the formal and informal sector, non-governmental organisations and communities.

The pace of this decentralisation will necessarily be gradual during the 1990s, varying from country to country, and linked to capacity building at the national, regional and local levels.

Today in Africa, costs of RWSS are heavily - often fully - subsidised. This cannot be sustained. While it will still be necessary for governments to subsidise a substantial proportion of the capital costs of new services, beneficiaries must shoulder most or all of the recurrent costs of operation and maintenance. This implies that service levels and technologies cannot be prescribed but must be responsive to consumer demand."

Source: 'Summary of Rural Water Supply and Sanitation Working Group Reports', annex to 'African Conference Statement: Abidjan Accord'

water and sanitation are being carried out to varying extents. Communities are being involved more in project decisions affecting them. In some countries, women play an important part in the inception as well as implementation, operation and maintenance of projects. A beginning has been made in some countries towards cost recovery from consumers.

Many problems remain. With the private sector not developed enough to play a delivery role in most countries and there not being enough trained middle-level and community-level staff, African governments continue to be direct providers of water and sanitation services. In rural areas, costs are often borne totally by central government. In urban areas, the pricing structure covers only part of the cost of providing water and sanitation.

Responsibilities for water and sanitation are frequently spread among several ministries/departments and therefore difficult to coordinate. Integrated approaches involving other relevant ministries (such as agriculture, environment and health) are rare, partly because all the ministries do not have equal financial and political muscle. Sanitation especially has been adversely affected by lack of ministerial interaction.

Most urban centres in Africa have no sewerage system at all. In cities with sewage disposal, the systems rarely serve more than a small proportion of the population, typically in the more affluent residential, government, and commercial areas.

There is little institutional support for water supply and sanitation activities. This is because of government policies which fail to involve them, as well as because of the weakness of the institutions themselves. Government agencies and research institutions are under-funded, do not pay competitive salaries and do not have sufficiently stimulating environments. Researchers are also isolated from international information sources. As a result, both agencies and research institutions lose many of their best people to the private sector or to institutions and agencies abroad.

Effective water resources management is becoming more and more difficult, as national hydrological monitoring networks are in decline and there is a lack of qualified staff.

North Africa & Middle East

The main problems in this region are water scarcity (leading to a progressively rising marginal price for new supplies), salinisation of coastal aquifers, and the dependence on internationally shared water resources.

The flow in wadis of the region is intermittent. To increase water supply, there is a trend towards reusing wastewater. Morocco is developing a national plan for water use which integrates wastewater with surface and groundwater resources. Similarly, sewerage for environmental sanitation forms an integral component of an agricultural, social and rural community development programme in Yemen. There is also a move towards conversion from open canals to piped networks in irrigation.

Scarcity can force water agencies into costly water resource development. Recent works to supply the Jordanian capital, Amman, for example, involved pumping water through a height of 1,200 metres from a site about 40km from the city. The high potential for international conflict of shared resources makes it vitally important to find solutions to scarcity problems.

Asia & The Pacific

Half of the billion people without access to safe water in the developing countries and three-quarters of the 1.7 billion people lacking adequate sanitation live in Asia.

The main problems are caused by rapid economic growth and continued population increase without adequate integrated water and sanitation development. In many places, water problems have become acute because of rapid industrialisation and urbanisation, which have led to rising demand for water for domestic, industrial, and energy generation purposes. Water requirements of the agricultural sector have also gone up with the need to feed rising populations.

Rivers are heavily polluted, raising the cost of safe water supplies. In several countries, over-extraction has led to salinisation of aquifers, land subsidence and degradation of agricultural land. Sedimentation is a major problem in many river basins, because of poor land management in the catchments.

The response to these problems has generally been to build more and larger projects, rather than to use existing infrastructure and water supplies more efficiently. Legislation is usually contradictory in specifying property rights to water, which makes the use of economic criteria in water management more difficult. Also, Asian governments have historically regarded water as a social service rather than an economic good whose extraction and supply involve costs that have to be recovered.

As in Africa, most urban centres in Asia have a serious sewage disposal problem and the water sources of large cities like Bangkok, Dhaka, Jakarta, Karachi and Manila are seriously polluted.

Reducing high levels of unaccounted for water

"The high level of unaccounted-for water in most Asian and Pacific cities is one of the major concerns for management. The successes of Singapore (now about 8% unaccounted-for water) and Bangkok (once 65% and now below 30%) in this regard should be closely followed.

Metering of all production and all consumption and the regular maintenance, repair and replacement of meters is lacking in most of the surveyed cities. This may be the most important finding of the survey.

Repair of all visible leaks with minimal response time, updated mapping and registration of all connections following ground surveys, public awareness campaigns, amnesties on illegal connections, reduction in pressure, replacement of mains with high leak frequency and supervision of the installation of new connections are other actions that utilities can take to reduce unaccounted-for water before the more sophisticated concepts of district and waste metering and use of leak detection equipment are employed.

Overall, there is undoubtedly a need for more financial and human resources to be committed to maintenance of water supplies. The time for demand management in water supply has arrived, but consumers will not take kindly to measures reducing their consumption when there are apparent large losses in the system."

Source: Water Utilities Data Book for the Asian and Pacific Region, Asian Development Bank, 1993

Responsibilities for water and sanitation are shared by many ministries and this often creates problems of coordination. Some Asian countries have well-organised NGOs which play an important role through direct work with communities in water and sanitation projects as well as by putting pressure on governments over environmental and development issues.

There is a high degree of technological innovation in Asia, especially in the development of low-cost technologies and approaches. Some products (for example, handpumps) and community-based approaches have been spread successfully to other regions.

Special problems of the Pacific island nations include over-extraction leading to depletion and salinisation of aquifers, and the threat posed by rising sea levels as a result of global warming.

Latin America & The Caribbean

In Latin America, the major issue is not the quantity of water available, but rather the difficulty of supplying that water to consumers. Sixty per cent of the region's population is concentrated in 20% of the land area containing only 5% of the regional water resources. Often, the water has to be transported uphill, as in the case of Mexico City which is considering pumping water up 1,000 metres from a lower region. Copious water resources like those in the Amazon basin can only be used at great cost.

The quality of water is a problem. In the large cities, water is trucked in and sold at very high prices to low-income "illegal" residents. The process of transfer from the water source to the consumers' storage vessels and its subsequent use create many opportunities for contamination. This is thought to have been one reason for the rapid spread of cholera in the cities in 1991. Piped water also gets contaminated because the economic decline of the region forced postponement of system repairs and the deterioration has led to leakages and negative pressure in pipes.

Environmental sanitation is another major problem. In the cities, the sewerage systems were built to serve the affluent parts of the population. Low-income residents are largely still unserved or underserved with sanitation. The same conditions apply in many rural areas. Some progress has been made recently towards serving low-income groups, often as a result of NGO initiatives, but much more needs to be done, especially in view of the heavy rural-urban migration.

There is a serious lack of sewage treatment facilities. Only two per cent of all sewage is treated. Insufficient maintenance has led to the breakdown of infrastructure: in Mexico, for example, more than 90% of all wastewater treatment plants are not operating[5].

Rivers in general receive a lot of waste and are becoming highly polluted, leaving few options for downstream users. Many lakes and man-made reservoirs are badly affected by heavy growths of algae and other plant life, owing to the discharge of nutrients from drainage water and untreated domestic wastewater. For example, the upper Tiete river in Sao Paulo state, Brazil, receives large volumes of drainage water, which contributes to the eutrophication of a number of reservoirs constructed downstream for regulation of flow and hydropower generation.

As in other parts of the developing world, the administrative division of water and sanitation responsibilities creates problems in widening coverage. Recent moves towards private sector involvement in some operations (for example, in Buenos Aires the private sector is to supply water to the public utilities which will then distribute it) may represent the wave of the future.

Information on five Caribbean countries (Barbados, Dominican Republic, Grenada, Haiti and Jamaica) indicates that waste disposal poses a major problem in the area.[6] This is the case even in Barbados, which has 100% sanitation coverage but where the use of private septic tanks and absorption pits, and inadequate waste disposal within the public system pose a serious environmental threat. In the Dominican Republic and Haiti, access to safe water is low. Cuba reports 100% water and sanitation coverage.

Eastern and Central Europe/ Newly Independent States

Limited reliable information is available. The confidence limits of data prior to the economic reformation are low because of poor monitoring and the manipulation of statistics for political purposes by the former governments. Recent studies confirm that the biggest problems facing the region are outdated and collapsing infrastructure, and pollution of water resources.

In some countries water pipes made of asbestos are cracking, adding to water loss. In most countries treatment plants are inefficient or have stopped working. For example, a new wastewater treatment plant in Vilnius is such a high consumer of energy that the authorities say it would actually pay the city to demolish it and construct a

5 John Briscoe, 'When the Cup Is Half Full. Improving Water and Sanitation Services in the Developing World', in Environment Vol 35 No 4, May 1993.

6 'Planning for Water and Sanitation Programs in the Caribbean', USAID Water and Sanitation Health Project (WASH) Field Report No. 335. February 1992.

new, efficient plant.[7] Rehabilitation and maintenance of infrastructure is made difficult by limited financial resources (domestic consumer tariffs are very low and the collapse of industries has reduced revenue).

The problem is made worse by pollution of surface and ground waters. The Aral Sea, reduced in volume by 70% since 1956 because of diversion of its tributaries to grow cotton and rice, is contaminated with chemicals from agricultural fertilisers, pesticides and herbicides. Its salinity is now approximately three times that of the ocean and salt from its shores is spread by the wind, salinising the soil for hundreds of kilometres.

Raw sewage and industrial effluents containing heavy metals and toxic chemicals are the main contaminants of surface water. Groundwater is also contaminated by chemicals from agricultural runoff. One effect of economic reform in central Europe has been the profitable importation for dumping of toxic waste from western Europe, either disguised as 'raw materials' or ostensibly for reprocessing.

Water supply coverage is generally high, but sanitation has lagged behind. In some countries, most rural people do not have access to adequate sanitation facilities. In urban areas, treatment and disposal of wastewater is a big problem.

Responsibilities for water and sanitation are shared among several ministries but coordination is minimal. At the management level, there is an urgent need for training.

The chaos accompanying the transformation of the economies, lack of financial resources and political instability, which in some cases has exploded into civil war, have all served to hamper the development of water and sanitation in the region. Projects with environmental components are being financed by international lending institutions and industrialised country governments (through the European Union and bilaterally). A number of conferences have been held to identify the problems and propose solutions (for example, in Lucerne, March 1993).

Industrialised Countries

The main problems are the contamination of surface water resources and groundwater, and the management of transboundary water bodies.

7 'Utility Reform and Environmental Clean-up in Formerly Socialist Countries. Report of a Workshop on the Baltic Sea', Water and Sanitation Utilities Partnership Report No. 3. World Bank. The workshop was held in February 1993.

Pollution originates from industry, agriculture and domestic consumers:

- Industries continue to flout laws regulating the discharge of hazardous substances into water bodies. Industrial emissions of sulphurous and nitrogenous compounds are also causing acid rain that in turn is damaging forests (which play an important part in the hydrological cycle) and killing aquatic life essential to the health of water bodies.
- Runoff from agricultural land contains pesticides, herbicides and an excessive amount of nitrates and phosphates because of over-use of fertilisers and careless disposal of animal wastes. In the USA, farm run-off is the principal source of pollution in 64% of the rivers. Agricultural runoff also contains natural organic matter which can cause undesirable disinfection by-products (such as chloroform) in water treatment.
- Domestic wastewater is contributing to the problem because of its high content of phosphates and nitrogenous compounds which stimulate eutrophication. A prime source of the phosphates is household detergents. The widespread use of washing machines and automatic dishwashers has dramatically increased the amount of wastewater containing phosphates.
- As all the countries do not have organised separation and proper disposal of hazardous wastes, disposal of solid and liquid wastes sometimes returns toxic substances to the environment. Even when separation does occur, toxic waste is sometimes "dumped" in the newly reforming states of Eastern and Central Europe or in developing countries where there is neither the capability nor the capacity to dispose of them safely.

Major problems in the United States include: salinity caused by over-extraction for agriculture; water scarcity coupled with improper water management; overtaxing of local and regional, especially groundwater resources (this has lowered the water tables of the Ogallalla sandstone formation in the Midwest and caused water shortages in Arizona cities sited over local land-locked basins); and the competition for water between agriculture and the cities.

There is a move in the industrialised countries towards water conservation. Germany has been exploring low-water sewerage technologies. Sweden has been researching "dry systems" for excreta disposal. Reduction of solid waste has also become a target and some countries are experimenting with waste removal charges based on the amount of waste and making companies pay for collection and recycling of packaging materials.

Private sector participation in delivering water

Urban water supply services in the Côte d'Ivoire are among the best in Africa. They have been operated for the past 30 years under lease contracts and concessions by a private utility, SODECI.

The company is owned by Ivorian stockholders (52%) and French interests (48%). It was set up in 1960 operate the Abidjan water supply system under a concession contract. In 1974 its role was extended through a lease contract for water supply in other urban centres, a maintenance contract for Abidjan sewerage and drainage, and responsibility for operating and maintaining rural water points.

By 1989, 72% of the urban population had access to safe water, compared with less than 30% in 1974. Unaccounted-for water was only 12% and the collection rate for private customers was 98%.

In the rural areas, however, a large proportion of the 13,500 water points equipped with handpumps were not maintained efficiently. Centralised maintenance resulted in delayed and costly repairs, community development initiatives were not well organised, and villager participation was weak. Cost recovery policies were erratic.

The rural systems were subsidised by high urban tariffs and revenues fell as urban industries recycled water and used less-costly private sources.

In 1987, the government moved rural service out of SODECI. The company now receives no operating subsidies, and all its new water supply investments are self-financed.

Sources: Water and Sanitation Utilities Partnership Report #2, World Bank. Thelma A. Triche, 'Private Participation in the Delivery of Guinea's Water Supply Services', World Bank Working Paper, 1990.

The worldwide economic downturn of the 1980s and early 1990s has stimulated governments to start privatising water and sanitation utilities. The forms and extent of privatisation vary from country to country. In many instances, privatisation is said to have lead to increased efficiency.

2 Sector Influences

Like other parts of the economy, water and sanitation is affected by the political and economic environment within which it operates. In the many global meetings convened to review experiences during the International Drinking Water Supply and Sanitation Decade, a common conclusion has been that the political/economic dimension is the primary one that determines the success or failure of attempts to expand water and sanitation coverage.

2.1 The political environment

The desire of governments to ensure the availability of safe water and adequate sanitation to their people, as endorsed by the Rio commitments, needs to be translated into strategies that maximise efficiency. Where centrally managed institutions are unable to achieve the necessary expansion/improvement, operation and maintenance, governments need to create the conditions that will enable decentralised management to do so. This is especially so with regard to community participation, which has been found to be essential for the sustainability of projects.[8] Political will is also needed to ensure the passing and enforcement of suitable legislation affecting water and sanitation. Too often, governments fail to enforce laws (for example, against polluters) for political reasons.

2.2 The economic environment

Spending on water and sanitation is an early casualty when national economies are not doing well in countries where the government is a service provider. This has been the case in Africa, especially in countries undergoing structural adjustment. Operation and maintenance of infrastructure has suffered first, followed by cuts in other spending.

8 The degree of participation relates to the degree of freedom of choice (or control). Thus, true community participation enta ils the involvement of all (or most) sections of the community from the inception of a project. The local needs having been expresse d, the community is presented with a 'menu' of choices to fulfil those needs, with the costs, effects and obligations of each being fully explained so that an informed choice can be made. Subsequently, the community is involved in all decision-making, management, financing, construction and operation and maintenance.

Where governments have decided to supply water and sanitation on a commercial basis and given the private sector a chance to participate with appropriate safeguards, national economic problems have had less of an effect and there has been an improvement in service. For example, a firm set up by a group of 26 companies in Mexico City has won a 10-year agreement from the government to buy wastewater and purify it for industrial reuse. It is able to sell the treated water at 75% of the tariff charged by the government and yet make a profit. In Côte d'Ivoire, unaccounted-for water in 1989 was only 12% in urban areas supplied by SODECI, a utility owned jointly by Ivorian and French shareholders (the level of unaccounted-for water is a good indicator of the efficiency of water utilities; it can be as high as 50% or more in some developing country cities, and is often about 20% in industrialised countries). It should be noted, however, that SODECI's performance in rural areas was poor.

Water and sanitation are also affected by competition from other sectors for available funds. In a tight budgetary situation, other sectors are often developed at the expense of water supply and sanitation. A recent example of this is Boston, Massachusetts, where infrastructure is breaking down because of lack of maintenance over a long period. Low tariffs, combined with the fact that most water supply and sanitation infrastructure (pipes, sewage treatment plants, etc.) is out of the public eye and therefore not a political spending priority, starved the metropolitan sewerage agency of funds.

2.3 A two-way process

The political and economic environments do not only affect water and sanitation; they are also affected in turn by what happens in the sector.

First, there is the obvious result that communities whose health and quality of life are improved feel satisfied with the government. This is so even when water and sanitation services are provided with private sector participation as long as the government ensures that the interests of the users are protected.

There are also other effects. Community participation creates political maturity, which strengthens democracy in the country. There is a stimulus towards gender equality as more women are involved in decision-making and management, disproving the stereotyped myths about them. Communities become more cohesive without necessarily remaining tied to an ethnic identity (unless vested interests try to use the cohesiveness for their own ends). Exchange of experiences with other communities can be highly effective in building up a sense of common purpose and thus national identity.

Access to safe water and sanitation in peri-urban and rural areas is frequently an entry point to the economic development of a community and a powerful aid to combating poverty. In rural areas women can save as much as five hours a day by not having to carry water and that time is spent on other activities (for example, in some cases the time saved has been spent in growing vegetables for family consumption and for sale).

Better health creates the possibility of increasing incomes, and higher incomes make it possible for users to pay tariffs that cover water supply and sanitation costs. UNICEF reports that in a rice-growing area of Nigeria with a population of 1.6 million, an estimated US$20 million in benefits could be generated from increased rice production and sales if Guinea worm disease were to be eradicated through the supply of safe water combined with an information/education/communication campaign. If this additional income were invested in low-cost technology, the population could be provided with water within four years.[9]

As water and sanitation improve, a pool of managerial and administrative skills is built up. Such skills are valuable to a developing economy. The reduction of disease that accompanies water and sanitation development results in a more healthy, and therefore more productive, labour force.

3 The achievements

Much has been achieved in water and sanitation since the 1977 Mar del Plata Conference. As a result of the experience gained during the Water and Sanitation Decade, understanding has been built up of the complexities surrounding improved access of drinking water and sanitation facilities, now recognised to be an integral part of the water resources environment.

Low-cost technologies for drinking water have been developed and disseminated in the developing world (although not always successfully). Many of the developments were initiated in the search for viable solutions at local level. In the sanitation field too, there has been significant technological progress. Though some gaps remain, interesting advances have been made in latrine design, wastewater treatment, recycling and secondary uses (aquaculture, etc).

9 'Report of the Economic and Social Council: Achievements of the International Drinking Water Supply and Sanitation Decade 1981-1990, Report of the Secretary General', paragraph 43. UN General Assembly, 13 July 1990.

The need to deliver safe water and sanitation to the poor as a priority has been made a global issue. The objectives of improving human health and wellbeing, along with social and economic conditions, have become much clearer. So have the linkages with health, nutrition, food security and the environment. Also gaining increasing acceptance now is the need for an approach in which access to safe water and sanitation go hand in hand with hygiene education, information and communication strategies, training, and community participation in decision-making, management and maintenance (ensuring that men and women are given equal opportunities). NGOs are playing an ever more important role in helping to develop effective partnerships at the community level, and local consultants are increasingly used for planning, programme design, project supervision, monitoring and evaluation. This is a useful form of capacity building.

It is recognised that governments have to develop policies for the allocation of water to competing users, recognising that it is a scarce resource and that efficient use can result in substantial savings. A beginning has been made in using pricing mechanisms for this purpose as well as for recovery of costs incurred in providing and sustaining water and sanitation services.

From the detailed analyses that have taken place of Decade experiences, sector specialists identify three key areas where fundamental changes of approach could build on these achievements and bring real prospects of accelerated and sustainable progress:

- Improving the effectiveness of sector investments;
- Maximising the mobilisation and use of financial resources; and
- Increasing the extent of collaboration at all levels.

Each issue is addressed separately in the Policy/Strategy for Action Papers which follow this one. It is helpful here to look at progress made in the late years of the Decade and the immediate post-Decade period.

3.1 Improving Effectiveness

The following recommendations in Chapter 18 of Agenda 21 emerge as being essential to the effectiveness of the sector: *a comprehensive policy framework* for integrated development of water resources and environmental sanitation, *water resources assessment, decentralisation, institutional development,* human resources development, use of *pricing mechanisms* and other incentives to conserve water and allocate it among competing users, and community participation ensuring the full participation of women.

Most developing and newly reforming countries do not have a comprehensive policy framework of the type envisaged. Many industrialised countries do, but the comprehensiveness varies from country to country, depending to some extent upon the degree of public concern over environmental issues and the ability of the public to lobby for these. For maximum effectiveness, political will has to be translated into mobilisation of all (or most) of the stakeholders. National governments have to work out comprehensive sector strategies which include capacity building (institution building, education/training, community involvement, etc.) and decentralised operation. National strategies produce the frameworks for detailed project planning to be carried out at the lowest appropriate level.

During the first half of the 1980s, most governments and external support agencies (ESAs) concentrated on cheapness and speed. In order to achieve this, in some countries they bypassed local administrative structures, setting up their own project committees. Projects were completed with minimal local participation. The result was that they were handed over to professional and sub-professional staff who had not been trained to maintain them and did not have the resources (in terms of transport, fuel and staff) to do so. Not surprisingly, the projects were not maintained and became inoperational. In the second half of the Decade, there was some improvement as the need for human resources development, including training, and the value of participation at the community level became apparent. However, in some countries the desire for a "quick fix" continues, fuelled by the rivalry between ESAs and abetted by governments.

Chapter 18 of Agenda 21 stresses that comprehensive and regularly updated data on the quantity and quality of water resources are vital for effective management of national resources. Yet the monitoring systems and the hydrological services that operate them suffer a severe lack of funding support. The situation is especially severe in Africa, where many governments have cut funding at a time when information is not needed, because of the escalating demand for more water.

The World Meteorological Organization has been at the centre of global *water resources assessment* through its support for national hydrological and meteorological services, of which the Hydrological Operational Multipurpose System (HOMS) - an active technology transfer system forms an important part. The Global Environmental Monitoring System of UNEP and the International Hydrological Programme of UNESCO have also been helping to assess the quantity and quality of surface and ground waters. In the late 1970s and early 1980s, countries were responding to the Mar del Plata call for more comprehensive information on water resources, but this trend was reversed in the later part of the 1980s because of worsening economic conditions, especially in Africa. Lack of trained staff has also been a major constraint. Asia and the Pacific and Latin America and the Caribbean have made good progress in this field, although in the latter region data collection is usually carried out on a project-specific basis and there is little attempt at its integration into a resources management system. In the newly reforming countries, only rudimentary monitoring systems are in place. The most advanced countries in this respect are the industrialised ones. Even there, however, calls for better assessment of groundwater resources, especially with regard to their contamination by pollutants, indicate that more work is necessary.

The process of *decentralisation* has begun in the developing countries, with municipalities in some countries being allowed greater autonomy in making some decisions, and with the involvement of the private sector in some operations. However, it is only a beginning. In the newly reforming countries, few resources are available for sector development and decision-making still tends to be centralised. In most industrialised countries, there is decentralisation to the municipal level and there is a trend towards privatisation.

Institutional development to facilitate water and sanitation management at the lowest appropriate levels has yet to be carried out in most developing and newly reforming countries. Human resources development has been constrained by the economic situation. Salaries in the sector are generally not competitive and promotions are not always based on merit, resulting in a loss of personnel to the private sector.

Some developing countries have started using the *pricing mechanism* to change water use patterns and improve cost recovery, but in the majority of countries the tariff structure is subsidised and benefits the urban middle classes. A recent review of World Bank-financed projects shows that the effective price charged for water is only about 35% of the average cost of supplying it.[10] In the newly reforming countries, utilities are realising that subsidies will have to be phased out: representatives of five Baltic countries participating in a recent World Bank workshop on utility reform (Russia, Estonia, Latvia, Lithuania and Poland) were unanimous in accepting realistic pricing as a long-term objective.[11]

Community participation is making significant inroads in the developing world. Women's participation has gone up: 42 countries are implementing programmes specifically designed to increase the involvement of women in the development of programmes.[12] In some countries, community participation has developed from voluntary labour, through construction or preventive maintenance in otherwise agency-managed systems, to more influence in local design and more power in local management.

3.2 Maximising financing

Lack of financial resources is quoted as a prime constraint to sector progress by most developing countries. Poor operation and maintenance is an ubiquitous indicator of inadequate cost recovery and lack of financial autonomy in water utilities. Post-Decade evaluations have paid considerable attention to the mobilisation of additional financial resources, particularly from users and the private sector. It is clear that the poorest members of the community are paying higher prices for inadequate water supplies from water vendors than their richer neighbours pay for public supplies. Willingness-to-pay studies confirm that people will contribute significant amounts, if the services provided are reliable and meet their reasonable expectations. This has led to the emergence of the concept of "effective demand", as a planning tool.

10John Briscoe, 'When the Cup Is Half Full. Improving Water and Sanitation Services in the Developing World', in Environment Vol 35 No 4, May 1993.

11'Utility Reform and Environmental Clean-up in Formerly Socialist Countries. Report of a Workshop on the Baltic Sea', Water and Sanitation Utilities Partnership Report No. 3. World Bank. The workshop was held in February 1993.

12'Report of the Economic and Social Council: Achievements of the International Drinking Water Supply and Sanitation Decade 1981-1990, Report of the Secretary General', paragraph 24. UN General Assembly, 13 July 1990.

Although the case for user payment is strong, adopting community financing as a universal policy in the short term may prove to be extremely difficult. However, there is clearly scope to mobilise community resources to a greater extent than is being done currently.

In 1987 a global consultation on progress during the Water and Sanitation Decade concluded that cost recovery in the sector "is generally ineffective".[13] A year later, UNICEF reported that an average of 30% of its assistance to water and sanitation programmes was devoted to recurrent costs, and would probably continue to be so "well into the future in many countries".[14]

Prospects for cost recovery are thought to be particularly difficult in rural sub-Saharan Africa, where poverty is most acute. However, it has been shown to be feasible even in that unfavourable economic climate. In Burkina Faso, for example, the National Water and Sanitation Office has been recovering costs by collecting tariffs at communal standposts. The tariff is fixed at that for a private connection using less than 10m3 per month, which is below what vendors charge. A reduced tariff also exists for systems using boreholes, pumps and independent reservoirs.

Cost recovery has been carried out successfully to varying degrees in some Asian cities. About two-thirds of 38 major utilities surveyed in 25 developing countries of the Asian and the Pacific region collect sufficient revenue from tariffs to cover operation and maintenance costs.[15] Seoul, Bangkok, Singapore and Taipei have eliminated grant financing of capital investment for water supplies. In rural Thailand, revolving funds handled at the village level have been used for cost recovery.

The private sector is becoming increasingly involved in water and sanitation. Private sector companies manufacture and repair equipment and components used in the sector. They also commonly carry out construction contracts. In several developing countries, the private sector has been given contracts to manage some sector operations such as meter reading and billing (Santiago, Chile), water supply delivery (Buenos Aires, principal cities in Guinea, all urban areas in Côte d'Ivoire) and wastewater treatment (Mexico City, southern Turkey). In Thailand, water resources management in the Eastern Seaboard is to be privatised, with the new company listed on the stock exchange. In the industrialised countries, there is an increasing trend towards privatisation.

13 'International Drinking Water Supply and Sanitation Consultation, Interlaken, Switzerland'. World Health Organization, 1987.

14 'Water, Sanitation and Health For All by the Year 2000: UNICEF Actions for the Years to Come'. Draft. 1988.

15 'Water utilities Data Book for the Asian and Pacific Region'. Asian Development Bank, 1993

Debt-for-water swaps: A way to lighten the burden

Debt-for-water swaps could provide a way for countries that are strapped for foreign currency to reduce their debt burdens to commercial banks while extending water and sanitation coverage.

Such an arrangement was reached between the Sudanese government and the UK-based Midland Bank in 1988. By then the country's foreign debt stood at more than US $1.3 billion and Sudan was unable to pay even the interest on it. About a fifth of the debt was commercial.

Sudan benefited from the exchange by paying off part of its debt in local currency and at a steep discount. The bank benefited by getting a bad loan off its books in a way that is good for its public image.

The biggest gainers were the 5,000 rural people in the Kordofan region where a UNICEF project aimed to build latrines, improve water supply and plant tree seedlings for 10 village wood lots. Twenty-five handpumps were handed over to the 10 villages for communal ownership. In the past, pumps had remained government property and maintenance had been a problem.

UNICEF provided the foreign exchange component for the project.

If the other holders of Sudan's commercial loans were to agree to debt-for-water swaps, the money could be supplemented with a hard currency fund to meet import costs of a nationwide water and sanitation programme. Every village would then have safe water.

Source: Cole P. Dodge, 'Debt for Water Swap: A First in Sudan' in Waterlines Vol 8 No 1, July 1989.

Unintegrated approach an obstacle to progress

"To date, for the most part, the international community has typically followed a sectoral approach to the support of water use and development. The organisations of the United Nations system, as well as other organisations, have devoted considerable resources in support of programmes within the purview of the individual mandates of each organisation.

While a great deal of effort has been devoted to improving coordination and cooperation, the international community, as in the case of national authorities, has not provided sufficient support to the development and management of water as a finite resource, with a consequent neglect of the vitally important interdependence and interrelationships of subsector projects.

The subsequent failure to integrate economic, environmental and engineering aspects into water development,and manage the whole as a system, is probably the major reason for the limited achievements under the Mar del Plata Action Plan, especially its long-term objectives.

It is here that action must be taken if a "strategy for the 1990s" is to have any meaning, and the United Nations system of organisations can play a major catalytic role in bringing about international support for an integrated approach to water resources planning and management. "

Source: 'Strategies and Measures for the Implementation of the Mar del Plata Action Plan in the 1990s, Report of the Secretary-General', February 1991.

Recent meetings and sector literature advocate more participation by the private sector in both the installation and management of improved water and sanitation services. For the most part, so far, examples of success are on a relatively modest scale in some developing countries. However, there is no analysis of the dynamics of the private sector in developing countries and little is known of the long-term effects of letting the private sector manage water and sanitation on a large scale.

3.3 Increasing collaboration

Among the factors contributing to failure of projects during the first half of the Water and Sanitation Decade was the low level of collaboration at all levels.

The early 1980s provided numerous examples of countries in which as many as ten different donor agencies supported water programmes installing diferent pumps, pipes and other equipment, each requiring (though rarely obtaining) their own provision for spare parts and trained mechanics. Experiences such as these sparked policy reviews which resulted in improvements in the second half of the Decade. However, rivalry between the ESAs (and governments) still sometimes fuels the "quick fix" mentality and leads to duplication of efforts. Such duplication is especially evident in the newly reforming countries where the activities of the ESAs would seem to indicate that the lessons of the Water and Sanitation Decade have not been fully absorbed.

On the whole, developing country governments have failed to coordinate the activities of ESAs at the country level. Collaboration among the ministries/agencies responsible for various aspects of the sector has also left much to be desired. Resources have not been utilised as efficiently as they could have been, inappropriate technology has been installed in some cases because an ESA was prepared to finance the capital costs, and projects have not been maintained after completion.

The late 1980s saw a much-enhanced degree of cooperation among donor agencies, including the formation in 1988 of the ESA Collaborative Council. Transformed in 1991 into the Water Supply and Sanitation Collaborative Council, this organisation now provides a forum for all sector professionals from developing country agencies, donors, NGOs and international research institutions to share views and experiences. It has initiated several in-depth studies by Working Groups into key issues in the sector (Country-level collaboration; Serving the urban poor; Operation and maintenance; Applied research; Information management; Information, education and Communication; and Gender issues). Proposals for enhancing collaboration at the country level will play an important part in sector development in the 1990s and beyond.

4 The challenges

In spite of the progress made globally since Mar del Plata, the problems are still vast. The first challenge is a political one: to accept that turning the Rio rhetoric into effective action requires changes in the role of government, accompanied by measures to strengthen the capabilities of decentralised agencies and communities to deliver services which meet the realistic aspirations of the users.

With political backing, the sector professionals have enough knowledge of the technologies and the approaches needed to make rapid inroads into the backlog of inadequate and malfunctioning water and sanitation services and to tackle the escalating problems of water scarcity and environmental degradation. Without that backing, they are condemned to working on the margins, delivering often inappropriate services at unaffordable cost and failing to address the shameful plight of the poorest sections of the world community. There is an increasing awareness that towards this backing, advocacy for water and sanitation as an essential component of development, needs to be rooted in the communities, and established at all levels.

These then are the challenges for the remainder of this century and the beginning of the next:

4.1 Partnership challenges

Change in the role of government

It is clear that there would be a lot of gains in efficiency if governments were to be facilitators for the provision of water and sanitation instead of providing the services themselves. In this role, they would be responsible for drawing up the national plan for the sector, drafting and enacting legislation to ensure the smooth running of the sector and protect the interests of users, creating and defining the responsibilities of institutions, helping with mobilisation of finance from domestic sources and internationally, and coordinating the interlinking national activity relating to the sector. The sector would then be planned and managed at levels closer to the user (e.g. municipal) with safeguards to ensure accountability for finance and quality and level of service.

Collaboration

Efficient partnership and collaboration at the country level are vital to the widening of water and sanitation coverage. Governments need to ensure that the strengths of all stakeholders, from ESAs to village-level communities, are used optimally to develop the sector in an integrated way. The conditions necessary for governments to change their

role from suppliers of services to facilitators have to be created. ESAs need to transcend narrow national considerations and cooperate with each other and with the governments of the countries they are helping in order to avoid duplication and use resources most efficiently.

Involvement of the private sector

In some countries, the informal sector is already involved in manufacturing materials and equipment, such as pipes and water tanks. Most countries have a private sector capable of manufacturing simple technology and spare parts but governments need to set quality standards and enforce them. The private sector is also involved in some countries in construction projects and operation and maintenance. A more difficult decision is to what extent the private sector should manage water and sanitation. Such involvement has generally been on a relatively limited scale in the developing countries; however, some industrialised countries have large-scale and generally successful experience: there is a need for independent evaluation of this to provide a better understanding of the implications. The experience with incremental private sector management of countries like the Cote d'Ivoire could have lessons (positive and negative) for other developing countries as well as for the newly reforming countries.

The private sector could also be involved more extensively in research, planning, design and evaluation of projects as well as financing.

Communication

In order to bring these new approaches about, behaviour changes at all levels are needed so that communities are enabled to take charge of their own lives. The way to achieve this is through effective communication. Obviously, communication is at its most effective at the interpersonal level where there is a two-way dialogue. The creative use of mass media can supplement this process, but it cannot replace it. Sector professionals need to keep this in mind if effective sustainable development is to be achieved.

4.2. Water management challenges

Integrated Planning

Governments need to produce long-term as well short-term plans and strategies for the integrated development of water and sanitation, based on feasible targets that take into account the financial and other resources available. Targets should include performance criteria in addition to physical infrastructure. Rolling targets ensure flexibility. Water resources need to be assessed and monitored, keeping in mind the possible changes because of environmental degradation and climatic change. Effective planning has to be based on reliable data and governments need to organise the collection and analysis of data better.

Balanced investment in sanitation and water supply. A much-repeated principle of the 1980s was that improved sanitation needs to accompany improved water supplies, if the full benefits are to be obtained. The principle was not, however, reflected in investment patterns. Governments and donors continue to focus on high-profile water supply projects, while people's health and the environment suffer from inadeqaute sanitation.

New activities to promote greater investment in sanitation are being initiated by the Water Supply and Sanitation Collaborative Council, and there is a clear need for governments to lead from the top with advocacy campaigns and budgetary support to stimulate demand for improved sanitation.

Matching health, environmental and economic goals. The primary objective of investment in improved water supply and sanitation has always been seen as protection of human health and wellbeing. The shameful toll of death and debilitating disease caused by inadequate access to these basic human needs, ensures that health improvements must remain a paramount goal. What Rio has done is to bring worldwide recognition that more rapid progress in improving water supply and sanitation is also a prerequisite for sustainable economic and human development, and for protection of aquatic ecosystems.

Health, economic and environmental goals are mutually supportive. They combine to make a powerful case for investments beyond the traditional health and social services budgets. Post-Rio, water supply and sanitation investments need to be seen as an integral part of national economic planning and strategies for protecting the environment.

Water crisis looming in Middle, East and North Africa

Water shortages could reach crisis proportions in the Middle East and North Africa in this decade.

Jordan, Israel, Algeria, Egypt, Tunisia, and the countries of the Arab Peninsula are already reaching a point where nearly all available supplies are being used.

The water issue is particularly difficult in this region because so many countries share common water sources. For example, Egypt relies on the Nile for 86% of its domestic consumption, yet most of the river's waters originate in eight upstream countries.

Israel, the West Bank and Gaza, and Jordan are facing a combined water deficit of at least 300 million cu metres per year.

Water has many political implications in the region: for example, the Yarkon/Taninim aquifer, which provides 25-40% of Israel's water, lies beneath both pre-1967 Israel and the West Bank and is thus a strategic concern for Israel and for the Palestians in negotiations over the future of the West Bank.

Efforts to develop the Jordan and Yarmuk River basins have been stopped by Arab-Israeli or Syrian-Jordanian tensions. Turkey, Iraq and Syria have frequently been at odds over the management of the Tigris and Euphrates river basins.

Egypt has started a consultative group of the Nile countries - the Undugu Group - and has proposed a long-range scheme for the development of the Nile.

Source: World Resources 1992-93, p.163.

It follows that sector planning needs to be integrated with other sectors and to involve multi-benefit analyses. Health benefits have proved difficult to quantify in economic terms, but achieving them must remain a priority. That means that planners need to recognise the comparative importance of sanitation as well as hygiene education in achieving health goals, and to include these components in all water supply programmes.

Water scarcity

By the end of the 1990s, many countries will have only about half as much easily accessible water as they had in 1975. On a global level, groundwater is being used up faster than it is being recharged, while pollution from untreated muncipal and industrial wastes is turning precisous surface water resources into offensive, health-threatening nuisances. At the same time, demand from agriculture, industry and domestic users is rising. The costs of providing new water supplies are rising exponentially, when protection, conservation and reuse could enable demands to be met much more economically.

Chapter 18 of Agenda 21 stresses the way that economic development is increasingly being conditioned by the scarcity of fresh water. Clearly, action is vital. Priorities have to be established which balance desires for food securitiy, health improvement, social development, environmental protection, and economic growth with the availability and long-term sustainability of water resources. Reversal of present overabstraction and pollution, to conserve and protect all available water resources has to be part of integrated development strategies.

Governments need to develop guidelines and protocols for the protection of surface water and groundwater resources and to enact and enforce legislation on this. The lack of integrated planning in many countries is causing ecological damage affecting water supplies. It is necessary to map out such ecologically sensitive areas of countries and ensure that activities harmful to them are prevented.

There is considerable scope for using water more efficiently. Better irrigation methods and reduction of losses in agriculture could free considerable amounts of water for other uses. In urban areas, better operation and maintenance would cut the unaccounted-for water which in many developing country cities is above 50%. There is also room for industrial and domestic consumers to save water by using it more carefully. Generally there is a tendency for users to regard water as an unlimited resource as long as it comes out of the tap whenever one wants it. This perception has to change.

Measures also need to be taken to increase sustainable water supplies where possible. In countries where seasonal flooding occurs, flood water can be trapped for recharging of aquifers. The treatment and reuse of wastewater in agriculture and industry is another way in which supplies are being, and can increasingly continue to be, augmented. Large cities produce prodigious quantities of wastewater which, if reused, would make a big difference to water supplies. Care needs to be taken, however, to treat the water so that it does not pose a danger to human health and groundwater supplies. Some countries are encouraging rainwater harvesting and others need to do so. If the costs of desalination were reduced, sea water and brackish water could be processed more extensively.

Urbanisation

By 2025, 60% of the world population will be living in cities. By 2000, 18 of the 22 metropolises of more than 10 million people will be in developing countries. The rise of megacities is already creating difficulties. The following three issues particularly need attention in all developing world urban areas:

Rural-urban migration is swelling the populations of marginal peri-urban areas. Neither starving them of services nor razing them has prevented their expansion. Peri-urban areas do not exist in a vacuum and their neglect can have wide-ranging consequences. Disease outbreaks there can easily spread to the 'official' urban areas. Often, the residents of peri-urban areas engage in economic activities that contribute to the local economy. Governments need to make extension of water and sanitation coverage to these areas a priority without waiting for legalisation of their status.

As urban areas expand, water allocations have to become more equitable. There is no "trickle-down effect" from wealthy to poor in water and sanitation and realistic pricing is needed. The current system of the middle class areas getting cheap supplies while the poorer ones have to pay much higher prices to buy supplies from vendors has to change. Demand needs to be managed through mechanisms such as increasing block tariffs under which a basic minimum is provided cheaply and higher consumption charged at increasingly steeper rates. The problem of liquid and solid waste disposal needs to be tackled at the production end, where significant reductions could be made with the right mix of incentives and information/education campaigns, as well as at the disposal end. A sewerage system designed for countries with regular and abundant supplies of water cannot deal with rapid urbanisation in countries experiencing water shortages. Consideration needs to be given to the extent to which 'dry' systems can be used to supplement conventional sewerage.

Urban water that need not all go to waste

As cities grow in size, their wastewater production rises dramatically. While presenting treatment and disposal problems, the wastewater also represents a potential source of water for agriculture.

Cairo produces about 2.7 thousand million cu metres of wastewater annually. By the year 2000 it will go up to 5.2 thousand million cu m and by 2010 it is expected to reach 6 thousand million cu m.

By 2010, Alexandria will produce 6.8 thousand million cu m of wastewater. The rest of Egypt will produce up to 15.2 thousand million cu m.

Reuse of agricultural drainage water in Egypt already amounts to 3.4 billion cubic metres yearly, and up to 11 billion may be used in the future.

While there have been many innovations to facilitate the supply of water in developing countries, wastewater disposal has stagnated. More research and development is needed urgently. The treatment and disposal of sewage needs attention; many developing country cities lack proper facilities for these. The disposal of increasing quantities of solid waste also calls for action.

Allocation among competing users

The scarcity and rising marginal price of water make it essential to allocate it as efficiently as possible. Governments need to assess the current and future needs of the competing users (agriculture, industry, domestic consumers) and decide on an allocation policy based on pricing mechanisms reflecting the most valuable use of aa restricted resource. The specific needs of women, particularly at the domestic level, should be considered in allocation policies. Pricing policies have been found effective in achieving reallocation from subsidised users to others. The challenge is to achieve such reallocation without tariff increases merely being passed on to consumers of agricultural or industrial products and without reducing production.

Pollution control

Surface water and groundwater resources are being contaminated in several ways. In agriculture, runoff from farms contains chemicals originating from fertilisers, pesticides and herbicides. Industries are also dumping chemical waste into water bodies, especially in developing and newly reforming countries but also in industrialised ones where anti-pollution legislation is not being enforced strictly. Domestic wastewater is adding to pollution with its rising content of phosphates and nitrogenous compounds which lead to the eutrophication of water resources. Air pollution is affecting the hydrological cycle and water quality through acid rain.

Countries that already have anti-pollution legislation need to enforce it more strictly. Those that do not need to enact and enforce it. Sources of pollution need to be identified and the principle of "polluter pays" needs to be applied more rigorously, even to agricultural producers. Phosphates and nitrogenous compounds in detergents need to be phased out as soon as possible. Water bodies that have been polluted need to be rehabilitated.

Shared water resources

This is an area in which progress is essential. About 60% of the surface area of Africa and 65% of the drainage area of Asian rivers consists of shared river and lake basins. In Western Asia, 95% of the average annual river discharge is from basins shared by two or more countries. In South America, international basins account for 75% of the total flow.

Development and conservation of the resources of international basins has been uneven, partly due to a shortage of financial, human and technological resources. Riparian countries commonly engage in unilateral river development, sowing the seeds of conflict .

4.3 Capacity-building challenges

Capacity building for change

Two prime objectives will be at the heart of capacity-building initiatives: the need to manage water resources holistically, so as to combat scarcity and ensure sustainable use: and the need to implement and manage water and sanitation programmes in full partnership between all stakeholders, so as to achieve effective services and financial sustainability. A balance has to be struck between the need for central government to have a key role in water conservation, pollution prevention and the assessment and allocation of national resources and the parallel need for decentralaisation of planning and management to properly supported local institutions.

Institutional development

It is necessary to create institutions to manage the sector at the lowest appropriate levels, backed by an appropriate support structure. Such institutions, whether public or private utilities, should have clearly defined responsibilities, a sound legal basis and autonomous control of finances and human resources. They should be run on a commercial basis and should be held fully accountable by law for quality and level of service. Safeguards should be built in to protect the interests of users against unnecessary tariff increases, etc. Their performance should be monitored on a regular basis. The human and other resources of existing institutions could be transferred to the new ones.

Participation by the community

Real community participation in projects is still rare. Communities need to be involved from the inception in all phases of a project. They need to be presented with a 'menu' of options to solve their particular problem, with the costs and consequences of each made clear. They have to be the ones who decide which of the options to accept. They need to be trained to operate and maintain the technology that is decided on. Experience shows that without this sort of involvement, the sustainability of projects is as risk. The experience gained by some NGOs in using such an approach provides a resource that could be used in training.

Gender issues

Inadequate participation by women is also a matter of concern. A lesson from the 1980s is that, when they are able to influence choices of such things as technology, methods of management and financial arrangements, women contribute greatly to the reliability of water projects, the complementary development of sanitation, and the effective use of facilities which are installed.

More women are being involved in projects but their role in decision-making is restricted. More needs to be done to increase the participation of women at all levels. For that to happen, decision makers (men and women) need to be sensitised to gender issues. Through advocacy, training and recruitment policies, the aim should be to ensure that women are equipped and enabled to fulfil management roles, and that men too recognise the need for gender sensitive approaches to project planning and implementation.

A number of techniques and approaches have been developed for fostering appropriate involvement of men, women and young people in water and sanitation programmes, particularly at community level. There is a danger that the broader sectoral approaches now being introduced to integrate all aspects of water resources management could tend to marginalise women again. Both cross-sectoral integration and cost-recovery principles need to be applied in ways which allow for full involvement of women. In some countries, quotas are being used as a way to initiating fuller involvement of women at policy level. Setting quotas can help, but should not be seen as goal in itself, rather as a means to the desirable end of raising gender awareness of all staff.

Education

The experience since Mar del Plata has shown that hygiene education is a vital ingredient for the success of water and sanitation programmes. There are many cases of safe water at source being contaminated en route to the consumer because of factors such as unclean vessels and improper storage and use. Also, communities used to sparse supplies tend to use water sparingly for cleanliness (for example hand washing), to the detriment of health; this practice would not necessarily change after supplies improved. Hygiene education is also necessary to achieve the full benefits of sanitation projects.

Hygiene education should start early in the educational system. In the developing countries, children and teenagers make up half the population. Sectoral issues could be made part of the school curricula to the extent possible. Adult functional literacy programmes could also be used in the same way. In addition, NGOs like the Scouts and women's organisations could be effective channels for transmission of hygiene education.

Human resources development

First of all training is an urgent need in the developing and newly reforming countries. It needs to be provided at country and regional levels and to be geared to the conditions under which trainees will be working. More use could be made of audio-visual resources which exist but are not being utilised sufficiently. Operation and maintenance should be an important part of such training. There should also be an emphasis on community participation and gender issues in the courses.

Furthermore, Governments need to create attractive working conditions to reverse the 'brain drain' to the private sector. This entails improvement in salaries and career development based on efficiency.

Information

Reliable, up-to-date and accurate information is vital to policy makers and planners in choosing project and programme approaches; to financial planners in ensuring the optimum use of funding resources; to trainers in support of institutional human resources development and community management; to communities in knowing how best to improve and expand services; and to technicians and project staff in implementing all stages to sector projects and programmes. To achieve this, leading water and sanitation agencies at the national level need to formulate official information policies for the sector in general and for their own institutions; promote the formulation of information policies by other sector institutions; take steps to ensure that all general plans and projects for the sector make appropriate provision for the development of information management capacities; and establish appropriate organisational structures and mechanisms for information management.

One area of particular concern is the low confidence limits of water and sanitation data in the developing and newly reforming countries. As a result of various regional meetings, there has been some improvement but there is a long way to go. The information needs of countries vary. Some need access to electronic and other databases and journals so that they can learn from the experiences of countries facing the same problems as they do. Others require printed documentation. A case in point are the Lusophone countries in Africa which need materials in Portuguese.

Applied research

The magnitude of the problems facing the sector call for a lot of high-quality research. Study by the Water Supply and Sanitation Collaborative Council has demonstrated that the research agenda is generally set in the industrialised countries. Developing countries need to take the lead in all spheres so that their needs are served more effectively.

4.4 Financial challenges

New Services

Estimates made by UNICEF in consultation with the World Bank and UNDP put the average annual investment required for new services to achieve 90% coverage by the end of the century at approximately US $28,200 million[16] This is more than double the average achieved during the Water and Sanitation Decade. It does not take into account operation and maintenance costs, or the costs of rehabilitating existing facilities.

With the increasing constraints on external funds, countries will have to rely more on domestic funds and be much more efficient in how they use them. They need help in mobilising finance from banks and other sources. The use of low-cost technologies where possible is a must for lowering costs so that the available funds can be used to maximum effect. Planning and implementation based on the effective demand of users and on demand management approaches should be the guiding rule.

Governments also need to provide loan channels for the poor, including women. Land tenure issues need to be resolved so that security is available for loans from commercial banks.

Infrastructure replacement

This is a problem in all the regions. However, while the industrialised countries can relatively easily mobilise the resources necessary for replacement, most developing and newly reforming countries are already finding it difficult just to maintain existing services. This poses a big challenge to the international community as a whole.

16'Report of the Economic and Social Council: Achievements of the International Drinking Water Supply and Sanitation Decade 1981-1990, Report of the Secretary General', paragraph 79. UN General Assembly, 13 July 1990.

Appendix 1: Statistical outlines

The population statistics below are from UNICEF's The State of the World's Children 1994. The water and sanitation coverage figures are from the WHO End of the International Drinking Water Supply and Sanitation Decade Review. They were compiled by national governments and in some cases may be based on the systems installed rather than the number of people actually using them. Since many countries did not respond to the WHO survey and the regional country make-up is different in the two sources, only national figures are used here to give an idea of the reported range of coverage in each region.

SUB-SAHARAN AFRICA

Population: 533 million
Annual pop. growth rate (1980-92): 3%
Crude death rate (1992): 15 per 1,000
Under-5 mortality rate (1992): 181 per 1,000

In 1990, the countries reporting the lowest drinking water coverage were the Central African Republic (19%), Mali (41%) and Cameroon (42%). At the other end of the scale, five countries (Botswana, Gambia, Guinea, Mauritius and Nigeria) reported that 100% of their population have access to safe water. In three countries, the coverage was said to be over 90% (Niger - 98%, Zimbabwe - 95%, Burundi - 92%).

The lowest sanitation coverage rates were in Niger (24%), Benin (25%) and Zaire (32%). At the top end, Burkina Faso, Ghana and Namibia reported 100% coverage and the figure for Zimbabwe was 95%.

NORTH AFRICA & MIDDLE EAST

Population: 341 million
Annual pop. growth rate (1980-92): 3%
Crude death rate (1992): 8 per 1,000
Under-5 mortality rate (1992): 78 per 1,000

Of the countries that responded, five (Bahrain, Iran, Jordan, Morocco and Qatar) reported that 100% of their populations had safe drinking water and adequate sanitation. Iraq had the lowest drinking water coverage (93%) while Egypt was at the bottom of the sanitation table with 80%.

SOUTH ASIA

Population: 1183 million
Annual pop. growth rate (1980-92): 2.2%
Crude death rate (1992): 11 per 1,000
Under-5 mortality rate (1992): 129 per 1,000

Bangladesh and Afghanistan had the lowest drinking water coverage (39% and 40% respectively) while the best-off countries were India (86%) and Sri Lanka (80%). In

sanitation, Afghanistan and Nepal were the lowest (13% and 34% respectively) while the Maldives reported the highest coverage (95%). Bhutan was second-highest with 80% coverage.

EAST ASIA & PACIFIC

Population: 1728 million
Annual pop. growth rate (1980-92): 1.7%
Crude death rate (1992): 7 per 1,000
Under-5 mortality rate (1992): 56 per 1,000

Eleven countries reported 100% drinking water coverage in this region (Cook Islands, French Polynesia, Hong Kong, Republic of Korea, Macao, Marshall Islands, Mongolia, North Mariana Islands, Palau, Samoa and Singapore). Only six countries had less than 90% coverage (Indonesia - 35%, People's Democratic Republic of Lao - 47%, Vietnam - 47%, Myanmar - 79%, Solomon Islands - 82% and China - 87%).

Six countries had 100% sanitation coverage (China, Cook Islands, Marshall Islands, North Mariana Islands, Mongolia and Samoa). Seven countries reported that less than 75% of their populations had adequate sanitation (Vietnam - 23%, People's Democratic Republic of Lao - 30%, Indonesia - 33%, Myanmar - 50%, Papua New Guinea - 57%, Republic of Korea - 67% and Solomon Islands - 73%).

LATIN AMERICA & CARIBBEAN

Population: 451 million
Annual pop. growth rate (1980-92): 2.1%
Crude death rate (1992): 7 per 1,000
Under-5 mortality rate (1992): 157 per 1,000

Five countries reported that they had 100% drinking water coverage (British Virgin Islands, Cuba, Guyana, Trinidad and Tobago, and Uruguay). The lowest levels of coverage were in Haiti (56%), Paraguay (61%) and Ecuador (63%). Sanitation coverage was 100% in four countries (Barbados, British Virgin Islands, Cuba and Trinidad and Tobago) and it was lowest in Paraguay (31%), Bolivia (38%) and Haiti (44%).

FORMER USSR

Population: 292 million
Annual pop. growth rate (1980-92):
Crude death rate (1992): 11 per 1,000
Under-5 mortality rate (1992): 44 per 1,000

In 1985, the USSR declared that it had achieved 100% coverage in drinking water and sanitation. Since the breakup of that country, this has proved to be incorrect. The actual coverage is still being determined.

INDUSTRIALISED COUNTRIES
(INCLUDING E. EUROPE)

Population: 936 million
Annual pop. growth rate (1980-92): 0.6%
Crude death rate (1992): 9 per 1,000
Under-5 mortality rate (1992): 43 per 1,000

Most of these countries report total drinking water and sanitation coverage. The exceptions in access to safe water are Albania (100% urban, 95% rural in 1985); Bulgaria (100% urban, 96% rural in 1987); Finland (99% urban, 90% rural in 1985); Hungary (100% urban, 95% rural in 1985); Poland (94% urban, 82% rural in 1985); Portugal (97% urban, 90% rural in 1985); Romania (100% urban, 90% rural in 1985); and the former Yugoslavia (100% urban and 65% rural in 1986).

Adequate sanitation was less than total in the following countries:
Federal Republic of Germany (95% urban and 83% rural in 1986); Greece (100% urban, 95% rural in 1985); Portugal (100% urban, 95% rural in 1985); Romania (100% urban, 95% rural in 1985); and the former Yugoslavia (78% urban, 45% rural in 1986).

(The coverage figures for the industrialised countries are from World Resources 1992-93, which cites the WHO and UNICEF as its sources.)

Policy/strategy for action:

Effectiveness

Ministerial Conference on Drinking Water and Environmental Sanitation: Implenting UNCED Agenda 21

19-23 March 1994, Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing, Physical Planning and Environment

Prepared for the Conference Secretariat under the auspices of the International Steering Committee by

MR COLIN GLENNIE

with major inputs from a worldwide network of Resource Institutions and Resource Persons

Acknowledgements

This paper has been prepared as a resource and background paper for the Ministerial Conference and beyond by Mr. Colin Glennie of UNICEF Uganda, for the Conference Secretariat in the Netherlands Ministry of Housing, Physical Planning and Environment (VROM). The work was carried out under the mandate and guidance of the International Steering Committee. Overall responsibility rests with Mr. G.W.Ardon of VROM as the Conference Manager assisted by Mr. P.Kendall as Conference Adviser.

The agreement of Mr. G. Ghosh of UNICEF Headquarters and Mr. B. Ljungqvist of UNICEF Uganda to make Mr. Glennie available is particularly appreciated.

Alongside the significant substantive inputs of the International Steering Committee, a large number of Resource Institutions and Resource Persons worldwide kindly agreed to make inputs to the content of the paper. These are listed in an appendix. Ms. Maggie Black helped condense and link the inputs of the resource network.

Principal review of the paper was carried out by the International Steering Committee, supplemented by internal and external reviewers. The Authors themselves also played a significant role in cross-review of their work at various stages.

Mr. Brian Appleton carried out constructive editing, incorporation of final comments and further development of the drafts where necessary.

The overall process behind the development was managed and guided by Mr. Alexander Rotival, Adviser to VROM, and Mr. Michael Seager of the IRC International Water and Sanitation Centre, supported by an IRC team for substantive advice. Documentalist Mr. Cor Dietvorst and programme assistants Ms. Loekie Broersma and Ms. Jennifer Francis, assisted in information gathering and administration.

The inputs of these and the many others involved in the team effort behind the synthesis, development, review and production of this paper are most gratefully acknowledged.

Although this paper attempts to reflect the widest possible consensus amongst all those who participated in its development, no part of its content should be taken to imply the endorsement of any view by a specific individual, government or agency.

Contents

Preamble

This paper is Number 3 in a set of six background papers prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation convened by the Government of the Netherlands in March 1994 at Noordwijk, The Netherlands. The six papers were conceived as part of a "cascade" process, intended to help the participants of the Noordwijk Conference to convert the commitments of their governments at the Earth Summit in Rio de Janeiro, Brazil, into strategies and actions for achieving accelerated progress in the critical areas of water supply and environmental sanitation.

The Conference Secretariat commissioned individual authors to prepare the six papers, under the guidance of an International Steering Committee comprised of some 48 members representing 29 countries and agencies. A further 60 expert Resource Persons and 18 Resource Institutions from all parts of the world responded positively to requests for summary ideas and insights on the main themes. The Appendix lists all these Resource Persons and Institutions, demonstrating the authority and diversity of the inputs to the background papers. The six elements of the cascade are:

Paper 1: Putting Agenda 21 to work

A graphic account of the developing crisis and the lessons learned from past attempts to deal with it, the Advocacy paper seeks to bring home the urgency of the call for action, the validity of the new approaches proposed, and the scale of the potential benefits if prompt and concerted action is taken. It may also help ministers to convince their colleagues of the seriousness of the current situation and the need for enhanced priority.

Paper 2: Achievements and Challenges

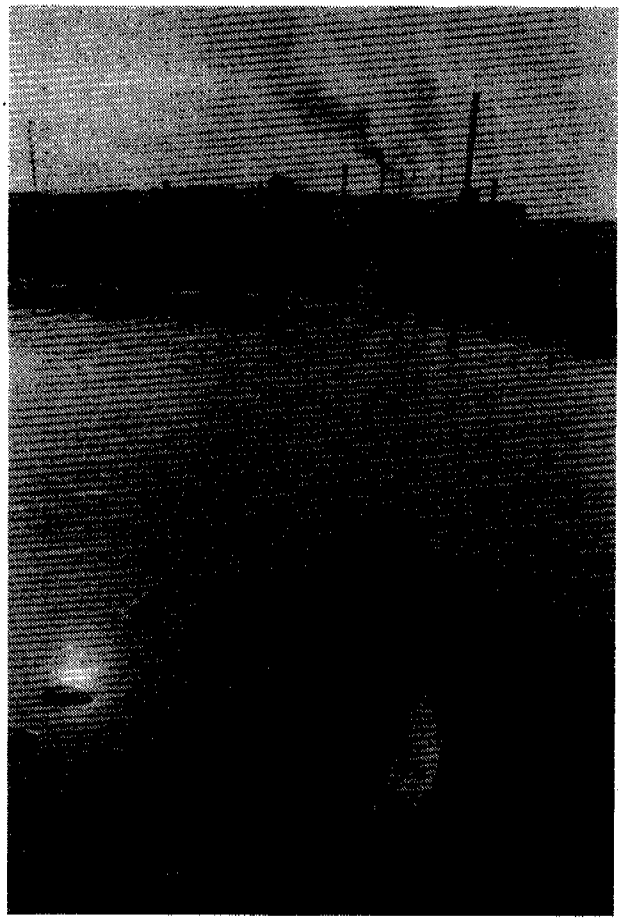
A scene-setting paper, reviewing progress achieved during the International Drinking Water Supply and Sanitation Decade (1981-1990), summarising sector professionals' own analyses of past successes and failures, and linking these to the urgent needs recognised in Rio.

Papers 3 to 6: Policy/Strategy for Action

A group of papers addressing three key areas of concern: Paper 3: *Effectiveness;* Paper 4: *Finance;* and Paper 5: *Collaboration,* leading to Paper 6: A *Synthesis* of recommendations designed to provide the basis for immediate action by national governments and support agencies. In the Policy/Strategy for Action papers, the aim has been to operationalise the Rio rhetoric, and to develop fundamental new approaches, taking advantage of the knowledge and expertise of the world's leading specialists in the water and environmental sanitation field.

Paper 3: Effectiveness
Author: Mr Colin Glennie

Colin Glennie has wide experience of community water supply and sanitation in Africa and Asia spanning more than 20 years. He is currently in charge of UNICEF's Health Programme in Africa. He is widely published and his book Village Water Supply and the Decade has had a particularly wide impact with its account of innovative approaches to rural water supply in Malawi.



Executive summary

The urgent tasks of providing water supply and sanitation for all and protecting the world's water resources come at a time of increasing competition for global financial resources. However, a review of the considerable resources already being invested shows that there is substantial waste and ineffectiveness. Improving effectiveness is not only good management, it also removes a big impediment in the competition for more resources.

One reason for ineffectiveness has been the preoccupation with *coverage* alone. The number of people who theoretically have access to a new water supply or latrine is not a very meaningful measure of investment success. In many cases, water has been supplied but with little indication of improvement in health; latrines have been built but are often not used; wastewater is treated but not sufficiently to meet pollution control standards. Even where a facility is available, the objective behind providing it may not be achieved. What people do - their *behaviour* - is just as critical as the technical provision of service.

By defining objectives in terms of behaviour instead of coverage alone, we are directly addressing the issue of effectiveness; and by adopting behavioural indicators, we can more meaningfully measure progress. This does require a fundamental change of approach from one that is principally technical and *supply-driven* to one in which communication and social scientists are as important as technology and engineers, and where *demand* is the driving force. With their communication skills, politicians can do more than anyone to bring about these changes.

As conditions are constantly changing, governments need to be continually updating their approaches. A vital lesson from the past is that governments find it difficult to provide water supply and sanitation services efficiently from the centre. There are many resources outside government which are rarely tapped if government tries to do everything itself; progress can be faster and more effective if governments move from a service-providing role to become the *enabler* and *regulator* of others who are able to meet the demand more efficiently. The others can be the communities themselves, NGOs, local authorities, and the utilities in large towns and cities. The private sector can also play an important role.

Another lesson is that progress has been hampered where water has been provided as a free service. The failure to cover costs of operation and maintenance of systems has

Proposed action points

- *Develop a comprehensive policy framework,* covering optimal water resource protection, extraction and use and optimal sanitation and waste management.
- *Rationalise resource generation and use,* phasing out free water and unaffordable technologies, basing technology choice on effective demand, facilitating access to credit for households and providers.
- *Put in place the legal framework to enable and regulate* developers, providers, private sector partners, managers and users.
- *Decentralise,* concentrating central government's role on enabling, regulating and monitoring.
- *Focus on behaviour and communication,* especially in the development of human resources.
- *Reorganise and rationalise responsibilities of sector-related institutions* to improve coordination.
- *Adopt a set of guidelines for investment,* defining priorities for public and private investments and mechanisms to ensure equity, transparency and accountability.
- *Define key indicators and use them creatively,* insisting on every manager knowing the status of the key indicators within his/her 'catchment area'.

led to their rapid deterioration and ineffectiveness. Contrary to conventional thinking, even the poor have proved willing and able to pay a significant contribution towards improved service, often because they are already paying even more to outsiders for an inadequate service. Where the poor are unable to pay the full cost, "lifeline tariffs" for basic needs with higher unit costs for higher usage, can be an effective form of cross-subsidy.

Effective management of water resources through the complete cycle of water protection, extraction, use and return calls for certain important actions, or behaviours, at all levels. The most crucial level for political action is the national level, for which the action points listed on the right are proposed (each action point is amplified in Section 6: Conclusion)

Creating the right conditions for sustainable development

1 Making resources go further - the 'win-win-win' option!

The squalid, degrading conditions endured by hundreds of millions of the world's citizens, the continuing use of rivers and coastal waters as dumping grounds for the untreated wastes of society and industry, and the intensifying competition for diminishing freshwater resources represent an escalating crisis obstructing sustainable development.

What can be done? The response to such a crisis is often an appeal for more resources, the lack of adequate resources sometimes an excuse for lack of progress. But competition for national budgetary resources is fierce, and international resources are becoming increasingly hard to secure. Whereas in the past it was sometimes easier to obtain additional resources than to use existing ones better, this is no longer true.

At first glance, the prospects of meeting the challenge seem grim indeed. Yet this is a false picture, for in reality the cost of doing something need not be as high as feared. Merely removing existing barriers can be a low-cost and effective first step. Updating policies, altering traditional government-people relationships, setting standards, setting performance improvement targets - these are not necessarily expensive investments - yet the returns can be dramatic and effective.

While the struggle to obtain a greater share of resources will continue, in the present global economic climate efforts to use existing resources better will usually release more resources more quickly than efforts to increase them overall. There is already a huge amount being spent on water, sanitation and other environmental services - by governments, external support agencies, local authorities, the agricultural and commercial sectors, and *particularly by families and individuals*. Yet all the evidence suggests that a major part of these resources is being used wastefully and ineffectively. Some have argued that rationalisation of the use of existing resources based on principles of equity, efficiency and effectiveness would *by itself* enable achievement of the goal of sustainable and environmentally sound water and sanitation for all.

Improving the use of existing resources has two other important benefits: being able to demonstrate the effective use of resources is increasingly becoming a winning factor in the competition for the limited extra resources available; and it will unlock other resources for development, especially at the household level. Improving effectiveness - achieving more with what we have - is not just a "win-win" but a "win-win-win" option!

Rio was a political event, resulting in a statement of accepted principles and common resolve. This paper suggests mechanisms to implement those commitments. It begins by looking at some of the problems inherent in the way in which we have been defining objectives (section 2). It then endeavours to define objectives in a way that addresses the issue of effectiveness, and suggests some indicators with which it can be measured (section 3). The changing role of government is then discussed and new approaches proposed (section 4), whose implications are then reviewed at various levels (section 5). In conclusion, some key political action points are presented in summary form (section 6).

2 Of dry taps and locked latrines - rethinking progress indicators

Effectiveness can be defined as *the extent to which an action achieves the desired outcome*. For water resource developments, the desired outcome can be expressed, for example, in terms of reduction in disease and health costs, increase in agricultural and industrial production, protection and improvement of water source quality. In developing countries additional outcomes may include reduction in women's workload, improvement in child nutrition, increase in girls in primary school. Outcomes such as these reflect the overall goal of any investment.

However, when we try to measure progress towards these desired outcomes, we find that their complex nature makes it very difficult, especially in the short term. Where a change has occurred, it is often impossible to attribute it to the investment; where no change is observed, nothing is revealed as to why - maybe other factors have intervened, maybe it is too soon to measure. So, while overall goals can be expressed in terms of desired outcomes, something more practical is needed to measure the effectiveness of interventions and investments.

Water and sanitation objectives are most frequently expressed and measured in terms of standards and coverage. In the developed world, where coverage is virtually universal, the emphasis is on the quality of supplied water and treated wastes. Standards, however,

vary widely. In the developing world the emphasis is on "reasonable access" to clean water and sanitation facilities. Definitions of "reasonable access" also vary widely and existing unscientific methods of determining coverage render such statistics virtually useless. More importantly, coverage figures completely ignore the issues of costs and effectiveness - for example: industries served by a waste treatment system but dumping their wastes to save costs; coastal cities achieving water supply coverage at the expense of saline intrusion into the aquifer; sewage effluent exceeding safe limits; the tap giving water for only one or two hours a day; the traditional contaminated source preferred to the clean borehole; the handpump cut of order for months; the latrine kept locked for visitors.

Standards and coverage bear very little relation to outcome and hide ineffectiveness and wasted investment. If we are serious about improving effectiveness we should stop using them as the principal indicators.

What then has a more direct relationship to outcome than standards and coverage? Surely it is what men and women *do*, not what they *have*, which determines the outcome, which enables the intervention or investment to be *effective*. For example, if they do not wash their hands, if they do not use the sanitary facility, if they allow drinking water to become polluted in the home, improved water and sanitation coverage will have little or no impact on health. Because of the scientifically proven link between people's behaviour and the outcome, *change of behaviour* is one of the best available indicators of outcome and, thus, of effectiveness. The advantage of measuring behaviour is that it can be applied at all levels, from handwashing at the household level, to gender equity at the community level, to budget allocations for operation and maintenance at the utility level, to the policy formulation performance of ministries.

Effectiveness is determined by what people do. To improve effectiveness, we need to set objectives in terms of behaviour at all levels, and measure progress in terms of behaviour change.

The cooking test

Eighty-two per cent of women surveyed in India judge water quality by whether it "cooks well". The bacteriologically safe handpump water takes longer to cook pulses and grains, so using the traditional source saves precious fuel wood. The traditional sources also taste "sweeter". Thus, despite four out of five women having access to a handpump, 40% prefer open dug wells for drinking water and 25% of handpump users never drink the water.

Sources: Nilanjana Mukherjee, "Between Access and Consumption", Health for the Millions Sep-Oct 1990; "People, water and sanitation", National Drinking Water Mission, Government of India, 1990.

3 Facing the real world - defining objectives and measuring progress

To demonstrate the appropriateness of the concept of behaviour for addressing issues of effectiveness, consider the general objective as currently expressed, namely "to achieve universal coverage of water supply and sanitation". How much more effective is the following objective, stated in behavioural terms:

"To achieve the environmentally and socially sustainable and effective use of water and safe disposal of wastes, obtaining the maximum benefits, equitably distributed and at affordable cost."

While the precise wording of such a statement is best framed at country level, stating the objective in behavioural terms directly addresses the issue of effectiveness and automatically leads to a range of indicators with which to measure progress. The "coverage" indicator, however imprecise, may still be useful as a guide to trends, but far more effective will be indicators such as handwashing, water quality protection in the home, the percentage of people actually using a sanitation facility, the sharing of work and decisions between men and women, the percentage water loss in the distribution system, the existence and performance of user associations, the ratio of operating costs to operating revenue, the number of connections per employee, the percentage compliance of industries with pollution control legislation, etc.[1]

This shift of emphasis to behaviour and the measurement of change does require a *fundamental change of approach and attitude*. First, engineers and managers need to address those indicators of environmental, technical and financial effectiveness. Second, social science professionals should become partners in every technical and management team, particularly to address user/consumer needs and behaviours and measurement of behavioural change. Third, professionals and technicians at all levels need to become

1 A few more potentially useful indicators relating to the behavioural objective are given here. Actual choice of indicators should be made at the country level.
- 'environmental sustainability' indicators:
  water table fluctuation; groundwater salinity; land subsidence due to groundwater extraction; downstream water quality;
- 'social sustainability' indicators:
  existence of user associations; participation of men and women; user involvement in technology choice
- 'effective water use' indicators:
  handwashing; water quality protection in the home; per capita consumption; percentage water loss in distribution system; percentage of time the system is not functioning
- 'safe waste disposal' indicators:
  percentage of population actually using a sanitation facility; percentage of industrial users meeting effluent standards
- 'equitable distribution' indicators:
  ratio of per capita consumption of richest 20% to poorest 20%; ratio of per capita subsidy of richest 20% to poorest 20%; percentage of population unserved
- 'affordable cost' indicators:
  willingness/ability to pay; operating cost per cubic metre produced; debt service as percentage of revenue; ratio of operating costs to operating revenue

proficient in *communication*, which is the key to behaviour and attitudinal change at all levels. Many of the problems of lack of effectiveness can be linked to the failure of managers and engineers to communicate with their own staff and with the common man and woman. Political masters of technical ministries should insist that management or engineering without good communication is bad management and bad engineering. Politicians, as skilled communicators, can do more than anyone to bring about these fundamental changes in attitude.

4 New roles for Governments in a changing environment

Governments have conventionally followed a supply-driven, service-provision approach to water and sanitation. Planners and engineers, often without consulting those they wish to serve, presume that a service is needed; and, as the technology is thought to be available, they set about providing it, limited only by the funds available. This approach was first developed in the mid-19th century mainly to cope with increased public health problems in cities resulting from the industrial revolution. As the problems of the cities came under control, the same approach was followed to extend service to towns and eventually to rural areas. This approach worked because public funds were available and the technical capacity existed to provide a reliable service largely irrespective of user attitudes and practices.

Developing countries have inherited from former colonial governments both the approach itself and the relatively expensive technologies that go with it. So, now it is widely perceived by the public in all countries that it is government's responsibility to provide water and sanitation services, preferably piped water and sewerage. In some countries, politicians are even elected on promises to provide water.

The problem is that in both industrialised and developing countries there is increasing competition for limited public funds, and governments no longer have the financial or technical capacity to provide such services. As a result, services in many industrialised countries have been deteriorating and in developing countries a privileged few receive piped water and sewerage, usually at subsidised cost. So it is that, despite huge advances in the 1980s, the majority of women in the developing world still waste several hours a day just fetching water and the downstream quality of water sources the world over continues to deteriorate through heavy industrial and agricultural pollution. With limited prospects of increased budgetary resources, why should the 1990s be any different?

Improving household water security

Rainwater harvesting can be a cheap and effective interim solution where ground and surface water sources are not easily available. In central Kenya there is adequate seasonal rainfall but water sources are often far from the villages. Harvesting rainwater for domestic use is not new, but the grass-roofed houses are not very effective. The Kamujine Farmers' Centre helped women's groups to make simple catchment surfaces out of woven plastic sacks and wooden poles, which are both available at a total cost of under US$ 3. They last about two years and can collect 40 to 80 litres a day, enough for cooking and drinking. The women report they are able to spend the time saved in the rainy season for planting, weeding and looking after the children.

Sources: Karen Iles, "Harvesting rainwater using a simple catchment surface" Waterlines April 1989

This centralised supply-driven, service-provision approach, followed with the best motives by many governments, has unwittingly become a major constraint to the achievement of government's stated objectives. First, it actively discourages self-help as men and women wait in the expectation that one day the government will "provide" the service free or at subsidised cost. Second, it often leads to the biggest single problem with water supply and waste disposal systems the world over, the failure to operate and maintain them. Where the system is based on supply rather than demand, the requirements of proper technology choice, proper use, proper operation and maintenance, and the financial ability to meet at least recurrent costs are invariably not met.

However, there are also pitfalls in basing service on demand, if the demand is unrealistic. The manufacturers of Rolls Royce cars would soon go bankrupt if they calculated demand based on the number of people who dream of having a Rolls! If someone is not willing, or not able, to pay the price asked, it is meaningless in economic terms to talk of demand. The concept of *effective demand* has been developed as a measure of the willingness and ability to pay the price for a certain technology and level of service. All parties must pay the required share of the cost - and the sum of the shares must somehow cover the total cost of operation, maintenance and capital replacement.[2] Even in poorer countries, higher charges for excessive use combined with lifeline tariffs for basic needs can achieve this.

A large proportion of the world's unserved population lives in rural areas of developing countries, where the supply-driven, service-provision approach is even less appropriate. It is significant that other sectors do things differently. For example, Ministries of Agriculture do not provide food. They give advice and relatively limited inputs to enable the household to improve what is often called "household food security". Similarly, because of the limitations of service provision in the health sector, there is a growing process of "community-based health care" in which minimally trained community health workers help communities to look after the "security" of their own health. A similar concept of "*household water security*" would effectively release the government from the millstone of having to provide water - instead government would participate with and support the efforts of communities and households to fulfil their own responsibility to achieve and improve their household water security. In many cases simple improvements to traditional sources and patterns of use produce substantial benefits very cost effectively.

2 If demand is low, the response should be to stimulate demand through information, education and communication. No service should be provided until effective demand is established.

This approach also allows water to be treated in a holistic rather than a sectoral manner, linking with other features of daily life, especially agriculture. The household water security approach means any feasible improvement can be promoted as an option, and it allows the concept of sequential incremental improvements, even of traditional facilities. As men and women can choose for themselves, it is also a demand-driven approach, which is by definition more sustainable. Often simple and inexpensive improvement of traditional facilities and patterns of use can provide an acceptable first step, which will stimulate effective demand for further incremental improvements as benefits accrue.

Some governments, especially in very poor countries, may still feel that it is politically difficult to change from the traditional providing role, believing that people are too poor to help themselves. It is also usually the poorest countries who are least able to satisfy the needs of their people from government resources, so maintaining a policy of centralised service provision effectively condemns people to little or no provision at all. Significantly, most studies have revealed that, contrary to the assumptions of politicians and bureaucrats, poor people *are* generally willing and able to pay something *provided they* are confident in a reliable service. Indeed the poor are often *already* paying a lot for very poor service, sometimes even more than the rich.

So, moving away from the providing role does not hold the political dangers that might at first be assumed. Indeed there are real political rewards in a policy that results in tangible improvements instead of frustrated promises.

So what is emerging as the new role of government? Many central governments, in both developing and industrialised countries, have already relinquished the role of provider to local authorities, often in partnership with the private sector. In general they have learned that this results in greater efficiency, less bureaucracy, and the mobilisation of a greater range of available resources from public and private sectors. By decentralising responsibility for service provision to local councils and autonomous utilities, by concentrating on providing the strategies, policies, and guidelines and by facilitating access to funding, the role of those governments has moved from being one of providing to one of *enabling*. By developing legislation, independent "watchdog" mechanisms and systems for user participation (especially of women) in decision-making, the governments also fulfill the role of *regulator* to protect national interests and those of the users. While such changes do not occur overnight, for them to occur at all requires a fundamental shift in policy.

The poor are the best judges

After 40 years of traditional master planning based largely on a single high-cost technology, the Ghanaian city of Kumasi still had no comprehensive sewerage system and most of the city remained unserved. A major re-thinking was in order.

The first step was to elicit the needs and preferences of the people in various communities. A "willingness to pay" survey was conducted among more than 2,000 representative residents to determine their preferences for various sanitation technologies and their financial resources to support new systems. Three findings were most revealing:

- families on average were willing to pay the same amount for sanitation as they paid for rent, electricity or water;
- the poorest people who used public latrines were spending more for sanitation than those with household systems;
- the poor were willing to pay even more for improvements in their homes.

Source: David Kinley, "Kumasi's people pay for better sanitation services", Source, July 1992.

Effectiveness is severely constrained by following a centralised supply-driven, service-provision approach. By changing towards an enabling and regulating role, by decentralising responsibility for service to local level, and by basing technology choice and level of service on effective demand, governments can accelerate achievement of their objectives.

5 Creating enabling conditions for effective action

This section of the paper looks at *how* the necessary changes - from coverage to behaviour, from provider to enabler and from supply- to demand-driven approaches - can be brought about. The starting point is the desired behaviour of the user.

5.1 The behaviour desired - the user level

The most critical desired behaviours are the *effective, economic use of water*, and the *safe disposal of wastes*. Investments in water supply and waste disposal are expected to give many benefits - health, time saving, environmental protection, economic productivity etc. but these benefits can only accrue if the water- and waste-related *behaviour* is effective. If the investment does not include provision to ensure effective use, the investment may be wasted. Examples of effective use are: protecting the water quality in the home; handwashing; conservation of water; environmentally sound disposal of wastewater; hygienic and technically sound use of latrines and toilets. A secondary but vital desired behaviour is *willingness to pay* (in cash or kind), at least to cover operation and maintenance cost, and preferably to contribute towards capital replacement costs. [3]

5.2 The enabling conditions - the role of the provider/utility level

The role of the *provider/utility* level is to create the enabling conditions for the user to use water and dispose of wastes effectively. The most important are:

- the easy availability of adequate quantity and quality of water and of appropriate and environmentally sound waste disposal facilities.

3 Experience shows that where resources other than from the users are expected to cover operation and maintenance costs, those resources are invariably not forthcoming. Therefore, if the users will not be able to cover these costs, it is usually wisest not to invest.

- the communication necessary to support the correct use of the facilities

These conditions are dependent on technology choice, communication and management.

Technology and choice

Familiar technology may not be the best. Optimal technology should be "people-" and "environment-friendly", based on effective demand, and the lowest economic cost to meet that effective demand. It should be easy and cheap to operate and maintain. These seem obvious requirements but they are rarely fulfilled. Where possible, users should be allowed to choose from a range of options according to his/her preference and ability to pay. Ideally the choices on offer should have the prospect of sequential incremental improvement, both to maximise the return on the initial investment and to make an initially modest choice more palatable.

While water supply is often the priority demand, the provision of water alone will rarely achieve the desired outcomes and may even make things worse (waterborne disease can spread more rapidly through shared water facilities used in an unhygienic manner). To be fully effective, the provision of water must be accompanied by wastewater removal and the promotion of hygiene and sanitation.

Communication and partnership - the key to user satisfaction

Effective water use and waste disposal requires a participatory *two-way communication process* between providers (or enablers) and users at every stage. Extension and utility staff need to be able to interact with men and women in a "people-friendly" and gender-sensitive way. If they are to influence the behaviour of the users, the behaviour and skills of technicians themselves must change, which means appropriate training and education of staff. Organisations need to start recruiting and promoting staff based on the overall requirements of the job, not just the technical ones. In developing countries, *hygiene education and promotion* is often the single most important communication requirement; this is a relatively new area which requires specialised professionals to be recruited into technical and management teams. There is mounting evidence that community development based on a partnership approach involving users, implementors and support agency staff is the best route to sustainable progress.

Nationally, governments can have an enormous influence on public attitudes and awareness by sending out the right signals. Public information campaigns, involving the media, schools, churches and other influential sources of public

Access to loans and technology choice create effective demand

In low-income barrios of Tegucigalpa, the capital of Honduras, the demand for improved sanitation appeared not to be high - people took out loans for other improvements, but not for latrines. The only latrines people knew were simple pit latrines which filled up quickly and were considered smelly and unsafe. Now the Cooperative Housing Federation(CHF), with the assistance of UNICEF, has started a sanitation loan programme offering people alternatives including the simple pit, ventilated improved pit (VIP), dry compost and pour-flush latrines. Offered a variety of options in a broad price range from US$100 to US$400 linked to well-managed credit programmes, families are now showing their demand for improved sanitation by taking out loans administered by three local NGOs. To ensure sustainability, interest is set at the market rate and the loans are repayable over three years. The loans cover the cost of material, labour and hygiene education. Most of the promoters are local women who are paid a small stipend out of the interest charge, thus giving them an opportunity to generate their own income.

Source: "CHF and UNICEF provide options for improved urban sanitation in Honduras", Peri-Urban News, May 1992.

opinion can both stimulate effective demand for water and sanitation improvements and encourage the behaviour changes needed to bring optimum benefits from resulting improvements. The two-way process is vitally important; campaigns must be responsive to public opinion, not didactic or prescriptive in their approach.

User associations and other NGOs increase effectiveness by providing a channel for negotiation and communication between users and providers or enablers. They also help to ensure user compliance with agreed obligations more effectively than any "policing" by the utility.

Promoting willingness and ability to pay

Willingness to pay is usually assured by basing the service on effective demand and allowing user participation in the choice of technology. In some circumstances, *access to credit* is vital to enable households to meet service connection or on-site construction costs. Transparency and *accountability* of the responsible institutions are also key factors.

Rational resource management

Other key behaviours for providers and utilities include the *reduction of water losses, reduction of unit costs and demand management*. These measures together are more effective and efficient in meeting growing demand than developing new sources. Efficient billing and revenue collection, information management (including monitoring of key performance and coverage indicators), *equitable distribution* of service and resources are also essential. Users will not pay willingly for new services when they can see evident profligacy, waste or inefficiency on the part of the water utility.

5.3 More enabling conditions - the role of the national/policy level

It is at the national level that political leadership is most crucial. The principal objective is to ensure economically viable, environmentally sustainable and socially equitable abstraction and management of water resources and disposal of wastes.

Comprehensive policy framework

Experience has shown the world over that without a *comprehensive policy framework* it is virtually impossible to ensure an integrated approach to water resource development and waste management, with rational and equitable resource allocation, and with priority to the poor and the unserved. The most effective policy frameworks recognise the longer term perspective of water as a finite and vulnerable resource, and address the whole water cycle, giving greater priority to sanitation and waste

disposal than hitherto. They address key behavioural issues at all levels and, especially in developing countries, the relative roles of women and men in water and wastes management. They include the establishment of standards and targets, and of a system to monitor and use these indicators on a system-wide basis for planning and management purposes. National managers should be made accountable for performance against objectives set out in this policy. Based on the policy framework, local, regional and national programmes can be developed and updated in an integrated way to match the strategic goals set and monitored at each level.

In most countries domestic water use is a small fraction of overall consumption, and domestic demand often has to compete against huge subsidies for agricultural water. A minor adjustment in agricultural water consumption and pricing could release relatively large financial and water resources for the domestic sector. Therefore one of the most important functions of a comprehensive policy framework is to *rationalise the competing demands from the agricultural, industrial and domestic sectors*. This could include the provision of incentives to each user category to use water more efficiently, whether through tariff structures or carefully targeted subsidies.

Coordinating mechanisms

To develop and implement such a comprehensive policy requires creative interaction between the various national institutions involved in water and waste management. In many countries where overlapping responsibilities are often spread across numerous institutions there is an urgent need for institutional reform and rationalisation. Even where coordination is effective, existing institutional structures need to be reviewed in the light of the changing role of government. While it is usually neither possible nor wise to have all responsibilities housed in one government ministry or institution, it is important that one institution plays an overall coordinating role, for which it needs the necessary authority. The experience of some countries suggests that for effective overall coordination it is sometimes best to choose a cross-sectoral ministry such as the one responsible for planning or local government.

Decentralisation, but with safeguards

The main role of the centre is to create the conditions for the provider/utility level organisations to function effectively. All the evidence suggests that the most crucial condition is the decentralisation of financial, managerial and political decision-making authority from the central government to the lowest level possible. In larger urban situations, autonomy even from the local authority has proved to enhance effectiveness. In small towns and rural areas, local authorities have proved more effective than the

Demand management saves water

Surprisingly, per capita water supply in Central and Eastern Europe is high in comparison to Western countries. This is a result of large losses from aged pipe networks and of low water prices. Water and wastewater charges have been increased significantly in the last few years. Charges in Hungary now realistically reflect the cost of services, and have led to 25-30% reduction in consumption. Reduced consumption has also decreased the overload on existing wastewater treatment facilities.

Source: László Somlyódy, "Quo Vadis Water Quality Management in Central and Eastern Europe?", draft paper for the 17th Biennial Conference of the International Association on Water Quality, Budapest, 1994

The price of pollution

Seventy per cent of Ukraine's population depends on surface sources for drinking water. But, in the absence of a comprehensive policy addressing the complete water cycle, surface sources have become intensively polluted by industrial, municipal and agricultural waste waters. In an impassioned plea, Dr V. Maxsimchouk of the Ukrainian Environmental Association Green World talks of the need for immediate and massive investments to stop "the process of the Ukrainian nation's extinction". He stresses that "the provision of drinking water begins with the provision of drainage area cleanliness" and also that a water policy can only be effective when "the population and its NGO are equal partners with state institutions".

Source: V. Maxsimchouk, personal input for this Conference.

Decentralising improves revenue

Beginning in 1985, Sri Lanka's National Water Supply and Drainage Board decentralised to five regional service centres with progressively increasing financial and managerial authority. By 1990, compared with 1984:

- billings had increased by 125%
- ratio of collections to billings had improved from 25 to 84%
- ratio of collections to O&M costs had improved from 31 to 99%
- consumer complaints were reduced from 10 to 3% of connections
- billed connections per employee had improved from 13 to 26

Source: Derived from the Final Report on Institutional Development of the NWSDB, August 1991, published in WASH Technical Report No 89 "Designing and Implementing Decentralization Programs in the Water and Sanitation Sector", July 1993

line ministries and other institutions of central government, providing they take part from the start, represent the interests of all users, and are accountable.

In any process of decentralisation there is a need for safeguards. An important function of central government is therefore to provide the *regulatory legal framework* for providers and utilities to fulfill their responsibilities to users and other stakeholders. To ensure effective accountability the responsibilities for regulation and provision should be housed in separate institutions. As long as government still retains a role of service provision, the choice of regulatory institution may be difficult - another reason for government to phase out its role as a service provider. An independent "watch-dog" mechanism can promote accountability to users and regulators, which is particularly important where commercial interests may clash with other considerations.

For decentralisation to be successful, there is also a need for devolution of decision making and responsibility to be accompanied by effective support from higher tiers. Economies of scale and resource limitations may point to some key activities being implemented centrally (procurement, training, research, etc), though the concept of demand-driven decion making remains fundamental. Support services have to be both readily accessible and affordable, to establish the right conditions for effective decentralisation.

Information management

Information is a vital tool for management at all levels from the user upwards. Yet in most countries, information is very limited and much of it of poor quality. For management to be effective, and particularly to enable rational planning and resource utilisation, central government should establish or strengthen systems for information management.

An important principle of information is that its greatest potential for use is at the level at which it is collected. This is not to understate its usefulness at higher levels, but to emphasise its even greater importance at the local level. The quality of information reaching the national level will depend on the value attached to it at each level. This means that information systems should not be established by a "top-down" approach. Each level should be assisted to identify its information needs and helped to develop a system to gather and use the information. The national level should play a vital role in harmonising the various information needs at each level into a national information system, with feedback to lower levels and also to the international level. Access to information on water quality, availability and pricing should be available to the public and to all partners in the development process.

Nationally, governments can have an enormous influence on public attitudes and awareness by sending out the right signals. Public information campaigns, involving the media, schools, churches and other influential sources of public opinion can both stimulate effective demand for water and sanitation improvements and encourage the behaviour changes needed to bring optimum benefits from resulting improvements. The two-way process is vitally important; campaigns must be responsive to public opinion, not didactic or prescriptive in their approach.

Resource mobilisation

If governments are no longer to be the sole source of funding, they are expected to facilitate the mobilisation of other resources. This can be achieved by adopting and enforcing some principles concerning who should pay for what. The "polluter pays" principle is one way of generating resources for wastewater treatment facilities. Another is the "developer pays" principle, requiring developers to pay for the improved or enhanced public services on which the success of their development depends. There is also a need for government to facilitate *access to credit or loans* in packages suitable for households, utilities, local authorities (including those in rural areas) and the private sector. These issues are addressed in more detail in the Finance Paper.

Training, capacity building and research

As government disengages from direct implementation of public works, the capacity of staff needs to be developed at the provider/utility level, and in the private consulting and construction industries. Pre-service and in-service training is often out-dated and needs review. Government should encourage the formation of multidisciplinary teams, and provide orientation and refresher training, particularly in communication and behaviour change skills and in gender issues for engineers and managers. This can be done through skills transfer schemes, training opportunities and carefully targeted incentives. An enabling government would also reward innovation and outstanding progress of individuals and institutions. *Operational research* needs to be actively encouraged, including the development and promotion of appropriate technologies.

5.4 International supporting mechanisms

International and bilateral support agencies and regional organisations have a vital facilitating role to enable concerned political leaders to take crucial action at national level. In the political sphere, international agreements and resolutions endorsed by national governments can strengthen the case of ministers responsible for

environment, water resources and health in making sometimes difficult decisions, and in the competition with other sectors for national resources.

Setting targets, monitoring performance, promoting accountability

The setting of standards and targets at international level can be an effective way to mobilise political and financial resources. However, there are dangers in setting targets without a strong mechanism for follow-up. Although there was a significant acceleration in implementation during the International Drinking Water Supply and Sanitation Decade, the dominating impression of the decade for most observers was one of failure to meet the target (universal coverage). Yet the target was, and still is, achievable *if behaviours change* at all levels. We now know more about those behaviours than before so *standards and targets should also be set for behaviour* at all levels.

So that internationally agreed targets are taken seriously, there is a need to establish a follow-up mechanism to develop the detailed standards and targets, particularly those relating to behaviour, and to develop the information systems necessary to monitor country, regional and global performance. It is particularly the *creative use of information* which makes it effective. One technique is the use of "league tables" to rank countries according to their performance against each chosen indicator. Another is to make such information widely available to international and national non-governmental pressure groups, including the press and the legal opposition parties. International conferences could also require participants to report progress on implementing previous resolutions. As a further incentive, international bodies could make periodic awards for innovative approaches and technologies and for the greatest improvements.

Guidelines for external support agencies

In countries where resources are inadequate to meet the cost of water and sanitation developments there is a need for external financial and technical support. However, contradictory policies followed by external support agencies (ESAs) can be a major complicating factor at national level. Countries seeking such support should develop *guidelines for* ESAs on policies and approaches for effective investments which will enable them to provide more coordinated support. A comprehensive policy framework which articulates the sector strategy is an essential prerequisite for developing such guidelines. Regional organisations should play a leading role to ensure that guidelines are not contradictory between countries. For their part, ESAs should be willing to adapt their approach to accommodate the new role of central government by, for example, agreeing to contribute a certain proportion of project costs

to guidance and regulation from the centre. ESAs should also recognise that their policies can sometimes be restrictive and over-demanding on a country endeavouring to develop its own capacity. Like water supply, donor assistance should also be "demand-driven".

Strengthening communication - facilitating information management, training and research

Communication, more than any other single factor, is the key to successful behaviour change at all levels and thus ultimately to the achievement of targets. Successful communication requires information, understanding and technique.

Information at international level on country and global performance against set standards and targets is at the top of a pyramid originating from individuals and communities the world over. The quality of that information will depend on the value attached to it at each level, which means that the system must be designed from the "bottom up". At present in most countries information is extremely inadequate at all levels. International agencies can help countries to improve their information systems and ultimately to extract data from information reaching the national level for global monitoring and comparison between countries.

The facilitation of information collection and dissemination on new approaches and technologies is also vital. The *development of communication and other behaviour change approaches* deserve special attention, as do experiences in resource mobilisation and management. Examples of outstanding progress in different countries also need to be documented and disseminated.

Improved performance at country level requires ongoing training and capacity building, in which international and bilateral agencies play an important role. However, experience has shown that training is not always effective, sometimes because it is inappropriate - the cost and difficulties of performing as trained are too high - and often because it is not followed by effective supervision. *Improving the effectiveness of training* is a major priority which could be taken up at the international level.

Operational research into improved technologies and methodologies is vital to stimulate improvements in effectiveness. Very often the appropriate research needs to take place in countries where scarce financial resources are already committed. ESAs can therefore play a very important role, for example by allocating a proportion of overall support to be used for this purpose.

Information helps policy development

A good example of regional information management is given by the Asian Development Bank. A survey of information available from 38 cities revealed:

- per capita consumption varied from 43 to 475 litres per day
- water consumed for domestic purposes varied from 26 to 58 per cent
- unaccounted for water averaged 36 per cent, ranging from 8 to 62 per cent
- unit production costs varied from 1 to 32 cents per cubic metre, with 70 per cent of utilities below 10 cents
- average tariff was around 20 cents per cubic metre, ranging from 1 to 47 cents
- water vending occurred in half of the utilities, with prices ranging from 2 cents to US$8 per cubic metre
- 11 out of 36 utilities did not cover costs
- staff per 1,000 connections varied from 1.2 to 61

With this information, the weaker utilities can be helped to see where they may need to update their policies to improve performance.

Source: Advance draft of the "Water Utilities Data Book for the Asian and Pacific Region" submitted by the Asian Development Bank in November 1993 as an input to the Conference.

Regional collaboration

Countries with limited financial and human resources and shared environmental and socio-cultural conditions can benefit enormously from collaboration with each other through regional institutions. Countries can help each other in the development of comprehensive national policy frameworks, guidelines for ESAs, training exchanges and private sector collaboration.

Small groups of countries working together on common problems can be an effective mechanism for advancing thinking in particular areas. Through the sharing of experience from demonstration projects, periodic intercountry workshops and seminars, and exchange of experts, countries can both extend their own capacity for research and development and contribute to the international knowledge pool.

Regional collaboration is essential in the joint management of river basins and catchments and in the resolution of conflicts, and it can also strengthen the hand of member countries in negotiations with ESAs. Institutions for regional collaboration among developing countries may themselves need external support.

6 Conclusion - improved effectiveness through political action at national level

Improved effectiveness can only be achieved through action, and effective action at other levels is dependent mainly on action taken at national level. The most important points proposed for action by national governments are:

- *Develop a comprehensive policy framework* covering optimal water resource protection, extraction and use and optimal sanitation and waste management, ensuring an equitable balance of water resource utilisation for domestic, industrial and agricultural users. The framework should provide the basis for local level planning of programmes responding to users' identified needs.
- *Rationalise resource generation and use:* Phase out free or unregulated use of water; adopt a demand-driven approach based on effective demand; phase out subsidies (including those for agricultural users) to all except the poor and the unserved; phase out unaffordable, non-cost-effective, inappropriate technologies; adopt "polluter pays" and "developer pays" principles; establish access to credit for households and providers.

- *Put in place the legal framework to encourage and regulate* developers, providers, private sector partners, managers and users; facilitate the extension of water and sanitation services to the urban poor occupying marginal land, by avoiding making legal land tenure a precondition.
- *Decentralise.* Give financial, managerial and political autonomy to local authorities, utilities and the private sector; concentrate central government's role on building capacity, supporting, guiding, enabling, regulating and monitoring. Devolve decision making to the lowest appropriate level.
- *Focus on behaviour and communication:* Reform pre-service and in-service training of technical personnel; promote multidisciplinary teams of technicians, managers and social scientists; develop a strong strategy of social mobilisation for behavioural change at all levels.
- *Reorganise and rationalise responsibilities of sector-related institutions* at national level to ensure institutional and multidisciplinary interaction and coordination; separate the institutions responsible for regulation and provision.
- *Define key indicators and use them creatively:* Develop bottom-up information systems to produce and use data at all levels; set specific standards and targets and insist on every manager knowing the status of the key indicators within his/her area of concern, how they relate to the national targets and to the status in other equivalent areas of the country.

These actions are described as political because it is now clear that the key to effectiveness lies with the politicians. While most of the proposed actions are not new, knowledge of them has often been limited to sector professionals who have generally been unable to put them into effect. *Politicians can release and guide available energy to apply known solutions to achieve the goals set at Rio.* Through *Agenda* 21, the Earth Summit in Rio established a place in history for today's environment ministers. Action now will ensure that their place is among those who were part of the solution, not part of the problem!

Policy/strategy for action:

Finance

Ministerial Conference on Drinking Water and Environmental Sanitation: Implenting UNCED Agenda 21

19-23 March 1994, Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing, Physical Planning and Environment

Prepared for the Conference Secretariat under the auspices of the International Steering Committee by

DR J. MAJUMDAR

with major inputs from a worldwide network of Resource Institutions and Resource Persons

Acknowledgements

This paper has been prepared as a resource and background paper for the Ministerial Conference and beyond by Dr. J. Majumdar, for the Conference Secretariat in the Netherlands Ministry of Housing, Physical Planning and Environment (VROM). The work was carried out under the mandate and guidance of the International Steering Committee. Overall responsibility rests with Mr.G.W.Ardon of VROM as the Conference Manager assisted by Mr.P.Kendall as Conference Adviser.

Alongside the significant substantive inputs of the International Steering Committee, a large number of Resource Institutions and Resource Persons worldwide kindly agreed to make inputs to the content of the paper. These are listed in an appendix. Ms. Maggie Black helped condense and link the inputs of the resource network.

Principal review of the paper was carried out by the International Steering Committee, supplemented by internal and external reviewers. The Authors themselves also played a significant role in cross-review of their work at various stages.

Mr. Brian Appleton carried out constructive editing, incorporation of final comments and further development of the drafts where necessary.

The overall process behind the development was managed and guided by Mr. Alexander Rotival, Adviser to VROM, and Mr. Michael Seager of the IRC International Water and Sanitation Centre, supported by an IRC team for substantive advice. Documentalist Mr. Cor Dietvorst and programme assistants Ms. Loekie Broersma and Ms. Jennifer Francis, assisted in information gathering and administration.

The inputs of these and the many others involved in the team effort behind the synthesis, development, review and production of this paper are most gratefully acknowledged.

Although this paper attempts to reflect the widest possible consensus amongst all those who participated in its development, no part of its content should be taken to imply the endorsement of any view by a specific individual, government or agency.

Contents

Preamble

This paper is Number 4 in a set of six background papers prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation convened by the Government of the Netherlands in March 1994 at Noordwijk, The Netherlands. The six papers were conceived as part of a "cascade" process, intended to help the participants of the Noordwijk Conference to convert the commitments of their governments at the Earth Summit in Rio de Janeiro, Brazil, into strategies and actions for achieving accelerated progress in the critical areas of water supply and environmental sanitation.

The Conference Secretariat commissioned individual authors to prepare the six papers, under the guidance of an International Steering Committee comprised of some 48 members representing 29 countries and agencies. A further 60 expert Resource Persons and 18 Resource Institutions from all parts of the world responded positively to requests for summary ideas and insights on the main themes. The Appendix lists all these Resource Persons and Institutions, demonstrating the authority and diversity of the inputs to the background papers. The six elements of the cascade are:

Paper 1: Putting Agenda 21 to work

A graphic account of the developing crisis and the lessons learned from past attempts to deal with it, the Advocacy paper seeks to bring home the urgency of the call for action, the validity of the new approaches proposed, and the scale of the potential benefits if prompt and concerted action is taken. It may also help ministers to convince their colleagues of the seriousness of the current situation and the need for enhanced priority.

Paper 2: Achievements and Challenges

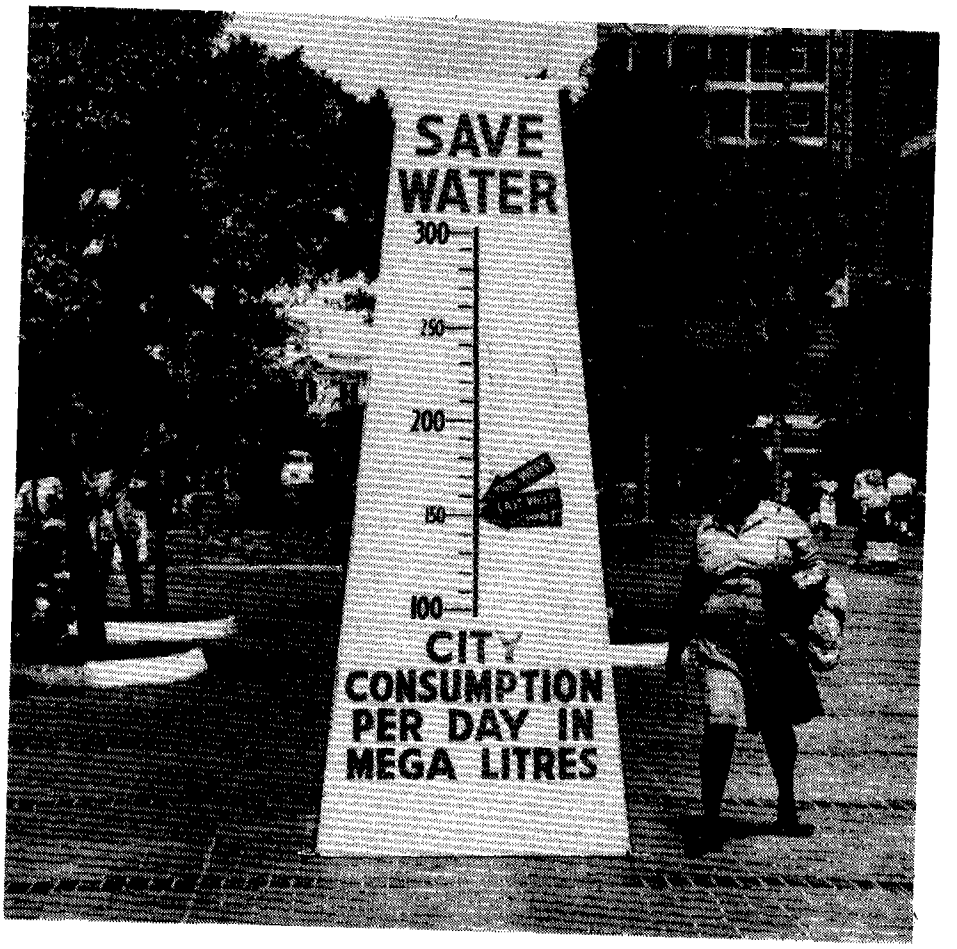
A scene-setting paper, reviewing progress achieved during the International Drinking Water Supply and Sanitation Decade (1981-1990), summarising sector professionals' own analyses of past successes and failures, and linking these to the urgent needs recognised in Rio.

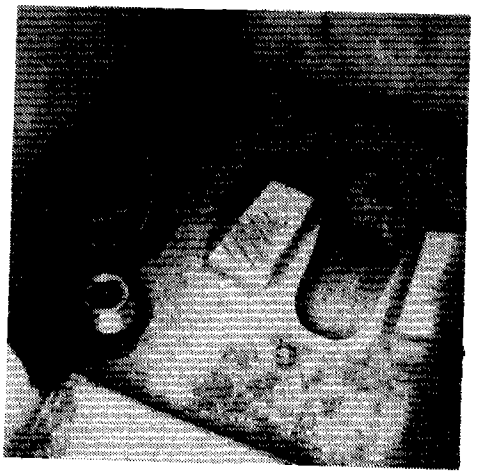
Papers 3 to 6: Policy/Strategy for Action

A group of papers addressing three key areas of concern: Paper 3: *Effectiveness;* Paper 4: *Finance;* and Paper 5: *Collaboration,* leading to Paper 6: A *Synthesis* of recommendations designed to provide the basis for immediate action by national governments and support agencies. In the Policy/Strategy for Action papers, the aim has been to operationalise the Rio rhetoric, and to develop fundamental new approaches, taking advantage of the knowledge and expertise of the world's leading specialists in the water and environmental sanitation field.

Paper 4: Finance
Author: Dr J Majumdar

Dr Majumdar is a Senior Lecturer and Course Director of the Development and Project Planning Centre at the University of Bradford in the UK, where he has held senior positions since 1972. He is particularly well known for his expertise in the area of development and project economics and finance, and is actively involved in the field of water supply and sanitation through his teaching, research and consultancies.


SAVE
WATER
300
250
200
150
100
CITY
CONSUMPTION
PER DAY IN
MEGA LITRES



Executive summary

At first glance, the estimate of finance needed to meet the goal of universal water and sanitation coverage in the foreseeable future seems very daunting. Based on the continuation of current approaches in urban and rural areas, investments ranging from $31 billion to $35 billion a year would be necessary depending on the chosen target date. That compares with an average of $13.3 billion a year invested by governments and donors during the International Drinking Water Supply and Sanitation Decade (1981-1990).[1]

Though it is the best estimate that can be made, the comparison is a false one for several reasons. First, the Decade investment reflects only spending by national governments (80%) and donors (20%). It ignores considerable amounts spent by the unserved, or people with unreliable or malfunctioning systems, who buy water from private vendors or invest in their own backup systems. That money is available and it represents a considerable resource to be mobilised for investment in services chosen by the people themselves.

The second distortion arises because 80% of the Decade investment was spent on dams, reservoirs, pipe networks and treatment plants to provide high quality services to comparatively small numbers of affluent urban residents. The projections reduce that percentage to around 70%, on the assumption that about half of the urban needs need to be met by high-tech solutions. If current approaches continue, the estimate is reasonable; if, on the other hand, investments are targeted to achieve optimum benefits in terms of environmental improvement and service for the unserved, high-tech projects will have much lower priority.

Five other ways of narrowing the gap are proposed here:

- Improving sector efficiency and cost recovery by adopting the principle that water is an economic good and setting realistic stepped tariffs which include "lifeline" rates for the very poor, full costs for additional supplies, and higher charges for extra consumption.
- Urgent measures to reduce "unaccounted-for" water (from leaks, poor metering or poor billing) which can be as high as 60%. Reducing it from say 50% to 20%, which is quite feasible, would lift the utility's revenue substantially, on top of the proposed tariff increases.

1 Source: The International Drinking Water Supply and Sanitation Decade: end of decade review (as at December 1990). World Health Organization, 1992.

- Delivering services based on "effective demand", which means technologies chosen by users on the basis of their willingness to pay.
- Promoting appropriate sanitation options in peri-urban areas (there is evidence that hygiene education stimulates effective demand).
- Establishment of financially autonomous public utilities able to set their own prices, subject to accountability and regulation. Efficient utilities will be able to raise funds in the private market.

Achieving the proposed improvements in financial performance depends critically on central governments accepting the role of enabler and regulator and vesting power and responsibility for service provision to lower levels. It also means the difficult but necessary political decision to raise water charges to realistic levels and target subsidies only at those in greatest need.

Policy/strategy for action: Finance

The price of progress

A great deal of the self-analysis undertaken by water and sanitation sector professionals since the end of the International Drinking Water Supply and Sanitation Decade in 1990 has been concerned with the financing of sector investments and the effective use of existing resources. The prime conclusion is that, while there are powerful arguments for increased spending by governments and donors, there is also considerable scope for making better use of the resources which are available, for increasing the recovery of costs from users of services, and for managing water and sanitation services (and water resources as a whole) in more cost-effective ways.

Two "Guiding Principles" enunciated by the 1992 Dublin International Conference on Environment and Development are at the heart of proposals for improving the sector's performance:

- Water has an economic value in all its competing uses and should be recognised as an economic good.[1]
- Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.[2]

Adoption of these principles has profound implications for water resources management in all countries. For countries where agricultural, industrial and domestic consumers all pay unrealistically low prices for their water and suffer from inadequate and unreliable services as a result, their adoption may well involve political decisions at the highest level. Without these key decisions though, the commitments made in Rio will remain empty rhetoric. With them, and the institutional changes that they imply, governments can pave the way for making better use of available water and financial resources. In doing so, they will also make the sector more attractive to external investors, be they donors or private funding sources.

1 The Principle continues: "Within this principle it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources."

2 The Principle continues: "The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of projects."

Costs of technology options

Technology type	Per capita cost (US$)
High-cost technology	
Urban water supply	200
Urban sanitation	350
Intermediate technology	
(Peri-)urban water supply	100
(Peri-)urban sanitation	25
Low-cost technology	
Rural water supply	30
Rural sanitation	20
Home improvements	
Water supply	5-10
Sanitation	10

Notes:
High-cost technology
Piped water (house connections) and sewerage systems with water and sewage treatment

Intermediate technology
Public standposts, pour-flush and ventilated improved pit latrines

Low-cost technology
Handpumps on boreholes or dug wells or gravity-fed standpost supplies, pour-flush and ventilated improved pit latrines

Home Improvements
Protection of traditional springs and wells, self-build simple pit latrines.

New financing mechanisms, including realistic charges for water for different uses and for the treatment and disposal of liquid and solid wastes, can be important ways of managing the demand for water and protecting the environment. Together with measures to improve the performance of existing utilities, they bring sector goals within reach.

1 How much money is needed?

The answer to this crucial question depends enormously on the approaches adopted in different countries towards investment in sustainable water and sanitation services and environmental improvement. The extent to which people are encouraged and equipped to contribute to improvement programmes, government policies on water charges and pollution penalties, and the further development and use of low-cost appropriate technologies are among the factors which can make a huge difference to investment needs. Trends towards the privatisation of service provision and management and the degree to which the sector can attract investments from the private capital market will also influence the demands on government resources.

1.1 The pursuit of universal coverage

Despite severe economic conditions throughout the 1980s, investments in the water and sanitation sector generally remained at or above earlier levels. On average in the developing countries, more than $13 billion was invested each year from 1981 to 1990, approximately 20% of it in the form of grants and loans, the rest primarily from government sources. Progressive development of more appropriate low-cost technologies meant that the pace of providing new services accelerated considerably during the Decade, but not enough to make substantial inroads into the huge backlog of unserved populations.

Because of the continuing trend towards the use of lower cost technologies, the historic figures provide only the roughest of guides to future investment needs. They can however indicate the scale of the investment which would be needed if sector approaches remain unchanged and the goal is to achieve universal coverage in the foreseeable future.

In Table 1, UN population projections for the years 2000, 2005 and 2010 are combined with the World Health Organisation's coverage figures for the end of the Water Decade (1990). That produces a range of targets for the number of people to gain access to water and sanitation

services in the rural and urban areas of developing countries, depending on the target date for universal coverage (adding the number unserved in 1990 to the projected population growth by the target year).

Table 1

Year	2000		2005		2010	
	Urban	Rural	Urban	Rural	Urban	Rural
Total projected population (in millions)	1902	2971	2259	3140	2683	3319
Safe Water coverage (in millions) by 1990	1128	1570	1128	1570	1128	1570
Yet to be covered(in millions) by Safe Water	774	1401	1131	1570	1555	1749
Safe Sanitation Coverage (in millions) by 1990	987	1056	987	1056	987	1056
Yet to be covered (in millions) by Safe Sanitation	915	1915	1271	2084	1696	2263

In summary, these projections show that aiming for universal coverage in the year 2000 would mean bringing improved water services to 220 million people each year in the current decade and sanitation to 280 million people a year. That compares with the 135 million served with water and 75 million benefiting from improved sanitation in an average year during the 1980s. Moving the target date implies a somewhat lower implementation rate, but the acceleration from present rates is still considerable, particularly for sanitation. A 2005 target date would mean providing 180 million people a year with water and 225 million a year with sanitation. If the target moves to 2010, the figures become 165 million a year (water) and 200 million a year (sanitation).

Converting these figures into investment needs, involves making assumptions about the types of technologies which will be used in bringing improved services to urban and rural areas. The significance of these assumptions will be apparent from the table which compares the unit (per capita) cost of four grades of technology. The projections are shown in full in Table 2. They are based on half of the new services being provided by high-cost technologies, a quarter through "intermediate" technologies, and the remainder using low-cost technologies; all new rural services are based on low-cost solutions. That assumption implies a shift towards increasing use of less expensive solutions - whereas high-tech projects serving more affluent neighbourhoods accounted for 80% of investments in the 1980s, the 50:25:25 split in urban technologies (in relation to numbers of people served) would reduce that figure to about 70%.

Clearly actual figures will vary from country to country, related to local costs, but the indicative calculations in Table 2 show global spending needs ranging from $35.3 billion a year (2000 target date) to $31 billion a year (2010 target date). Even the lower figure is 2.3 times the average rate of spending during the Water Decade.

While these cost projections are daunting, they also carry some important messages. The first reinforces the conclusion that "business as usual" will not work. The cost of achieving universal coverage within 20 years using present approaches is unrealistic.

The second conclusion, revealed in the breakdowns at the base in Table 2 is that 80% of the unserved population can be reached for just 30% of the estimated investment needs.

Table 2

Expenditure needed to cover the remaining population with safe water supply and sanitation (based on the mix technologies given in the box on page II)

	(2000 AD Case)				(2005 AD Case)				(2010 AD Case)			
Water Supply	PC of Population	Population (10^6)	Lost per Head (US$)	US$ (10^6)	PC of Population	Population (10^6)	Lost per Head (US$)	US$ (10^6)	PC of Population	Population (10^6)	Lost per Head (US$)	US$ (10^6)
(A)												
(1) Urban												
High Cost Technology	50%	387	200	77400	50%	565,5	200	113100	50%	777,5	200	155500
Intermediate Technology	25%	193,5	100	19350	25%	282,75	100	28275	25%	388,75	100	38875
Low Cost Technology	25%	193,5	30	5805	25%	282,75	30	8483	25%	388,75	30	11663
(2) Rural												
(Low-cost Technology)	100%	140	30	42030	100%	1570	30	47100	100%	1749	30	52470
				144585				196958				258508
(B)												
Sanitation												
(1) Urban												
High Cost Technology	50%	457,5	350	160125	50%	636	350	222600	50%	848	350	296800
Intermediate Technology	25%	228,75	25	5719	25%	318	25	7950	25%	424	25	10600
Low-Cost Technology	25%	228,75	20	4575	25%	318	20	6360	25%	424	20	8480
(2) Rural												
(Low Cost Technology)	100%	1915	20	38300	100%	2084	20	41680	100%	2263	20	45260
				208719				278590				361140
	Total - US$ 353904 million				Total - US$ 4[illegible]5548 million				Total - US$ 619648 million			
	(I) High Cost Technology - $ 237525 million (67,23%)				(I) High Cost Technology - $ 335700 million (70,59%)				(I) High Cost Technology - $ 452300 million (73%)			
	(II) Intermediate Cost and Low Cost Technology - $ 115779 million (32,77%)				(II) Intermediate Cost and Low Cost Technology - $ 139848 million (29,41%)				(II) Intermediate Cost and Low Cost Technology - $ 167348 million (27%)			
	Annual Expenditure (average) US$ 35330,4 million				Annual Expenditure (average) US$ 31703,2 million				Annual Expenditure (average) US$ 30982,4 million			

A change in focus, giving investment priority to meeting the basic needs of the rural and urban poor could have a dramatic impact on the coverage statistics - it would also, of course, produce the biggest impact on poverty alleviation, environmental improvement and community health.

The third conclusion, closely linked to the first two, is that, where government resources are involved, a faster move towards adoption of lower cost solutions for serving most sections of the urban community could enable services to be extended to many more people. For the same investment needed to provide 1,000 people with a new urban sewerage system, 14,000 of their less fortunate neighbours could benefit from communal latrines or on-site sanitation, or as many as 35,000 of the rural poor could be helped to build their own simple pit latrines. Development of low-cost alternatives to conventional sewerage for crowded peri-urban areas is a priority for the sector, and some promising options are emerging which could transform the economics of urban sanitation.

Benefits from Safe Water

Assisting women to prevent water and sanitation related diseases not only increases well-being but also reduces health costs to the family and the national economy. It is estimated that in Thailand alone, 100,000 tons of rice are lost annually because of the high incidence of ascariasis. In India, 73 million working days are lost annually to water and sanitation related diseases. For individual households, a high incidence of disease may mean investing as much as 30% of their income on health care, as found in a preliminary study in Thatta, Pakistan.

1.2 A social service or an economic imperative?

During the 1980s, providing access to safe water and hygienic sanitation was heavily promoted as a vital contribution towards improving the health and wellbeing of the rural and peri-urban poor. The International Drinking Water Supply and Sanitation Decade (1981-1990) was seen primarily as a global commitment to reduce the horrifying toll of death and disease caused by the widespread lack of these basic services.

At the launch of the Decade in November 1980, the then UN Secretary General, Kurt Waldheim, remarked that ". . provision of safe water and sanitation does not only mean healthier, happier citizens; it also means increased economic productivity". Nevertheless, governments and donors continued to regard water supply and sanitation investments as part of their social/health budgets.

Post-Decade analysis, and particularly the broadening of the sector proposed to the Rio Conference by the 1992 International Conference on Water and Environment in Dublin, clearly identify investment in water and sanitation as crucial to economic growth and environmental improvement. Dublin and Rio also recognised the powerful argument for greater investment in sanitation as a component of an integrated approach to water resources management. In essence that argument is: the quality of the water environment is degrading rapidly, depleting water resources needed to sustain economic growth; inadequate human sanitation is a prime contributor to

water pollution; only rapid investment in sanitation improvements can reverse the degradation. The cost of providing new water supplies for agriculture, industry and domestic use is rising fast, as resources become scarcer. Conservation and protection of existing resources are more cost-effective and more sustainable options than continuous investment in new supplies.

So far, there is little evidence that these arguments have moved water and sanitation planning and budgeting out of the cuts-prone social services programmes. Until that happens, the prospects of any massive injection of new funds from governments or donors remains remote.

2 Improving financial performance

In the meantime, there is plenty of scope for making better use of the resources which are available, and for recovering more of the costs of providing and maintaining services from the users.

Many of the political and institutional changes needed to improve the effectiveness of sector, including the enabling role of central government, are described in Paper 3. The proposals for involving all "stakeholders" in sector planning, for linking service improvements with hygiene education geared to achieving behavioural change, for separating responsibility for regulation from that for service provision, and for decentralisation and devolution of decision making to the lowest practical level all help to create the enabling environment for better financial performance.

Three measures in particular merit more detailed discussion because of their direct impact on sector finance: managing water as an economic good; basing the delivery of improved services on "effective demand"; and stimulating demand for accelerated provision of improved sanitation.

2.1 Water as an economic good

Past failure to recognise the true value of water is a prime reason why an increasing number of countries are heading for water crises. The symptoms are familiar: intermittent supplies, expensive investment in transferring water from distant sources, loss of agricultural production, threats to industrial supplies, and so on. Then there is the wastewater equivalent, with inadequate control over polluting discharges making rivers and groundwater unsuitable for further use, creating environmental nuisance and health hazards, and accelerating the need to turn to alternative sources.

Opportunity cost

As the competition for available resources becomes more intense, so the concept of "opportunity cost" and management of water as an economic good becomes easier to understand. When water is restricted, the "opportunity cost" of the next thousand cubic metres of water to arrive is very high; the farmer who needs it to grow a tonne of grain and the industrialist who could produce an extra five tonnes of steel would bid considerably more in an auction for that water than they are accustomed to paying through the highly subsidised water charges prevalent in most developing countries. On the other hand, if they were charged something approaching that cost for every thousand cubic metres of water, they would quickly find ways of using it more efficiently and reducing their demand.

The pricing mechanism

Review of water pricing mechanisms for agriculture, industry and domestic use is one of the most effective options available to governments seeking to conserve scarce water resources. With agricultural water use accounting for more than 80% of total water use in the developing world, quite small increases in irrigation efficiency, coupled with more realistic payment for water consumed, could generate enough water and enough revenue to make substantial progress in the provision of drinking water supplies to unserved populations.

Agricultural water pricing is a highly sensitive political issue in most countries, linked as it is to national strategies for food security. The fact remains that subsidising food production by providing very cheap (sometimes free) water looks to be both bad economics and bad water management, when more realistic water pricing could provide money to subsidise food production directly and save water.

The extreme example illustrates a principle which applies at its most basic level in most urban water utilities in developing countries and in many of the newly reforming countries of Eastern and Central Europe. Low water tariffs encourage excessive use of water by consumers connected to public supplies, resulting in supply interruptions, inadequate revenues for the utility, breakdowns in service, and no resources to extend services to the unserved. Yet few countries have tariffs which yield even enough revenue for routine operation and maintenance of their water systems.

Lifeline supplies

Application of the concept of water as an economic good has to be accompanied by considerations of equity. The continuation of the Dublin Principle, reproduced in the footnote on page 1, stresses the basic right to water and sanitation at an affordable price. Some of the poorest rural

Loans for latrines

In a small town in Tamil Nadu, India, the municipality offered loans of Rs1,000 to Rs1,500 to individual households in a slum area to pay for pour flush latrines. About 80% of the slum dwellers took up the offer and built their own latrines. They are now paying back the loans at Rs10 to Rs15 a month, so that the debt will be cleared with interest in 10 years.

and peri-urban residents would be further marginalised by a requirement to pay the full costs for improved water supplies (though many would not, as they are already paying excessive charges to water vendors for very inadequate supplies).

Well-designed tariff structures provide for "lifeline" supplies at reduced cost, additional supplies at prices which reflect the true costs of providing and maintaining the service, and extra consumption at rates which discourage excess and provide the means to subsidise the lifeline rates. These principles are well established in most industrialised countries.

In the developing countries, however, water pricing is frequently a central government concern and governments frequently shirk the decision to put up prices, perceiving it as a vote loser or as detrimental to the poor. In fact, the real vote loser is the inefficient and unreliable service resulting from inadequate cost recovery; and the poor suffer most from the low rates, because there is not enough revenue to extend services to them.

Collection systems

Cost recovery can be much enhanced if payment systems are designed to suit the income patterns of users (men and women). In some cases, banks may offer more flexibility than water agencies, allowing people to make small contributions on a weekly, or even a daily basis. In rural areas, payment for communal supplies from handpumps may be timed to coincide with harvests. Women's influence is very important in terms of payment collection and they frequently make the best treasurers of water point committees.

Unaccounted-for water

Assigning the right value to each cubic metre of water provides the incentive to tackle another critical problem facing urban water utilities throughout the world - excessive rates of "unaccounted-for" water. The term refers to the difference between the amount of water drawn from the sources - boreholes, reservoirs or treatment works - and the amount for which the utility actually receives payment. It thus includes water which is lost through leaks in the transmission or distribution mains, water which is not metered, or incorrectly metered, and water which is not billed (or billed but not paid for).

In some urban utilities, unaccounted-for water may be as high as 60%, and rates of 40-50% are commonplace. Even in the industrialised countries it is sometimes argued that it is more cost-effective to provide extra water than to take measures to cut unaccounted-for water below 20-25%. The fact remains that some of the best run utilities claim to have brought the rate down to 10% or less.

In countries where water is scarce, high rates of unaccounted-for water are grossly uneconomic, frequently leading to very high costs in transporting otherwise unnecessary water from great distances (only to throw half of it away). That is the kind of institutional inefficiency which deters investors. It is encouraged by low water tariffs, whereas realistic pricing puts a higher value on every cubic metre saved. If a utility brings its water losses down from 50% to a more reasonable 20%, revenue goes up significantly. The water saved could alone be enough to serve more than 10% of the unserved urban population, and the savings in terms of deferred investment in new sources can have an enormous impact on sector financing.

Importance of user choice

A willingness-to-pay study in Kumasi, Ghana, revealed that, on average, households are willing to pay almost the same amount per month for a ventilated improved pit (VIP) latrine as they would for a water closet connected to the sewerage system. Many households felt that factors such as increased water bills and the undependable nature of Kumasi's water supply system lowered their willingness to pay for a water closet.

Source: UNDP/World Bank, 1990

2.2 Effective demand

The term "effective demand" was popularised in the sector at the end of the 1980s. It was introduced by sector economists to differentiate the notional demand commonly used by planners of water supply and sanitation programmes to determine investment needs from the true requirements of the potential users, expressed by a willingness to pay for the selected services.

When applied in the planning stage, it can have a marked impact on both the choice of technology and service levels and the prospects for cost recovery. Methodologies have been developed for applying the effective-demand concept through willingness-to-pay studies in communities seeking water and sanitation improvements, and the early results provide useful data for general sector planning.

It is clear that improved water supplies are a priority perceived need among those who currently lack them. The studies also indicate that, given the right information, most communities are able to reach agreement on the most appropriate technology and service level, and to commit themselves to pay quite large proportions of household income for reliable services.

Assessing effective demand depends on close links between the planning/implementing agency and the user community. The principles for achieving that linkage are set out in Paper 3, but it is important to note here that the concept of effective demand is only one part of the "partnership" approach to sector development which is now seen by sector specialists as a prerequisite for sustainable water and sanitation development.

2.3 Sanitation promotion

Complementarity of water supply, sanitation and hygiene education has been a sector concept since the start of the Water Decade. During most of the 1980s the prevailing view was that there was little demand for sanitation improvements among target populations, whereas improved water supply was a clear perceived need.

More recently, evidence has started to grow that, particularly in the squalid conditions endured by the peri-urban poor, hygiene education rapidly translates into an effective demand for the means to clear excreta and wastewater from neighbourhoods. In view of the enormous contribution better sanitation provision can make to water pollution prevention, reduction of health risks and environmental improvement, it seems clear that the comparatively small investment needed for hygiene education interventions in high priority slum areas could pay dividends.

2.4 Institutional reform

A common theme of the Conference papers is the changing role of government and the development of partnerships among all the stakeholders (users, local, regional and central government, NGOs, private sector agencies, and donors). The concepts of decentralisation backed by central support and regulation are essential components of the financial approaches recommended in this paper.

Four aspects of the institutional changes will be particularly important to financial performance:

- Strengthened public utilities need financial autonomy and the power to fix water supply and wastewater treatment charges appropriate for the effective management of their services. They should be accountable to their customers and to the government for compliance with nationally set standards.
- Wherever the private sector may be able to offer competitive services, it should have the opportunity to do so. Again this must be subject to the same conditions of accountability and regulation as would apply to the public utility. Frequently, public and private organisations may undertake complementary roles.
- Particularly in rural areas, but also where appropriate in some peri-urban situations, full community management of water and sanitation services may be the best option. Government's enabling and facilitating role should also extend to support for community management.

- In all areas, provision must be made for the consumers to influence planning decisions, including the choice of technology, service level, and payment mechanisms.

3 Re-targeting sector investments

From the unit costs listed on page 2, it is not hard to see why 80% of the Water Decade's $133 billion investment in the sector was devoted to providing high-tech schemes to benefit affluent urban areas. Just a few big urban water treatment plants or giant dam schemes soon dominate the statistics. Historically too, they have been the type of projects favoured by the big lending institutions, as governments were able to give assurances about the institutional arrangements for cost recovery to assure payback of loans.

That view is changing, as donors recognise the increasingly urgent need to deal with the backlog of unserved millions. The projections in Table 2 show that 80% of the target group can be reached with 30% of the estimated funding requirements. That estimate is based on half of the unserved urban population receiving supplies from new high technology schemes.

The question politicians need to address is whether such schemes should have any place on the priority list while so many urban poor lack basic services. If the criterion for investment priority is related to obtaining optimum environmental benefit by providing affordable services to those in greatest need, sector action plans will be headed by projects for hygiene education, sanitation and least-cost appropriate water supplies in peri-urban areas, and rural water and sanitation programmes.

In that way, available funds will have the greatest impact on both the conventional progress indicator - coverage - and on the proposed new basis for assessing success - behavioural change.

The concept of establishing investment priorities according to the potential for maximum environmental benefits is one which could usefully also be applied in the industrialised and the newly reforming countries. The spirit of Rio is surely to give environmental improvement (or the reversal of environmental degradation) preference over schemes to bring extra benefits or extra security to the more affluent members of society.

Private supplies offer economies in Bangkok

In the Thai capital, Bangkok, a common form of private supply consists of a small pumped well and piped distribution system serving a housing development. The system is installed by the developer and the capital cost is included in the selling price of the lots. The owners pay monthly for operating costs, which are on average about one fifth of the Metropolitan Water Authority tariff.

4 Mobilisation of additional funds

Though the gap between the estimated investment needs and current levels of spending in the sector seems very large, the comparison is distorted, because the estimates of current spending include only investments by central and local governments and donors. They ignore the considerable amounts invested by people themselves, either to buy water from private vendors or to add their own backup systems to unreliable public supplies. Most of the direct private investment is "informal" and is generally for private water-pumping and distribution systems, private waste-treatment for households and firms etc. It is difficult to estimate the true value of these investments, but it may be substantial: one example is of Bangkok's water supply where the Metropolitan Water Authority serves only 50% of the population; for almost all the remaining 50% of the population the supply is from private suppliers.

4.1 Mobilising private-sector capital

As well as continuing to support this private investment in private water-supply and sewage-treatment arrangements, private-sector capital can also be deployed to permit additional investment in public water-supply and sewage-treatment services.

In order to mobilise such resources, water agencies need to plan on the basis of effective demand and to develop partnerships with community groups, with the aim of establishing a solid, well-accepted base for their operations. A pattern of properly targeted investment, of achieved improvements in efficiency and of regular recovery of payments for their services, backed by government authority, will enable water utilities to mobilise resources on the private market. This approach has already been adopted in many industrialised countries.

The private-sector sources of such funds can be very diverse. As well as the traditional bond markets, pension funds and insurance companies have funds to invest and can be brought to see the advantages of investment in well-run utilities which have revenues sufficient to cover their total costs. Such a status does not rule out the utilities receiving subsidies to enable them to provide services at low cost to the poor, but the source of such subsidies needs to be identified, and the basis of payment clearly established.

The mobilisation of private-sector funds can be achieved in many different ways. In some of these ways, the investment and operation of the utilities remains with the public authorities. In others, private-sector companies can undertake part, or all, of the provision or operation of the services.

4.2 Ear-marked funding

Traditionally, public authorities have funded their investments in water-supply and sewerage as part of their general funding, with any borrowing being secured on their revenues generally. It is possible, however, for such investment to be focused precisely on the finances of the water and sewerage undertakings. The public authority borrows, not against general revenues, but against the finances of the specific activity. Such borrowing against the specific revenues of water-supply or sewage-treatment services requires the separate identification of these services as a trading entity, the preparation of separate accounts on a commercial basis and the adoption of a commitment to ensuring that the utilities will have a charging basis (if need be, including specific subsidies to support services to the poor) adequate to cover their total cost, including the amortisation of capital.

Such funding, specially ear-marked for water-supply and sanitation and supported by the revenues of the sector, can be raised on domestic markets, on the international finance market or from international agencies.

4.3 Private-sector management responsibilities

Going beyond this, it is possible for the private sector to undertake a greater share of the responsibility for designing, constructing and operating the necessary infrastructure. Possibilities range from private management of public assets to the complete privatisation of the water-supply and sewerage systems.

4.4 Private management of public assets

The "French concession" model has been successful in bringing about private-sector participation in the water-supply and sanitation sector. Under such an arrangement, a private or mixed enterprise assumes the responsibility for investing in, maintaining and operating the infrastructure, which nevertheless remains the property of the public sector and must be returned to the appropriate public authorities in good condition at the end of the contract

period - usually 25 or 30 years. During this period, the concessionaire assumes all commercial risks and most financial risks. Buenos Aires, Argentina, has adopted water-supply and sanitation systems based on this French model and has been able to get considerable participation by private-sector companies. Variations of this French model have also been in operation in Abidjan, Côte d'Ivoire, Gdansk, Poland, and Macao.

4.5 Private management of private assets

A wide variety of arrangements are possible under which a private-sector company constructs and operates the infrastructure for water supply or sanitation. The key concept is Build-Operate-Transfer (BOT): a new private-sector company is established, under the control of those providing the finance, which finances and builds the system (incorporating existing schemes where these sensibly form part of the whole system); it then operates the system for a defined period (15-25 years), collecting the specific revenues from the provision of the services and meeting all the cost of operation maintenance and renewal; at the end of this period, the shares in the new company are transferred to the public authorities, who can then either integrate the company into their system, run it as a separate public-sector enterprise or invite new private-sector bids to take over and run the company.

Schemes of this kind originated in California for power-supply schemes. Subsequently BOT projects have been undertaken in power and transportation sectors in a number of countries. Malaysia has a large BOT project covering 174 rural water supply systems and Indonesia is currently engaged in establishing a BOT project for water supply in its second-largest city, Surabaya.

It has so far proved difficult to develop this approach in other countries because of the need to have a self-financing water-supply or sanitation system and the risks of subsidised competition or political interference in the lengthy periods which such contracts must cover.

The variations on BOT can cover the extent to which the private-sector company is involved in the design of the system, the extent to which existing schemes are incorporated, the length of period before the system is transferred back to the public authorities and the way in which new requirements arising during the contract period are to be handled. A crucial feature of all such contracts is the agreement of the way in which the tariff for the

provision of services is to be up-dated from time to time. This agreement will inevitably require the intervention of some independent person or law-court to act as the final arbiter between the interests of the providers of finance, the public authorities and the consumers of the services.

4.6 Privatisation

As has been said, the length of time for a BOT contract is variable. It is also possible for the private-sector company to take permanent responsibility for the operation and extension of water-supply or sanitation systems. In such arrangements, provision is also needed to deal with the questions of additional investment requirements arising after the initial contract is made. Such privatisation can have the advantages of creating a more stable environment in which the private-sector company can attract and retain the necessary staff and avoid problems as the end of the contract period approaches.

Such privatisation has been undertaken in the United Kingdom, where it has shown advantages in clarifying the division of tasks between those who operate the systems (who are clearly responsible for ensuring that the required standards are achieved) and those who regulate the system (who are clearly responsible for judging whether those standards have been attained).

4.7 Debt swaps

International agencies and governments have shown increasing interest in debt conversion programmes as a means of channelling funds to certain causes. UNICEF, for example, used such funds in 1988-89 for health care, water supply and tree planting processes in Central Sudan. Debt swaps have not yet been considered to be of great value to the water supply and sanitation sector, but they may well become more attractive in the future.

Policy/strategy for action:

Collaboration

Ministerial Conference on Drinking Water and Environmental Sanitation: Implenting UNCED Agenda 21

19-23 March 1994, Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing, Physical Planning and Environment

Prepared for the Conference Secretariat under the auspices of the International Steering Committee by

DR HAFIZ PASHA

with major inputs from a worldwide network of Resource Institutions and Resource Persons

Acknowledgements

This paper has been prepared as a resource and background paper for the Ministerial Conference and beyond by Dr. Hafiz Pasha, for the Conference Secretariat in the Netherlands Ministry of Housing, Physical Planning and Environment (VROM). The work was carried out under the mandate and guidance of the International Steering Committee. Overall responsibility rests with Mr. G.W.Ardon of VROM as the Conference Manager assisted by Mr. P.Kendall as Conference Adviser.

Alongside the significant substantive inputs of the International Steering Committee, a large number of Resource Institutions and Resource Persons worldwide kindly agreed to make inputs to the content of the paper. These are listed in an appendix. Ms. Maggie Black helped condense and link the inputs of the resource network.

Principal review of the paper was carried out by the International Steering Committee, supplemented by internal and external reviewers. The Authors themselves also played a significant role in cross-review of their work at various stages.

Mr. Brian Appleton carried out constructive editing, incorporation of final comments and further development of the drafts where necessary.

The overall process behind the development was managed and guided by Mr. Alexander Rotival, Adviser to VROM, and Mr. Michael Seager of the IRC International Water and Sanitation Centre, supported by an IRC team for substantive advice. Documentalist Mr. Cor Dietvorst and programme assistants Ms. Loekie Broersma and Ms. Jennifer Francis, assisted in information gathering and administration.

The inputs of these and the many others involved in the team effort behind the synthesis, development, review and production of this paper are most gratefully acknowledged.

Although this paper attempts to reflect the widest possible consensus amongst all those who participated in its development, no part of its content should be taken to imply the endorsement of any view by a specific individual, government or agency.

Contents

Preamble

This paper is Number 5 in a set of six background papers prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation convened by the Government of the Netherlands in March 1994 at Noordwijk, The Netherlands. The six papers were conceived as part of a "cascade" process, intended to help the participants of the Noordwijk Conference to convert the commitments of their governments at the Earth Summit in Rio de Janeiro, Brazil, into strategies and actions for achieving accelerated progress in the critical areas of water supply and environmental sanitation.

The Conference Secretariat commissioned individual authors to prepare the six papers, under the guidance of an International Steering Committee comprised of some 48 members representing 29 countries and agencies. A further 60 expert Resource Persons and 18 Resource Institutions from all parts of the world responded positively to requests for summary ideas and insights on the main themes. The Appendix lists all these Resource Persons and Institutions, demonstrating the authority and diversity of the inputs to the background papers. The six elements of the cascade are:

Paper 1: Putting Agenda 21 to work

A graphic account of the developing crisis and the lessons learned from past attempts to deal with it, the Advocacy paper seeks to bring home the urgency of the call for action, the validity of the new approaches proposed, and the scale of the potential benefits if prompt and concerted action is taken. It may also help ministers to convince their colleagues of the seriousness of the current situation and the need for enhanced priority.

Paper 2: Achievements and Challenges

A scene-setting paper, reviewing progress achieved during the International Drinking Water Supply and Sanitation Decade (1981-1990), summarising sector professionals' own analyses of past successes and failures, and linking these to the urgent needs recognised in Rio.

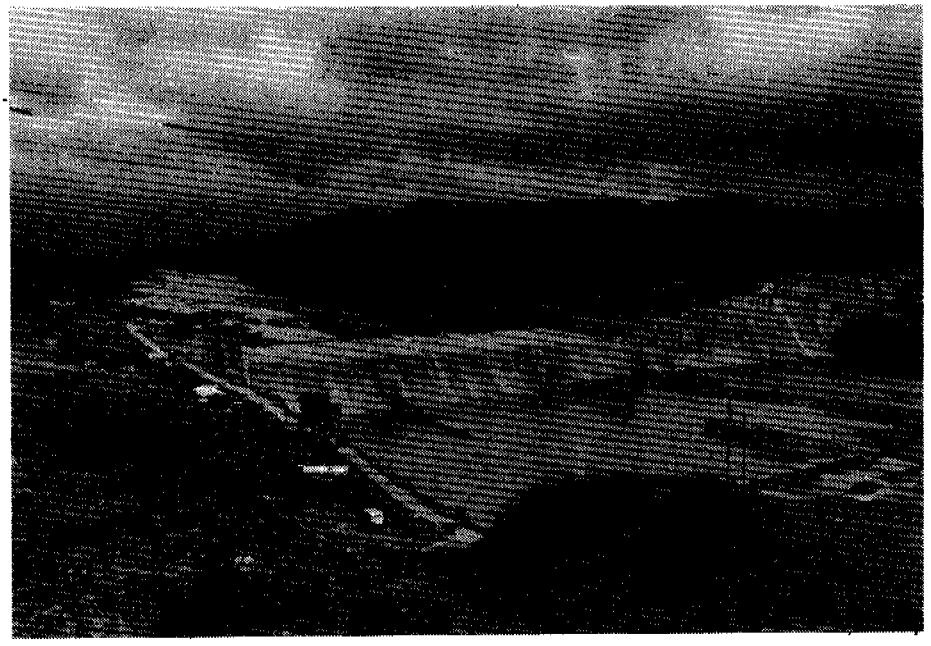
Papers 3 to 6: Policy/Strategy for Action

A group of papers addressing three key areas of concern: Paper 3: *Effectiveness;* Paper 4: *Finance;* and Paper 5: *Collaboration,* leading to Paper 6: A *Synthesis* of recommendations designed to provide the basis for immediate action by national governments and support agencies. In the Policy/Strategy for Action papers, the aim has been to operationalise the Rio rhetoric, and to develop fundamental new approaches, taking advantage of the knowledge and expertise of the world's leading specialists in the water and environmental sanitation field.

Paper 5: Collaboration
Author: Dr Hafiz Pasha

Hafiz Pasha is a Research Professor and Director of the Applied Economics Research Centre at the University of Karachi, Pakistan. He was recently the Federal Minister of Commerce of Pakistan.

A regular consultant of the World Bank, Asian Development Bank and other international agencies, he was involved in the development of water supply and sanitation sector investment plans for Sri Lanka, Pakistan and Myanmar. He was co-author of a recent paper on Country level collaboration in the sector, prepared for the WSS Collaborative Council.



Executive summary

Collaboration and partnership among key players in the water supply and sanitation sector remains one of the less emphasised inputs to sector development, when compared, for example, with financing, technology and institutional development. Given the magnitude of the sector's unfinished tasks, and the limited prospects of increased resources being made available, collaboration has become essential as a means of achieving a concerted and coordinated approach to sector development.

Collaboration can be good politics; it can promote the process of social mobilisation and decentralisation, avoid duplication of efforts and waste of resources; it facilitates the integration of activities such as water resources management; and it leads to more efficient use of available resources. It is largely through extensive global collaboration that the water and sanitation sector is able to speak with authority and confidence about the approaches needed to achieve accelerated and sustainable progress in future years.

There are good examples of collaboration taking place at all levels (country level, regional level and global level), but the widespread use of collaborative mechanisms is not yet well established. The Water Supply and Sanitation Collaborative Council has been taking a leading role in developing guidelines for country-level collaboration, which is being seen as an especially useful way of improving the effectiveness of sector development at national level.

Recommended actions

An eight-point action programme is described in section 4 of this paper:

- Incorporation of integrated water resources management in National Environmental Action Plans, with water and environmental sanitation as major components.
- Preparation of Strategic Investment Plans, based on national sector policies and strategies and decentralized planning.
- Establishment of national coordinating mechanisms on the basis of guiding principles elaborated in the paper.
- International support for social mobilization initiatives in countries, launching action programmes.
- Support for greater South-South collaboration, particularly through regional initiatives.

- Support for the UN Commission on Sustainable Development (UNCSD) in its advocacy and policy dialogues on implementation of Agenda 21.
- Highlighting of drinking water and environmental sanitation issues in forthcoming international conferences.
- Strengthening of the Water Supply and Sanitation Collaborative Council.

It includes a number of activities intended to establish country-level collaboration as a component of the national planning process, including the establishment of a national coordinating mechanism, for which a number of guiding principles have been developed.

1 Introduction

One of the principal reasons that water and sanitation professionals talk with some confidence about the routes to future sustainable progress is the extensive collaboration that has built up among them in recent years. Common concepts for future water and sanitation development, innovative solutions to technological problems, replication of successful approaches and avoidance of the repetition of unsuccessful ones, all can be attributed to the collaborative process.

To date, the majority of collaboration has been donor-led and international in nature. What that collaboration is demonstrating, however, is that many more substantive benefits can be achieved through collaboration at the country level. As yet, such collaboration tends to be ad hoc, and focused around one or more specific problems shared by a few agencies. Only in a very few cases are there attempts to coordinate all sector activities through a single national focal point. This is despite the fact that there is a natural complementarity between the many players working in this sector which forms a good basis for partnerships.

Success stories include the coordination of sector activities in Nepal, Pakistan's National Policy Workshop and Strategic Investment Plan, Indonesia's demand-driven sector planning, the National Action Committee in Zimbabwe, donor consultations in Sri Lanka, Guinea worm eradication programmes in Ghana and Nigeria, and hygiene education and environmental sanitation in the Gambia. This listing serves to highlight the considerable diversity in types of collaboration and the need to tailor the process to suit the particular situation.

In a resource-constrained environment, collaboration represents a viable option for increasing cost effectiveness and sustainability of investments at comparatively low cost. The September 1991 Water Supply and Sanitation Collaborative Council (WSSCC) meeting in Oslo, Norway, identified Country Level Collaboration (CLC) as being a prime requirement for the successful development of the water supply and sanitation sector. Earlier, collaboration among ESAs and governments at the international level had been the main vehicle for diffusion of knowledge regarding sector achievements and problems identified in reviews of the International Drinking Water Supply and Sanitation Decade (1981-1990). The WSSCC set up a Working Group which reviewed experience of country-level collaboration and developed guidelines for national agencies on the most appropriate ways of achieving effective collaboration.

Given the magnitude of the unfinished task, and the need to make most effective use of all available resources, collaboration has become vital as a means of providing for a concerted and coordinated approach to development of the sector. Such collaboration will have to be encouraged at all levels - country, regional, and international - for pooling together capacities to increase efficiency in utilisation of resources and to promote sustainable development.

2 Benefits of collaboration

In the past, collaboration has often been hindered by the desire of individual agencies/ministries to safeguard their territorial interests. There is also sometimes the perception that working as part of a group restricts flexibility in action, slows down the process, forces greater accountability and sharing of the credit from any achievements.

During the 1980s, in a world of central planning and vertical programming, there was reluctance to undertake multi-agency projects or create horizontal linkages. With the greater recognition today that there are a large number of stakeholders in the water supply and sanitation sector and that decision-making is best devolved to the local level with government support, there is a need for greater decentralisation and partnership not only among ministries but also with community groups, the private sector and NGOs. It is, therefore, critical for each player in the sector to appreciate the need for and benefits resulting from collaboration as a means of improving performance.

Summarising the case for collaboration:

- *Collaboration is good politics.*
  It increases public perception of enhanced sectoral priority, of improvement in the quality of governance and of the accountability of government in problem resolution. It is useful, indeed essential, to the decentralisation process where the voice of local government, communities and the consumer must be heard for effective programming. It can contribute to social mobilisation, as a vital element in the partnership approach.

- *Collaboration will achieve more for less.*
  It helps to avoid waste of resources in duplicate efforts and in the application of inappropriate technology or approaches, where proven solutions have already been found. It also enables joint monitoring and evaluation, thereby providing for a more efficient and rapid feedback.

- *Collaboration leads to sustainable progress.*
  Community development based on a partnership approach between both men and women of the

community, implementors and support agency staff is an essential condition for sustainable development.

- *Collaboration can resolve conflicts and promote integration.* With so many players, water supply, sanitation and the environment sectors are fraught with conflicting policies and priorities, duplication of effort and even competition among agencies. Coordination is essential if optimal use is to be made of scarce resources. Integrated water management, a central theme in environmental management, cannot be accomplished without strong inter-agency collaboration.
- *Collaboration encourages collective efforts, with enhanced benefits.*
  Good coordination between water, health, education and environmental agencies results in better utilisation of the water and sanitation facilities and greater benefits through improved hygiene and sanitation in the home and community environments.

Collaboration helps in the mobilisation and deployment of resources for sector 'public goods' like strategic investment plans, data bases, research and development, information and networking mechanisms, etc.

Collaboration in water resources management

An innovative approach to finding new water resources for municipal use is being tried in the Imperial Valley of California: The Metropolitan Water District of Southern California is financing measures to improve the efficiency of irrigation systems (through providing new flow-regulating reservoirs, improved canal lining and more flow monitors) in exchange for the 106,000 acre feet of annual water saving.

The city government of Casper, Wyoming, USA, pays farmers to line their irrigation ditches and to install water-saving irrigation, in turn the city receives the salvaged water.

Source: John M. Kalbermatten and Richard N. Middleton, Future Directions in Water Supply and Waste Disposal.

3 Types of collaboration

Collaboration among parties with common objectives occurs at all levels. Here we categorise collaboration in three levels - country, regional and international. The motivations, mechanisms and guidelines for each are presented below.

3.1 Country Level Collaboration

It is at the country level at which collaboration is generally considered to be most useful for development of the WSS sector. Ministers of national governments are likely to be most effective at this level. Closer collaboration is particularly needed in order to bring about effective action, where the government decides that it should replace its role of provider by one of enabler. However, country level collaboration does not only involve federal agencies/ministries working together but also includes collaboration at sub-national (state, district) level or at the individual project level. It could also involve informal collaboration at the field level among sector professionals for solving a particular problem.

Zimbabwe's National Action Committee

Zimbabwe formed a National Action Committee (NAC) at the start of the Water Decade, but its effectiveness was limited in its early years. A transformation came about when the NAC was reorganised to coordinate implementation of the Country's Master Plan for Rural Water Supply and Sanitation. One reason for the NAC's current effectiveness and resulting high profile is that is has a permanent secretariat - the National Coordination Unit (NCU). The NCU is located in the Ministry of Local Government, Rural and Urban Development (MLGRUD) and, though acting independently of the host ministry, is able to use the MLGRUD's provincial and district structure to extend the NCU's influence to local levels.

In terms of implementation of Agenda 21, country-level collaboration is a way to progress the integrated approach to water resources management, to ensure that sanitation and hygiene education are included alongside water supply, to introduce communication and stakeholders participation into the sector, to promote the consideration of water resources in all development planning at national and local levels and to support multi-agency monitoring and management information systems. More than that, vertical and horizontal collaboration mechanisms can greatly facilitate the process of decentralisation and devolution of decision-making now recognised to be fundamental to successful sector programming.

The results of actions become more sustainable when the community is sharing ideas and experiences with the programme planners. The two-way exchange of information, through people-friendly and gender senstive interaction, leads to projects which respond best to the real needs of users, and should help to promote the behavioural changes which need to accompany improved services, if optimum health and environmental benefits are to be achieved. At regional and local levels, regular discussions among the "stakeholders" provide the opportunity for all voices to be heard. In that way, for instance, women can be encouraged to play a more influential role in project planning, design and implementation, and the needs, aspirations and "effective demand" of all different consumer groups can be taken into account.

Accountability to the consumer and community by enabling their voices to be heard through collaboration is essential to their assuming long term operations and maintenance responsibility (and thereby sustainability) for the facilities.

As well as providing for more effective communication and accountability, enhanced collaboration can bring about community finance for installed facilities. It can also help to mobilise extra resources. Where external donors are involved, collaboration helps countries to rationalise their approaches and avoid the inefficiencies brought about by unnecessary competition or lack of uniformity in donor conditions.

For the agencies working with the communities, complimentarity of programmes between them is essential to rational multi-purpose use of water resources (groundwater irrigation, water supplies for drinking and wastewater disposal, industrial development) leading to behaviourial change and protection of water resources. Better understanding of the needs, perceptions and aspirations of the consumer through direct sharing and learning with the community is another benefit of

collaboration. It will ensure understanding of sustained behavioural change (through new knowledge, attitude and practices) as the ultimate goal of water and sanitation efforts.

To realise these potential benefits, governments need to arrange or facilitate a variety of different collaborative mechanisms. The types of mechanisms which have proved useful in individual cases in various developing countries include:

- Formal and informal sector coordination bodies on which all concerned parties are represented: government and non-government organizations, community representatives and (rarely in the past, but certainly recommended in the future) professional and trade associations.
- Regular donor-sponsored consultations at central and project levels, which provide a broad overview and plans for sector development (institutional, service levels, financing, community management, and maintenance) over the long term. Again, these overall planning activities require active participation of all parties.
- Joint participation of local government communities and central/state level departments in planning, budgeting, project selection, and design in ways which ensure accountability to the consumer.
- Project steering committees representing the interests of all parties to the process before and during project implementation.
- Task forces created to resolve specific issues .
- Sector information and resource centres and data banks responding to the information needs of the entire sector.
- Local, regional and national fora through which community organizations, NGOs and local bodies (formal and informal) can express their views and be heard. These fora can be effective means of ensuring that the voice of consumer is heard. Thailand has good examples of such fora which are active in environmental affairs and in supporting sustainable local development projects.
- Professional associations which support quality control through the maintenance of professional standards, and also act to introduce new concepts and approaches to the sector.
- Demonstration projects for testing new technologies or implementation methodologies.

The effectiveness of country level collaboration is very much a product of the individuals participating in it and largely determined by their interest, openness and

Sequence of collaboration between government and ESAs in Pakistan

The Government of Pakistan launched an ambitious five point program for rural development in 1986, which included emphasis on rapid expansion of rural water supply coverage. In the Aid-to-Pakistan-consortium meeting in Paris in 1987, donor agencies were invited to increase their involvement in the sector. This led to the launching of a mission consisting of international and local sector professionals jointly by the World Bank and CIDA to undertake a Sector Review with the objective of identifying achievements, constraints and strategies. This was followed in 1987 by a National Policy Conference in which representatives of both sector agencies and ESAs participated. The output of the Conference was the Islamabad Declaration which laid down the general principles for sector development and collaboration between government agencies and ESAs.
In 1989, the World Bank and CIDA sponsored the preparation of a Strategic Investment Plan (SIP). This plan was not target driven but based on a realistic assessment of resources and implementation capacity. It clearly demarcated roles for different players in the sector and identified the scope for an nature of ESA involvement in the sector. It is generally felt that the SIP was instrumental in mobilising more donor funding and in avoiding duplication of efforts. Currently the SIP is under implementation as part of the Eighth Five Year Plan of the Government of Pakistan and the Social Action Program (SAP).

communications skills. The WSS Collaborative Council's report on country-level collaboration includes some tentative guiding principles for effective CLC (tentative because, in a wide trawl of available experience, the Council's Working Group found mixed levels of success with different mechanisms). The recommendations are:

- Any national coordinating mechanism or body should be seen to be neutral. In particular, it should not be controlled by the principal government agency or donor in the sector. It should restrict itself to overall policy and macro-planning and not be involved in implementation. It should act as a monitor of the process of coordination.
- Service and coordination go hand in hand. Effective "coordination" is best achieved by providing a service (such as sector planning and technical assistance) rather than coordination by control.
- The coordinating body should have a secretariat (staffed by active, experienced and respected professionals) through which it can provide services to and coordinate the sector.
- The collaborative process works best when all parties (including non-governmental and community) are involved. Although sometimes heated, the resulting discussion is the most effective way of ameliorating concerns and initiating steps to resolve differences. The emphasis must be on effective communication leading to attitudinal changes among individuals and organisations.
- Complementarity of needs enhances collaboration. Each party brings different resources and experience to the table. Where needs of one agency can be met by the resources of another, collaboration can be very effective.
- The underprivileged, such as the low income and low caste groups, are frequently ignored. This is also true of women who should play a central role in collaboration but are commonly left out of the dialogue. Participatory methods are now available to enhance their involvement, but women also need to be included in management roles, so that they can have a substantial impact on design.
- Transparency of information is a key ingredient for project success. Working from a common understanding goes a long way to improving collaboration at the project level.
- NGOs are valuable assets in sector development yet they are too often perceived as being too independent and working undesirably outside of government policy and planning. The collaborative process is well suited to building trust and confidence between government and

NGOs while at the same time drawing on their considerable knowledge and institutional resources for sector development. Support to NGOs which respects their individual interests and plurality of approaches (rather than attempting to control them) goes a long way to reducing differences and encourages compatibility between programmes.

3.2 Regional (Multi-Country) Collaboration

Regional collaboration offers numerous opportunities to countries with common interests and concerns. It can be a useful way to rationalise the management of common transboundary water resources by riparian states. The creation of regional fora and even institutions which can act to unify policy and approaches can help to resolve regional disparities and resource conflicts in the region. Exchange of experience in facing similar problems under similar situations makes it easier to identify ways and means for their resolution.

At the end of the 1980s, regional consultations were an important way of sharing the experiences of the International Drinking Water Supply and Sanitation Decade among sector professionals from government agencies, donors, NGOs and research/information institutions.

For most of the least developed countries, opportunities for regional collaboration are not frequent. Thus, care should be taken to optimize the opportunity for such exchanges and to maximize benefits accrued. This is most likely when the collaboration is focused, task oriented and specific to the region. Examples include working tours and staff exchanges between projects introducing community management into water supply and sanitation to increase sustainability.

Regional collaboration activities should not be donor dominated. It is only natural that the interests of the donors do not match those of the recipients exactly. Thus there is a preference for working through regional associations such as ASEAN, SARC, OAS, etc. As with country-level collaboration, every opportunity should be taken to include non-government organizations in recognition of their capacity and expertise in implementing community based projects in water, sanitation and the environment.

Collaboration among riparian countries: the Rhine Action Plan (RAP)

The Rhine river provides drinking water to over 20 million people. 20% of the chemical industry of the world is concentrated on the Rhine. Water quality seriously deteriorated during the post-war economic boom. Pollution of the river reached its peak in the 1970s when the Rhine was called "the most romantic sewer in Europe".

The International Commission for Protection of the Rhine (ICPR) with member countries - Switzerland, France, Germany, the Netherlands, Luxembourg and European Community - prepared the Rhine Action Plan (RAP) to achieve the following goals by the year 2000:

- Production of drinking water must be guaranteed
- improvement of the marine ecosystem (with indigenous salmon once again)
- reduction in sediment toxity

This plan was approved by Environment Ministers of the member countries in 1987. Already, in Phase II of RAP, implementation of the proposed measures has led to a substantial improvement in water quality.

Source: Dirk Hogervorst, Rhine Action Plan, fighting threat to rivers' ecosystem, in Wiseman, Robin, Water Management Europe 1993.

Mechanisms for enhancing regional level collaboration include:

- UN Regional Commissions and Regional Banks, which have collaboration specifically included in their mandates and budgets. There is good potential for establishing on-going task oriented Working Groups under the aegis of existing regional institutions which have the advantage of tackling region specific problems.
- Seminars and workshops to discuss and find solutions for region specific problems.
- Regional information and resource centres and documentation networking (such as the Asian Environmental Sanitation Information Centre at the Asian Institute of Technology, Bangkok) which are devoted to region specific needs.
- Study tours are extremely useful when introducing new concepts and approaches which have been successfully developed in one country and are being introduced in another country in the region. In such cases staff can visit the neighbouring country's programme in a working capacity for as long as required to gain experience in working with the new methods.
- Permanent basin wide commissions (e.g., the International Joint Commission for the Great Lakes between Canada and the USA) for management of shared transboundary water resources.

3.3 International Collaboration

The water supply and sanitation sector has led the way in development circles in establishing a well respected collaborative mechanism for sector professionals at the international level. The Water Supply and Sanitation Collaborative Council evolved from periodic meetings of groups of external support agencies (ESAs), which started in the mid-1980s. In 1988, the meetings were formalised by the establishment of the ESA Collaborative Council.

It soon became obvious that ESA meetings alone could not effectively addres sector problems in developing countries. To meet the clear need for sector professionals from the North and the South to resolve issues of common concern, the ESA Collaborative Council was transformed into the Water Supply and Sanitation Collaborative Council at the Global Consultation on Safe Water and Sanitation for the 1990s in New Delhi, India, in 1990.

The Council is an innovative mechanism which derives its mandate from a UN Resolution in 1991 (though it is not a UN body). It is neutral and devoid of bureaucracy, is able to

involve and engage all agencies concerned with the sector (North and South, governmental and non-governmental, multi- and bilateral, research, information, professional and training, and public and private sector), to carry forward the momentum of the Decade and provide members with the means to develop and promote new and progressive concepts.

At the Council's first Global Forum in Oslo, Norway, in 1991, the Council established Working Groups to deal with seven key issues: country-level collaboration; urbanisation; operation and maintenance; applied research; information management; information, education and communication; and gender issues. The Working Groups are voluntary units comprising professionals from ESAs and developing countries. The Groups reported to the second Global Forum in Rabat, Morocco, in September 1993, and the Council is now implementing a Rabat Action Programme to put into use the tools produced by the Groups (guidelines, manuals, strategies). In this programme, collaboration and partnership will play a central role.

The Collaborative Council provides a unique springboard for developing effective collaboration mechanisms at all levels in the water and sanitation sector. The Council, and other international collaboration initiatives are important in bringing about continuous advocacy for the sector at the international/global level, to project the nature and magnitude of the urgent needs and unfinished tasks and place them high on the political agenda of international agencies, fora and governments.

International fora help in the mobilization of resources, especially for regions with least coverage and greatest poverty. They have the capacity to bring together a wide range of expertise to develo consensus on the key issues and critical bottlenecks to development and joint means for their resolution. In that way, they help to transform conference resolutions, such as the UNCED Agenda 21, into positive action and concrete achievements. The promotion of greater cooperation and effectiveness of information exchange between donors and recipient governments is already proving to be a powerful unifying force for concerted action.

In addition to the WSS Collaborative Council, international collaboration can usefully take place through special commissions or working groups such as those commonly supported by the UN or the International Banks to focus on specific tasks of international concern. Donor Consultations are undertaken in most countries. International conferences and seminars draw on common interests of like minded parties for collaboration and initiating action to resolve the outstanding problems and constraints to development.

Guidelines for international collaboration include:

- Adequate representation of all key constituencies like national governments of developing countries, multinational and bilateral ESAs, international NGOs, profesional associations, resource centres and the private sector.
- Focus on broader issues of general interest and of relevence at all levels of development and to all regions of the world so as to ensure that consensus is evolved. International collaboration must contain a proper balance between political and substantively-oriented action.
- Collective funding, wherever possible, to promote ownership and sense of participation by all parties.

4 Recommended actions

The following actions are suggested as positive actions which could be taken up in the form of resolutions of the Ministers Conference for follow-up action:

4.1 Environmental Action Plans

Most countries are preparing (or have already) national environmental action plans (NEAPs). These should incorporate water supply and sanitation as part of the environmental action plan being legitimate elements of the household environment (micro-environment) and critical to the health and well being of the family. In addition, integrated water resources management should also form part of the NEAP and include such important components as wastes management, water pollution control, and groundwater resource management.

4.2 Preparation of Strategic Investment Plans

Sector analysis and the preparation of Strategic Investment Plans should be encouraged. These would enable the development of sectoral priorities, policies and strategies within the context of decentralized local initiatives, community management, integrated water resource management, existing financing constraints and implementation capacities. They would provide the basis for demarcation of roles of different agencies and provide rational institutional frameworks for the sector. In addition, they would have strong potential for inducing greater ESA involvement and funding to the sector.

4.3 Establishment of National Coordinating Mechanisms

The establishment of national coordinating mechanisms which would enhance sector collaboration, establish uniform policy, improve planning, and foster the sharing of sector relevant information should be encouraged. These should, however adhere to the guiding principles as listed previously in this paper as being (a) part of an existing institution, (b) neutral, (c) not attached to the principal sector agency, (d) service oriented and (e) supported by an active, professionally competent secretariat. It should serve to advocate the sector in national priority and resource allocation. All participants in the sector (including non-government, private sector and consumer groups themselves) should be represented on its governing body. In addition, the co-ordination function may be supported by the establishment of a National Resource Centre for the sector, acting as a focal point for information, advice, research, etc.

4.4 Support for Social Mobilisation Initiatives

Several countries have already started to incorporate social mobilisation as an integral part of action programmes. Others should be encouraged to do the same. Organisations such as UNICEF, the Water Supply and Sanitation Collaborative Council and the IRC International Water and Sanitation Centre, have documentation, expertise, and potential access to funding sources which could be mobilised in support of national initiatives.

4.5 Support for Greater South-South Collaboration

Donors with special regional interests should be encouraged to support greater collaboration among groups of countries on a regional basis through establishment of information and documentation centres, seminars and inter-country exchange of sector professionals. For example, given the critical water supply and sanitation needs in Africa, there is a need for a stronger collective response to meeting these needs, through collaboration at the regional level. Also, regional development banks could play a major role in promoting the process of collaboration between countries and external agencies in their region.

4.6 Support for UNCSD in the implementation of Agenda 21

All governments are urged to provide the United Nations Commission on Sustainable Development (UNCSD) with information to support advocacy and policy dialogue and to mobilise greater resources for sector development. Opportunities for further international promotion of sector achievements include the planned 1995 report to the UN General Assembly on progress in water supply and sanitation, and the 1996 meeting of the Committee on Natural Resources, which will review progress in implementing Chapter 18 of Agenda 21.

4.7 Highlighting Drinking Water and Environmental Sanitation Issues in International Conferences

The Ministerial Conference should urge the inclusion of drinking water and sanitation provision as one of the issues in the forthcoming UN Conference on Population and Development. This will clearly highlight the problem of service coverage and water resources management in face of continued rapid population growth and urbanisation.

Likewise, water supply and sanitation as an integrated component of (micro) environmental management and as a key issue in women's development should be highlighted at the Fourth World Conference on Women (1995).

4.8 Strengthening of the Collaborative Council

Collaborative functions of the WSSCC should be promoted at the global, regional and country levels. This would involve (a) a more broad-based membership of the council for representation of all key constituencies, (b) strengthening of its secretariat, (c) greater involvement in case studies of collaboration with the objective of developing guidelines for successful collaboration and (e) reviewing collaborative activities between governments and ESAs as a means of increasing awareness of the need for collaboration and encouraging the creation of effective collaborative mechanisms.

Policy/strategy for action:

Synthesis

Ministerial Conference on Drinking Water and Environmental Sanitation: Implenting UNCED Agenda 21

19-23 March 1994, Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing, Physical Planning and Environment

Prepared for the Conference Secretariat under the auspices of the International Steering Committee by

MR JOHN M. KALBERMATTEN

with major inputs from a worldwide network of Resource Institutions and Resource Persons

Acknowledgements

This paper has been prepared as a resource and background paper for the Ministerial Conference and beyond by Mr. John Kalbermatten, for the Conference Secretariat in the Netherlands Ministry of Housing, Physical Planning and Environment (VROM). The work was carried out under the mandate and guidance of the International Steering Committee. Overall responsibility rests with Mr. G.W.Ardon of VROM as the Conference Manager assisted by Mr. P.Kendall as Conference Adviser.

Alongside the significant substantive inputs of the International Steering Committee, a large number of Resource Institutions and Resource Persons worldwide kindly agreed to make inputs to the content of the paper. These are listed in an appendix. Ms. Maggie Black helped condense and link the inputs of the resource network.

Principal review of the paper was carried out by the International Steering Committee, supplemented by internal and external reviewers. The Authors themselves also played a significant role in cross-review of their work at various stages.

Mr. Brian Appleton carried out constructive editing, incorporation of final comments and further development of the drafts where necessary.

The overall process behind the development was managed and guided by Mr. Alexander Rotival, Adviser to VROM, and Mr. Michael Seager of the IRC International Water and Sanitation Centre, supported by an IRC team for substantive advice. Documentalist Mr. Cor Dietvorst and programme assistants Ms. Loekie Broersma and Ms. Jennifer Francis, assisted in information gathering and administration.

The inputs of these and the many others involved in the team effort behind the synthesis, development, review and production of this paper are most gratefully acknowledged.

Although this paper attempts to reflect the widest possible consensus amongst all those who participated in its development, no part of its content should be taken to imply the endorsement of any view by a specific individual, government or agency.

Contents

Preamble

This paper is Number 6 in a set of six background papers prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation convened by the Government of the Netherlands in March 1994 at Noordwijk, The Netherlands. The six papers were conceived as part of a "cascade" process, intended to help the participants of the Noordwijk Conference to convert the commitments of their governments at the Earth Summit in Rio de Janeiro, Brazil, into strategies and actions for achieving accelerated progress in the critical areas of water supply and environmental sanitation.

The Conference Secretariat commissioned individual authors to prepare the six papers, under the guidance of an International Steering Committee comprised of some 48 members representing 29 countries and agencies. A further 60 expert Resource Persons and 18 Resource Institutions from all parts of the world responded positively to requests for summary ideas and insights on the main themes. The Appendix lists all these Resource Persons and Institutions, demonstrating the authority and diversity of the inputs to the background papers. The six elements of the cascade are:

Paper 1: Putting Agenda 21 to work

A graphic account of the developing crisis and the lessons learned from past attempts to deal with it, the Advocacy paper seeks to bring home the urgency of the call for action, the validity of the new approaches proposed, and the scale of the potential benefits if prompt and concerted action is taken. It may also help ministers to convince their colleagues of the seriousness of the current situation and the need for enhanced priority.

Paper 2: Achievements and Challenges

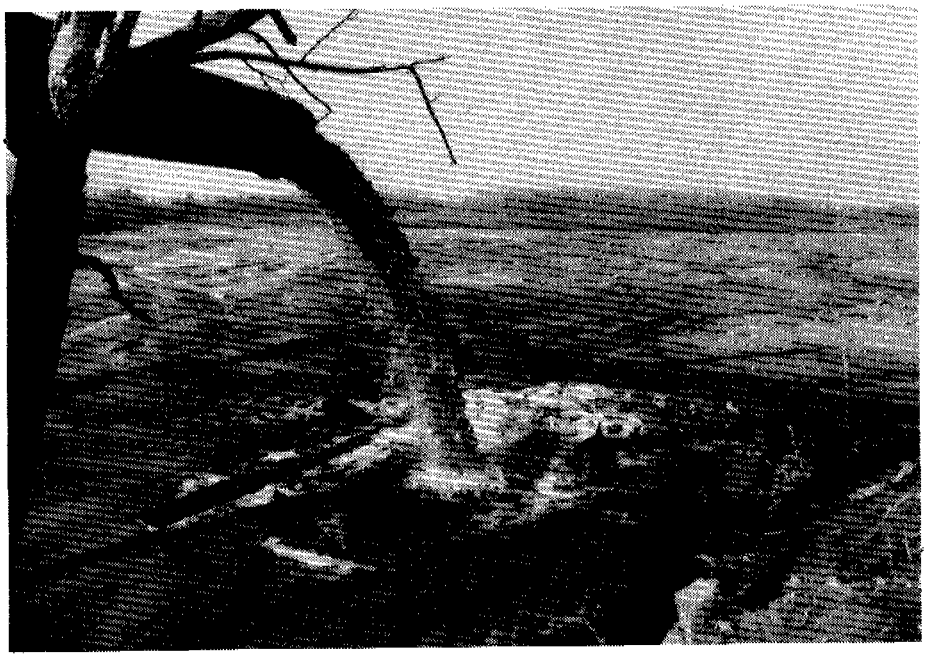
A scene-setting paper, reviewing progress achieved during the International Drinking Water Supply and Sanitation Decade (1981-1990), summarising sector professionals' own analyses of past successes and failures, and linking these to the urgent needs recognised in Rio.

Papers 3 to 6: Policy/Strategy for Action

A group of papers addressing three key areas of concern: Paper 3: *Effectiveness;* Paper 4: *Finance;* and Paper 5: *Collaboration,* leading to Paper 6: A *Synthesis* of recommendations designed to provide the basis for immediate action by national governments and support agencies. In the Policy/Strategy for Action papers, the aim has been to operationalise the Rio rhetoric, and to develop fundamental new approaches, taking advantage of the knowledge and expertise of the world's leading specialists in the water and environmental sanitation field.

Paper 6: Synthesis
Author:
Mr John M. Kalbermatten

Internationally recognised as one of the "wise men" of the water and sanitation sector, John Kalbermatten has unparalleled experience in this field. Many years as Senior Adviser with the World Bank and more recently working through his own company, he has travelled to all corners of the globe, using his insight and knowledge to the benefit of many developing, industrialised and newly reforming countries.



Executive summary

A commitment to change

Global endorsement of Agenda 21 at the Earth Summit in Rio de Janeiro in 1992 has provided environment ministers and water sector agencies with an unprecedented opportunity to turn the tide of environmental degradation and human misery that has plagued the planet for so long. Just a few key political decisions in Noordwijk could initiate a programme of concerted action for which most of the technical tools and many of the institutional approaches are now well established. The *Action Programme* proposed promises more effective use of available resources and more sustainable improvements in water and sanitation services. Its most important prerequisite is *a political commitment to a change in approach.*

Common Concepts

Experience gained from the massive efforts made during the International Drinking Water Supply and Sanitation Decade (1981-1990) shows that there are certain universal principles which lead to success in this sector. They are described in Section 2 of this paper as *"Common Concepts"*. Suitably adapted for specific country conditions, they provide the basis for accelerated and sustainable progress towards the Rio goals.

By adopting the Common Concepts at global level, the Noordwijk Conference can send a powerful message around the world that, in the water and environmental sanitation field at least, Agenda 21 is more than rhetoric. The right message from Noordwijk can stimulate governments to make the policy changes at national level which will enable all the "stakeholders" to combine their energies, resources and skills into an *Environmental Action Programme* to benefit them all. It is that *"partnership" approach*, in which there are varying roles for the users of water and environmental services, for local regional and central government, for non-governmental organisations, and for public and private sector agencies (i.e. for all the stakeholders), which provides the key to success or failure.

A recurring theme in international conferences during and following the International Drinking Water Supply and Sanitation Decade (1981-1990) has been the "right of access to safe water". In support of the Common Concepts, a new *statement of water rights and obligations* is proposed, linking the right to water with the obligation to protect it.

Common concepts

Analysis of past successes and failures highlights these Common Concepts for sustainable progress (detailed in Section 2 of this paper)

1 Balanced development
Water, sanitation, hygiene education, drainage and waste disposal form a coordinated programme, which is an intrinsic part of national strategies for water resources management and environmental protection.

2 Partnership
Government as an enabler and regulator, equips other stakeholders to deliver and sustain services based on "effective demand" of users. The partnership is initiated and continually reinforced by social mobilisation initiatives. Responsibility for service delivery is devolved to the lowest practical level, with appropriate support, standards and controls.

3 Financial sustainability
A long-term goal of full cost recovery based on realistic tariffs and well-directed cross-subsidies helps to build financially viable utilities. User willingness to pay is stimulated by reliable and cost-effective service delivery. Polluters pay realistic charges for waste disposal and penalties for illegal discharges.

4 Appropriate technology
Appropriateness relates to user choice and willingness to pay, designs which optimise water conservation and environmental protection, and provision for long-term sustainability.

5 Gender perspective
Planning and implementation aim to reflect the different needs and interests of women, men and children, and to involve all sections of society in the design and management of projects.

Social mobilisation

Mobilising the stakeholders and providing them with the incentives and the means to work together in coordinated programmes to better their living environment is the single most fundamental action that national governments can take to launch effective water and environmental sanitation programmes. For a single government to give up the role of "provider" of basic services and become an *"enabler"* and a *"regulator"* of multi-partner alliances delivering those services is a difficult decision - even where the government recognises its own shortcomings as a provider. As part of an internationally endorsed programme for change, backed by increasing evidence of success, the decision may be easier.

Government as an enabler

Once the political decision is taken, and the mobilisation has begun, the Common Concepts will help to steer governments to the new policy frameworks, standards and support programmes most appropriate for their people's needs. By using those concepts, formulating sector strategies based on partnerships among all stakeholders, building the capabilities of communities, utilities and decentralised agencies, and enhancing their own capabilities to enforce standards, governments can address the daunting environmental challenges spelt out in the Noordwijk Conference papers with a confidence built on the promise of more effective use of resources, more relevant delivery of services, and more lasting impacts. The challenges will be no less daunting, but the prospects of success will be considerably better than they are now.

Roles of the partners

The resource papers have shown how all stakeholders can play their parts in the planning and implementation of improved services, once the initial policy decisions have been taken by their governments. Their recommendations represent a consensus among sector professionals, developed through a collaborative process that has built up considerably in recent years, particularly at the international level. *Collaboration, communication and partnership* at national and local levels will be important catalysts in the implementation of future Action Programmes.

Building national capacity

An Action Programme, covering key activities at national and international level is set out in Section 3 of this paper. Three immediate actions will be necessary in most countries, once the social mobilisation is under way:

- Development of a *Sector Strategy* based on the Common Concepts, to reflect the needs and responsibilities of all the different stakeholders, to move the sector into a

broader perspective encompassing all the environmental services (water supply, sanitation, solid wastes management and storm water drainage), and to link it to a national Environmental Action Programme.

- *Capacity building programmes* at national, regional and local levels, to strengthen the roles of government as an enabler and regulator and of decentralised agencies, communities and the formal and informal private sector as partners in the Action Programme.
- *Redirection of sector investments* towards least-cost affordable projects serving the unserved, coupled with authority for service providers to set equitable tariffs which assure financial autonomy.

International support

International collaboration can offer better coordinated support for national programmes. Among the supporting initiatives proposed in this paper is the development of a "Toolbox" containing guidelines and case studies illustrating application of the Common Concepts. It is also suggested that a helpful repeated reminder of the importance of water and environmental sanitation would be the establishment of *The Noordwijk Awards*, to be awarded annually or biennially for innovative approaches or conspicuous progress.

In summary, Noordwijk can provide the impetus for change by giving global backing to a *4-step approach* in each country:

1 Reinforcement of the political commitment to change, through the five key political decisions listed in Section 1

2 Adoption of the Common Concepts and the Statement of Rights and Obligations as the basis of sector development.

3 Social mobilisation to stimulate stakeholder partnerships.

4 Adoption of the Action Programme outlined in Section 3.

Statement of rights and obligations

Access to adequate water and sanitation services at affordable cost is a basic right, and is accompanied by an obligation to use water efficiently and to dispose of wastes in a manner which protects and sustains the environment for the benefit of future generations.

Policy/strategy for action: Synthesis

1 The will to win

As long ago as 1972, the Stockholm Conference on the Environment called for improvement in drinking water and sanitation around the world. "Universal coverage" has since been agreed as the objective in numerous global gatherings, from the HABITAT conference in Vancouver in 1976 to the Heads of State Summit on Children in 1990. Yet, despite all these fine resolutions, the situation in developing countries remains appalling. Two thousand million people are still at risk from water-borne and food-borne diseases, which are the main cause of 4 million child deaths each year.[1] In industrialised countries, water resources and human health are under continuous threat from the impact of industrial and toxic waste disposal.

"In contrast with such diseases as AIDS, for which solutions remain elusive, the knowledge needed to bring safe water and adequate sanitation to all exists today."

"Today, 22 years after the 1972 Stockholm Conference, it is time to replace conference resolutions with actions."

The real tragedy behind these disturbing facts is not just the suffering they represent, or that the conditions which give rise to them make sustainable development impossible. The real horror is that this human suffering is unnecessary. In contrast with such diseases as AIDS, for which solutions remain elusive, the knowledge needed to bring safe water and adequate sanitation to all exists today. No revolutionary new breakthroughs in science and technology are needed for immediate action. What is required is the political will to use the tools which already exist, and to mobilise the resources (human and financial) which are available.

The United Nations Conference on Environment and Development (UNCED) has indicated the political commitment of Governments to take decisive actions to improve drinking water and sanitation. "Sustainability" and "environmental protection" have now been added as goals, reflecting experience with implementation of drinking water and sanitation programmes, which has so often resulted in only short-lived improvements and in disregard of environmental impacts. The Noordwijk conference has the opportunity to translate the UNCED political will into action. Today, 22 years after the 1972 Stockholm Conference, it is time to replace conference resolutions with actions.

In preparation for the Conference, the Secretariat tapped a huge reservoir of knowledge and experience. The response of sector professionals from all parts of the world was

1 Source: Report of the WHO Commission on Health and the Environment, WHO/EHE/92.1, WHO, 1992).

impressive. It demonstrates a powerful collective will to get on with the job, to put into effect the solutions developed during ten years of concerted effort in the International Drinking Water Supply and Sanitation Decade, and to reverse the devastating trends of human misery and environmental degradation that have plagued this planet for too long. Spurred on by the Rio accord, the professionals have invested great hope in Noordwijk. Their commitment comes through in the potent reasoning of the theme papers and in the remarkable consensus around the Common Concepts for sustainable progress described in Section 2 of this paper. Their aspiration now is that Noordwijk can will the political actions needed to put their ideas to work.

The political mood change resulting from the world leaders' endorsement of Agenda 21 in Rio provides environment ministers with a golden opportunity to press for the adoption of action programmes based on universally agreed technical and political approaches. To set those programmes in motion, the political commitment needs to be converted into fundamental changes in approach, and that requires some key political decisions at national level:

1 A decision that water supply and sanitation planning and development will be integrated into national programmes for water resources management and environmental protection. The integrated programmes need to incorporate a commitment that access to adequate water and sanitation services at affordable cost is a basic right, and is accompanied by an obligation to use water efficiently and to dispose of wastes in a manner which protects and sustains the environment for the benefit of future generations.

2 A decision that central government's role will change from a direct provider of water and environmental sanitation services, to an enabler and a regulator of other "stakeholders" (users, public and private sector agencies, local, regional and central government, NGOs and donors) acting in partnership to deliver services at the local level. Responsibility for the provision and upkeep of water supply and environmental sanitation services will be devolved to the lowest practical level, and government's role will include development of policies and strategies for the overall management of water resources and establishment and enforcement of legislation and standards to protect water resources and the environment for the benefit of all users.

3 A decision to mobilise all the "stakeholders" as partners in sector development through nationwide social mobilisation programmes.

4 A decision to review and where necessary revise existing national strategies for water supply and environmental sanitation and for management of water resources and protection of the environment, to develop an integrated strategy incorporating the Common Concepts for sustainable progress, suitably adapted to fit national circumstances.

5 A decision to invest in the institutional strengthening and human resource development programmes needed to create organisational and management capacity at all levels.

If these key decisions are taken by national governments, the strategies and actions described in conference papers 3, 4 and 5 and summarised in this paper offer very much enhanced prospects of success. By adopting the Common Concepts at global level, the Noordwijk Conference can provide individual governments with the impetus to take those critical decisions.

2 Common concepts for sustainable progress

A great many "lessons" emerge from the Policy/Strategy papers. They result from a detailed analysis by sector specialists in the water and sanitation sector's innovative global collaboration fora. Here, they have been merged with additional inputs from the many resource persons who contributed to the conference preparations. As such they represent an authoritative and widely respected consensus on the way to achieve faster and more sustainable progress in the sector in the future.

To make them into a more effective tool for accomplishing political change, they are presented here as a set of Common Concepts for sustainable progress, together with a summary of the experiences and analyses that led to their adoption. In this form, they can provide national governments with the foundation for sector strategies (an overriding common concept is that a national sector strategy is a prerequisite for success). They will be significantly strengthened in that supportive role, if they receive global endorsement following the Noordwijk Conference.

Common Concept No. 1: Balanced Development
Water, sanitation, hygiene education, drainage and waste disposal form a coordinated programme, which is an intrinsic part of national strategies for water resources management and environmental protection.

Agenda 21 reflects the overwhelming experience of recent years that for programmes to be successful and environmentally sustainable, water and sanitation planning has to be related to overall water resource management strategies. In that way, governments can assess the fair allocation and reuse of scarce resources for water supply, sanitation, solid waste disposal and surface water drainage alongside the demands of agriculture and industry. When resources are tight, this integrated approach helps to identify the subsector(s) where investments will have the greatest beneficial impact (for example, reduction of disease and suffering, increase in human productivity, employment generation, economic development, improving the environment and living conditions, etc.), and least detrimental environmental impact.

A national sector strategy states the government's objectives for the sector, and the methods to be employed to achieve them. The strategy includes investment and project development guidelines. Inter alia, the guidelines should ensure that water supply and sanitation development reflects water resource management and environmental considerations, such as the equitable distribution of water resources and the prevention of pollution. In an increasing number of countries, the allocation of scarce water resources for competing uses (industry, agriculture, domestic use) is a critical issue. The sector strategy also provides the framework for coordinating the inputs of external support agencies, to avoid duplication and encourage collaboration.

Resource allocations at national and local level are most effective when priority is given to investment in providing basic services for those presently unserved. The benefits come in lower unit costs and hence more rapid increase in coverage, and in achieving more extensive behavioural changes to bring about health and environmental improvements.

Monitoring and evaluation are essential for the updating of strategies in line with actual progress. Coverage statistics say nothing about people's personal behaviour. Personal hygiene practices are as important as the availability of adequate facilities; indeed, inadequate personal hygiene will reduce the health impact of safe water and sanitation facilities. This is particularly true in peri-urban and rural areas, where users have often had little exposure to modern practices and facilities.

Progress should be monitored not only in terms of coverage, but in terms of the quality of coverage and the impact of investments on health and the environment. To profit from monitoring, the results need to be widely disseminated, and a system should be established to provide rewards for

excellence in performance by individuals and organisations. Monitoring and reporting of performance and progress can usefully be undertaken by an independent organisation, such as a National Resource Centre, to ensure impartiality and transparency. The same organisations should be available to provide advice on corrective actions. Internationally, IRC, UNEP and WHO can assist in the analysis and dissemination of information which can help other countries in their efforts.

Common Concept No. 2: Partnership

Government as an enabler and regulator, equips other stakeholders to deliver and sustain services based on "effective demand" of users. The partnership is initiated and continually reinforced by social mobilisation initiatives. Responsibility for planning, management and service delivery is devolved to the lowest practical level, with appropriate support, standards and controls.

People, not technologies, not money, are the most important resources of the sector.

Water supply and sanitation are local issues which require local initiatives managed by local people. In different situations, the leading role in planning and implementing improvements may be taken by the local community, local public or private sector agencies, a non-governmental organisation, or a large urban water utility. The guiding principle is that any or all of these "stakeholders" should have the opportunity to collaborate in a partnership approach to solving local problems. Where legislative or institutional constraints hamper the necessary collaboration, central government may need to intervene to create the right enabling environment.

Decentralisation is a vital requirement for effective management. The overall objective is to devolve responsibility to the lowest level capable of assuming it. Central government remains responsible for general policies, standards and overall sector planning, while local agencies are responsible for the planning and construction of facilities and for subsequent operation and maintenance. Government relinquishes operating responsibilities, and becomes the "enabler", transferring executive functions to local authorities and communities, which become the providers of services. Full community management of water and sanitation services has proved the most appropriate option in many rural areas, and has also been shown to be viable in some peri-urban communities. It works best when there is strong government support, including a legal and administrative framework.

Strong capacity-building programmes (institution-building, human resource development, and community participation) are required to create the intellectual and organisational infrastructure required for the sector to fulfil

Decentralising improves revenue

Beginning in 1985, Sri Lanka's National Water Supply and Drainage Board decentralised to five regional service centres with progressively increasing financial and managerial authority. By 1990, compared with 1984:

- billings had increased by 125%
- ratio of collections to billings had improved from 25 to 84%
- ratio of collections to O&M costs had improved from 31 to 99%
- consumer complaints were reduced from 10 to 3% of connections
- billed connections per employee had improved from 13 to 26

Source: Derived from the Final Report on Institutional Development of the NWSDB, August 1991, published in WASH Technical Report No 89 "Designing and Implementing Decentralization Programs in the Water and Sanitation Sector", July 1993

its functions and accomplish the objectives set for it by the government. National training programmes help to ensure the availability of sufficient numbers of qualified staff in all disciplines. Programmes should optimise the use of existing educational institutions and in-house training to avoid duplication of facilities. Training should particularly address the needs of rural and peri-urban communities and ensure that women become part of management and operations. Where appropriate and feasible, twinning with competent enterprises should be encouraged. Compensation, incentives and career development policies are needed to ensure that the sector is able to attract and retain competent staff.

The organisational structure should reflect a country's culture and state of development, but generally be based on the delegation of responsibilities to local authorities/utilities to the maximum extent feasible, giving them adequate authority to set tariffs sufficient to cover the costs of operation and maintenance and of recovery of capital, as well as to set employment conditions and to enter into necessary contracts. The private sector should be included in the institutional arrangements, from the provision of contract services to the management of publicly-owned assets, in an effort to increase the efficiency of the sector.

Responsibility for water supply and sanitation in most countries is shared among several ministries and agencies, often with no effective arrangements for consultation and cooperation - indeed often with conflicting responsibilities. Water resource management and responsibility for environmental protection is usually assigned to yet other ministries. Unless there are detailed policies incorporated in a country strategy, such dispersion and duplication of responsibilities will almost certainly result in duplication of efforts, and the misallocation and waste of financial resources. The problem usually prevails both at national and local level, although at local level ad hoc collaboration does occur, mainly as part of project implementation. Such collaboration usually is the result of individual initiative, rather than established institutional policies.

Collaboration among all stakeholders is an effective way of transferring knowledge and experience and making best use of resources. International collaboration contributes to the development of common approaches and can make available additional resources. At the regional level, collaboration can include formulating policies for the exploitation and protection of boundary waters and shared river basins. Exchange of information on promising approaches and on lessons learned can be particularly useful within a region, and should be promoted by governments and by ESAs which are active in the region.

The most important collaborative efforts are those made at country level. They include collaboration among country institutions; and collaboration between country institutions and ESAs active in the country.

Collaboration between country institutions and ESAs is frequently handicapped by the absence of a clear sector strategy. As a result, ESAs often deal with a favourite institution and develop policies designed to facilitate their own work. This approach can develop into a "client" relationship between selected ESAs and country institutions which implement policies different from those of other country institution-ESA pairings within the same country.

Common Concept No. 3: Financial sustainability

A long-term goal of full cost recovery based on realistic tariffs and well-directed cross-subsidies helps to build financially viable utilities. User willingness to pay is stimulated by reliable and cost-effective service delivery. Polluters pay realistic charges for waste disposal and penalties for illegal discharges.

The long-term objective is full cost recovery for water supply and sanitation services through user charges which recover the cost of capital investments and provide sufficient funds for proper operation and maintenance. Subsidies, if any, are best limited to the provision of basic services to the poor, and these consumers should, as a minimum, pay operation and maintenance costs and if possible, make at least a minimal contribution towards investments (these payments may be in cash or in kind). Government-subsidised investment support should be provided for a specific period only, with the objective of progressively eliminating such support and replacing it by internal cross-subsidies.

Cost recovery should be based on tariffs and other mechanisms which provide both "lifeline rates" for low-income consumers and, at the highest consumption levels, charges which exceed the marginal cost of service, to finance cross-subsidies and maintain the financial viability of the enterprise. In rural and peri-urban areas, cost recovery may be by any method that is locally acceptable, preferably one administered by local community organisations; charges need not necessarily be related to water consumption. Tariffs for waste disposal should be based on the "polluter pays" principle; there should be no assumed right to discharge wastes freely.

To reduce the funding gap for investments, the sector will need to gain access to sources of capital other than those it has traditionally used. Attracting capital requires efficient and competent institutions, and government policies providing them with the autonomy required to recover costs through tariffs and fees, enter into contracts, and

High cost of poor service

"Households which purchase water from vendors paid 2 to 6 times the average monthly amount of households with private water connections, for one tenth as much water". In Surabaya, Indonesia, 27 percent of the population purchased water from vendors. They used only 8 percent of the water sold by the city, but paid more for this than the water authority received from all its other customers combined!

Whittington, Dale et al.: Water Vending and Development: Lessons from Two Countries. Technical Report No. 45, WASH, May 1988.

provide employment conditions which attract and retain competent staff. At the same time, government policies should make appropriate provisions to ensure that financial assistance is limited to support only investments dedicated to serve low-income groups, and that tariffs reflect government social policies by providing a lifeline tariff for the poor, charging at least marginal cost at high consumption levels, and encouraging water conservation.

Credit facilities should be established for low-income homeowners to permit borrowing for on-plot facilities, and land tenure should be formalised where this is required to facilitate borrowing.

Health benefits alone are unlikely to convince a majority of people of the need for improvements. Convenience, prestige and financial benefits may be more convincing reasons. The challenge is to mix motivational messages with hygiene education and awareness raising, so that people's willingness to pay for new services is accompanied by the behavioural changes needed to bring optimum health and environmental impacts.

Common Concept No. 4: Appropriate technology
Appropriateness relates to user choice and willingness to pay, designs which optimise water conservation and environmental protection, and provision for long-term sustainability.

Past projects have often been designed to provide service improvements to middle-class customers using conventional approaches. It is reported that, during the Decade, conventional technologies serving middle-class customers absorbed 80% of the available investment funds. Different priorities could have provided affordable basic services for many more people through the use of more innovative and cost-effective methods.

Sector institutions need to ensure the consistent application of technologies appropriate to local cultural, financial and physical conditions. In particular, technologies should be capable of being operated and maintained locally, by the community or another stakeholder on the community's behalf, so as to reduce investment costs and ensure adequate operation and maintenance of the completed facilities. For the same reasons (cost reduction and operating competence) local labour and materials should be used to the maximum extent possible.

The design of facilities should be based on "effective demand" (the willingness of people to pay for the service standards they choose), and the participation of the user community, appropriate to local conditions, in the choice of technology. Complementary hygiene education programmes should be provided, since hygiene education,

by informing the people of the benefits of changing personal hygiene practices and the benefits of different facilities, is the key to securing user participation and to determining true effective demand. Without it, investments have been shown not to provide the benefits expected of them.

Project design should consider conservation of water to reduce both demand on resources and wastewater disposal needs. Similarly, reuse of wastewater should be considered as a disposal option, both for the potential benefits resulting from reuse and also as a more economically attractive disposal option.

Common Concept No. 5: Gender perspective
Planning and implementation aim to reflect the different needs and interests of women, men and children, and to involve all sections of society in the design and management of projects.

Women's and men's needs and interests differ considerably in water supply and sanitation. Effective improvement programmes need to take account of the needs of all sections of society and to ensure that women's views are represented as well as men's. The need for a gender balance applies also in the planning and design of water and sanitation improvements. Women should be adequately represented at policy level, and both men and women at all levels need to be sensitized to gender issues in the sector.

Capacity building efforts should take special care to ensure the participation of women in the sector's development because as the family provider of health care they have the motivation to participate effectively in the promotion and operation of effective drinking water and environmental sanitation services. All potential user groups should be consulted prior to investment decisions and, especially in rural and peri-urban areas, be involved in the planning, implementation and operation of service extension. It is particularly important to seek out the views of women users, as their influence will be a critical factor in achieving sustainability.

3 An Action Programme

For this conference to be known as the ACTION CONFERENCE, action proposals should be highly focused and limited in number to those which are clearly achievable. Success - improvement in the environmental living condition of the underserved - must be visible in the near future to attract political and financial support. At the same time, these actions must be designed to achieve long-term sustainability.

3.1 Political change

The starting point for national post-Rio Action programmes is the translation of global political commitment into national political decisions. The key decisions were set out in Section 1 of this paper. They are:

1 A decision that water supply and sanitation planning and development will be integrated into national programmes for water resources management and environmental protection. The integrated programmes need to incorporate a commitment that access to adequate water and sanitation services at affordable cost is a basic right, and is accompanied by an obligation to use water efficiently and to dispose of wastes in a manner which protects and sustains the environment for the benefit of future generations.

2 A decision that central government's role will change from a direct provider of water and environmental sanitation services, to an enabler and a regulator of other "stakeholders" (users, public and private sector agencies, local, regional and central government, NGOs and donors) acting in partnership to deliver services at the local level. Responsibility for the provision and upkeep of water supply and environmental sanitation services will be devolved to the lowest practical level, and government's role will include development of policies and strategies for the overall management of water resources and establishment and enforcement of legislation and standards to protect water resources and the environment for the benefit of all users.

3 A decision to mobilise all the "stakeholders" as partners in sector development through nationwide social mobilisation programmes.

4 A decision to review and where necessary revise existing national strategies for water supply and environmental sanitation and for management of water resources and protection of the environment, to develop an integrated strategy incorporating the Common Concepts for sustainable progress, suitably adapted to fit national circumstances.

5 A decision to invest in the institutional strengthening and human resource development programmes needed to create organisational and management capacity at all levels.

If these key decisions are taken by national governments, the strategies and actions described in conference papers 3, 4 and 5 and summarised in this paper offer very much enhanced prospects of success. By adopting the Common Concepts at global level, the Noordwijk Conference can provide individual governments with the impetus to take those critical decisions.

3.2 Priority activities at country level

Converting these political decisions into concrete actions, the four principal thrusts at country level have to be:

- *Social mobilisation programmes* to raise awareness among all the stakeholders of the government's commitment to the partnership approach, and the changed roles and responsibilities that result from that decision. Communication and education initiatives to establish dialogues among potential partners, and strong advocacy from government of the environmental and health benefits expected to flow from the new approach.
- *Development and implementation of national strategies for drinking water and environmental sanitation, integrated with strategies for water resources management and environmental protection* (or review and improvement of existing strategies), to guide all stakeholders in the rational and effective provision and use of drinking water and environmental sanitation.
- *Capacity-building*, designed to mobilise and equip all the stakeholders and to create competent institutions, provide adequate numbers of qualified staff, and enable communities to become full partners in the development of the sector.
- *More effective use of resources* by: directing investments towards least-cost affordable projects which meet the needs of the poor and unserved; enabling water providers to set equitable tariffs for agricultural, industrial and domestic water which encourage conservation and efficient use and which assure the financial autonomy of local water utilities; reducing "unaccounted-for water" to acceptable limits and so deferring expensive new investments; and mobilizing local resources through local credit schemes and the enablement of community management.

Without these four fundamental activities other actions will fail. The activities can be implemented without delay, because the capacity to design and implement them already exists. Successful completion of these tasks will improve the sector's capacity to provide better services, and increase its ability to attract capital for future expansion.

The tasks are great, but so are the resources which can be mobilised, for every well-managed water supply and sanitation institution is a potential participant in this effort to transfer and adapt water and sanitation management skills to less capable institutions. Every NGO with successful experience in water supply and sanitation and/or community participation is a potential partner.

On the basis of the endorsement of this Action programme, governments may expect that country level collaboration involving external support agencies may focus particularly on:

- *Technical cooperation/consultation* activities in strategy and policy development reflecting the needs of all stakeholders in the sector
- *Implementation of the Capacity-Building Technical Cooperation/Consultation Programme* based on bilateral agreements
- *Implementation of the necessary institutional reform* (to maximum extent by enabling existing organisations to assume responsibility for recommended functions) to coordinate inter-ministerial/sectoral activities and to undertake (or assist in the undertaking of) intersectoral plans, programmes and activities
- Establishment (if possible by reorganisation of suitable existing organisations) of *National Resource Centres* for information collection and dissemination, applied research, technical support and monitoring

Evidence of successful institution-building successes exists. Institutions have been improved, communities have participated (and made sensible decisions) and expertise to organise a major effort can be made available. The cost of such an effort is small compared with the potential payoff resulting from the management of the sector by competent institutions. The actions to be taken are few, so efforts will not be spread too thinly over too many activities.

While many actions can be taken quickly (and their payoff will be realised equally quickly), the overall effort will need to be extended over several years so that a new institutional culture will take permanent hold. The ultimate impact, will be the establishment of a technically and financially viable sector attractive to national and external financiers.

Progress will be monitored although some key indicators, those dealing with the impact on institutional performance, community capacity and user wellbeing, have yet to be defined.

3.3 International supporting actions

The international community (donors, UN agencies, international professional associations, research institutions, and other resource centres) can provide substantial support for these country level activities, by implementing a collaborative programme of complementary activities. The activities will need to be

coordinated by a designated lead agency and guided by a steering group through which country needs can provide the impetus for action. Elements of such a support programme could, for example be:

- *International support for social mobilisation initiatives* in countries launching action programmes. Organisations such as UNICEF, the Water Supply and Sanitation Collaborative Council and the IRC International Water and Sanitation Centre, have documentation, expertise, and potential access to funding sources which could be mobilised in support of national initiatives.
- *Preparation of a capacity-building technical cooperation programme*, including the establishment of an information centre to function as a clearing house and to assist in coordination, in order to facilitate bilateral technical cooperation in capacity-building.
- *A promotion and publicity programme* which contributes to the visibility, understanding and support for the water supply and environmental sanitation sector, building on the powerful messages highlighted in the Conference papers, particularly Paper 1.
- *Development of a "toolbox"*, containing framework documentation, such as guidelines on: sector strategic planning; the establishment of policies, regulations and standards; investment prioritising and selection criteria; and project development. The toolbox would include case studies and examples of successes and failures in capacity-building, privatisation, monitoring, etc.. The guidelines would be "generic" and written with a focus on ease of adaptability to country conditions by staff of national institutions. The purpose is to make international experience more readily available, so that countries can benefit by adapting successful approaches to their own needs, without necessarily having to seek technical assistance from ESAs.
- *The Noordwijk Awards*. Governments and ESAs should consider establishing awards for the best individual and institutional performance at regional and global levels, to encourage excellence of performance, to publicise successes, and to encourage others to perform equally well. If the Water Supply and Sanitation Collaborative Council is selected to monitor sector progress or to participate in the monitoring, awards could be made with appropriate publicity at its biennial meetings. Regional awards could be made during alternate years. Awards should be substantial enough in prestige and emoluments to provide real incentives for participation. At least two categories should be considered, one for innovation, the other for the greatest improvements in sector performance. UNEP may be asked to administer The

Noordwijk Award for Environmental Achievement in Drinking Water and Sanitation to commemorate this conference.

- *Expansion of the activities of the Water Supply and Sanitation Collaborative Council* to undertake those tasks which the conference identifies as within the Council's capacity, such as: monitoring the implementation of actions recommended by this conference; information exchange; and administering the award candidate selection process.

3.4 Decisions needed at Noordwijk

Participants in the Noordwijk Conference can take a vital step towards meeting their governments, commitments to implementation of Agenda 21 in the field of water and environmental sanitation through these four actions:

(I) Adoption of "Common Concepts"

(II) Adoption of "Rights and Obligations

(III) Endorsement of the proposed national and international actions

(IV) Adoption of a follow-up mechanism to provide immediate support.

3.5 Noordwijk Follow-up

Ultimately, the success or failure of this conference will depend on whether good intentions are translated into action. Therefore, a follow-up mechanism needs to established. It should be kept as informal as possible, in order to avoid the establishment of additional resource-consuming bureaucracies.

UNDP and the conference host have demonstrated their capacity to develop and support successful technical cooperation activities in capacity-building. Their contacts with existing academic and professional institutions active in this field, with professional associations, public and private utilities and with NGOs, make them well suited for the organisation of a decisive effort to upgrade the sector's institutional capacity in countries where such assistance is needed. This would not require new institutions, but the effort would have to be supported by ESAs through participation in a collaborative framework, and by governments through the establishment of sector strategies.

It may simply be that the conference organiser could assume the responsibility to continue bilateral dialogues initiated during the conference in an effort to identify Government and Non-Government Organisations able and

willing to undertake specific tasks of particular interest to them or their "development partners". Specific projects could be undertaken based on bilateral agreements, while others would require more general agreements. Collaborative actions could be approved by the ministers as a follow-up of UNDP or Conference Host proposals through existing United Nations mechanisms.

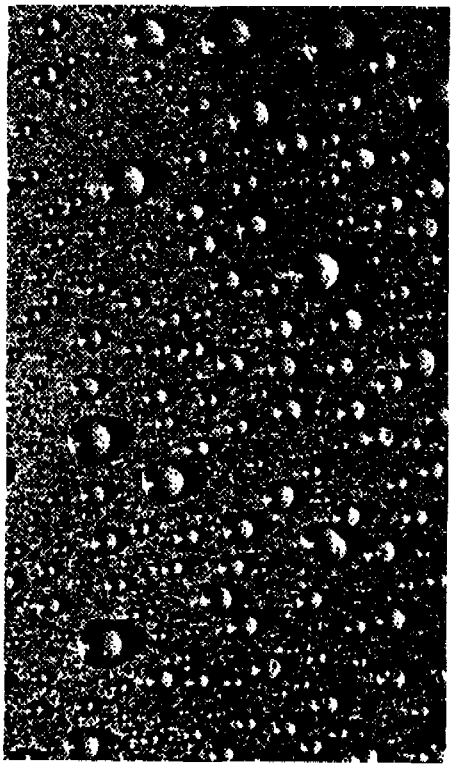
The mechanism could also consist of a small ministerial advisory/promotional panel designated by the conference to perform the same tasks. The panel could make available to its members proposals developed by staff or by consultants. These proposals would then be submitted to interested organisations, with the panel monitoring implementation and eventually disseminating results (both success and failures). The panel could meet during other scheduled meetings, or conduct its business by correspondence or through tele-conferencing.

It is also preferable that monitoring and information-dissemination should be undertaken by organisations already established for similar tasks, such as IRC or the Collaborative Council (or both).

Immediate projects required to implement the actions proposed include:

- *Preparation of Capacity-Building Technical Cooperation Programme*, including proposal for establishment (preferably expansion of work programme of existing institution, such as IRC, IRCWD, or the Foundation for the Transfer of Knowledge) of an information centre-clearing house on capacity-building resources.
- *Study to evaluate desirability of awards* and proposing administration of awards (Possibly sponsored by The Netherlands as a result of the conference as a permanent contribution to the sector, administered by the UNEP and awarded every two years during the Collaborative Council Meeting, and possibly with regional awards in the other years?)
- *Implementation of selected Environmental Services Demonstration Projects*, with bilateral technical cooperation, if desirable.

Appendix



Lists of International Steering Committee Members, Resource Institutions and Resource Persons who have contributed to the content and development of the Conference Papers

List of International Steering Commitee members (Countries)

Mr.Lionel Michael
Ministry of Health,
Central Board of Health
All Saints Road
St. John's
ANTIGUA

Mr. Peter Brathwaite
Management of Water Division within Antigua
Public Utilities Authority
P.O.Box 416
St. John's
ANTIGUA

Mr. John Whitelaw
Commonwealth Environment Protection Agency
P.O. Box E 305 Queen Victoria Terrace
ACT 2600 Canberra
AUSTRALIA

Mr. Jose Edson Perpetuo
IBAMA Sain Av. L-4
Brasilia DF 70800-900
BRAZIL

Ms. Hu Zhongping
Ministry of Construction
San Li Hé Road
Beijing 100835
CHINA

Mr. Liu Changxing
Ministry of Construction
San Li Hé Road
Beijing 100835
CHINA

Mr. Gong Huseng
Ministry of Construction
San Li Hé Road
Beijing 100835
CHINA

Mr. Abdel Salam Salem Awad
Ministry of Housing and Public Utilities
1, Esmaiel Abaza St from
Kasr El Einy Str
Cairo
EGYPT

Mr. Mostafa Abdel Aziz Sharaf
National Organisation for Potable Water & Sanitary Drainage
96 Orabi Street
El Mohndseen, Cairo
EGYPT

Mr. J.P. Murat
Ministère de l'Environnement
100 Avenue de Saffren
15015 Paris
FRANCE

Mr. J.L. Nicolazo
Ministère de l'Environnement
14 Boulevard General Le Clerc
92000 Neuilly-sur Seine
FRANCE

Mr. Bosenius
Bundesministerium für Umwelt,
Reaktorsicherheit und Naturschutz
P.O. Box 120629
53048 Bonn
GERMANY

Mr. J. Lewerenz
Federal Ministry of Economic Cooperation and Development, unit 225
P.O.Box 120322
D-53045 Bonn
GERMANY

Dr. Wieting
Bundesministerium für Umwelt,
Reaktorsicherheit und Naturschutz
P.O.Box 120629
53048 Bonn
GERMANY

Mr. J. Wanderoth
Graurheindorferstr. 2
53117 Bonn
GERMANY

Mrs. H. Imhoff
Bundesministerium für Umwelt,
Naturschutz
Und Reaktorsicherheit
Kennedyallee 5
5300 Bonn
GERMANY

Mr. K. Geyer
Counsellor German Embassy
Groot Hertoginnelaan 18-20
2517 EG The Hague
The Netherlands
GERMANY

Mr. P. Ottlik
Ministry of Environment and Regional Policy
P.O.Box 44/50,
1011 Budapest
HUNGARY

Mrs. Ibolya Gazdag
Ministry of Transport, Comunication and Water Management
Dob. 75-81
H-1077 Budapest
HUNGARY

Mr. Jagdish Chander
Rajiv Gandhi National Drinking Water Mission
Ministry of Rural Development
R.N.O. 249, Krishi Bhavan,
New Delhi
INDIA

Mr. G.J. Tharayathu
Joint Secretary to Government of India
Ministry of Environment and Forests
Paryavaran Bharan, CGO/Complex
Lodi Road, New Delhi
INDIA

Mr. J.C. Kala
Ministry of Environment and Forests
Paryavaran Bharan, CGO/Complex
Lodi Road
New Delhi
INDIA

Mr. P.K. Sivanandan
Ministry of Rural Development
R.N.O. 249, Krishi Bhavan
New Delhi
INDONESIA

Mr. S. Hendropranoto
Assistant to the Minister of Public Works
Jl. Pattimura 20c
Kabayoran Baru
Jakarta Selatan
INDONESIA

Mrs. S. Risyana
Directorate of Water Supply
Ministry of Public Works
Jalan R. Patah I/1
Jakarta 12110
INDONESIA

Mr. Sundjaja
Sub-Director for River Basin Development Planning
Ministry of Public Works
Jalan R. Patah I/1
Jakarta 12110
INDONESIA

Mr. Takafusa Yamamura
Ministry of Health and Welfare
1-2-2 Kasumigaseki
Chiyoda-ku
Tokyo-100
JAPAN

Mr. Adnan Elayyan
Engineer
Ministry of M.R.A. and the Environment
P.O.Box 1799, Dept. of Environment
Amman
JORDAN

Mr. Ahmed Khattab
Ministry of M.R.A. and the Environment
P.O.Box 1799, Dept. of Environment
Amman
JORDAN

Mr. F. Bahamonde
Punta del Este 64
Mexico, D.F. 07708
MEXICO

Mr. F.A. Sandoval Sanchez
Indsway 315
21180 Mexicoli
MEXICO

Mr. Abid Abderrafii Lahlou
Financial Manager ONEP
6 Bis Rue Patrice Lumumba
Rabat
MOROCCO

Mr. P. Heijns
Water Resource Development
Department of Water Affairs
P/Bag 13193
Windhoek 9000
NAMIBIA

Mr. G.J.R. Wolters
Deputy Director General for Environment
Ministry of Housing, Physical Plannning and Environment
P.O.Box 30945\600
2500 GX The Hague
THE NETHERLANDS

Prof. W.J. Kakebeeke
Director International Environmental Affairs
Ministry of Housing, Physical Planning and Environment
P.O. Box 30945\670
2500 GX The Hague
THE NETHERLANDS

Mr. J. Blom
Sector Specialist Drinking Water and Sanitation
Ministry of Foreign Affairs
DGIS/DST/TA
P.O.Box 20061
2500 EB The Hague
THE NETHERLANDS

Mr. J.O. Bassey
Director Water Supply and Quality Control
FMNRRD, Area 1
P.M.B. 159, Garki
Abuja
NIGERIA

Mr. O.O. Olabenjo
Federal Environmental Protection Agency
P.M.B. 265, Garki
Abuja
NIGERIA

Mr. Anatoli Lvov
Ministry of Protection of the Environment
and Natural Resources
B./ Czysinskayastr. 4/6
123812 Moscow
RUSSIAN FEDERATION

Mr. S. Natalchuk
Committee for Water Management
3, Orlikov Lane
Moscow, RF
RUSSIAN FEDERATION

Mr. V.A. Vladimirov
Office of Inland Surface Water Conservation
Ministry of Protection of the Environment
and Natural Resources
4/6 B. Grusinskaya St.
123812 Moscow, RF
RUSSIAN FEDERATION

Mr. Abdou Aziz Mbaye
Technical Advisor to the Minister of
Environment and Protection of the Nature
23, Rue Calmette
MEPN-Dakar
SENEGAL

Mr. Elimane Ba
Chef de bureau des Etude et des Programme
Ministère de l'Environnement et de
la Protection de la Nature
23, Rue Calmette
MEPM-Dakar
SENEGAL

Mr. C. Sakho
Ingénieur Sanitaire
23, Rue Calmette
MEPN-Dakar
SENEGAL

Mr. Ingvar Andersson
Department Director SIDA
S 10525 Stockholm
SWEDEN

Mrs. Gunilla Björklund
Ministry of Foreign Affairs
P.O.Box 16121
10323 Stockholm
SWEDEN

Mr. Sture Persson
Special Adviser
Ministry of Environment
S-1-333 Stockholm
SWEDEN

Mr. Alan Simcock
Head of Water Resources & Marine Division
Department of the Environment
43 Marsham Street
London SW1P 3PY
UNITED KINGDOM

Mrs. Marjorie Shovlin
US Aid
Near East Bureau, Development Resources
515 22nd Street N.W.
20003 Washington D.C.
U.S.A.

Mr. James E. Smith, Jr.
Senior Environmental Engineer
U.S. Environmental Protection Agency
26 W. M.L. King Drive
Cincinnati, Ohio
U.S.A.

Mrs. Eleanor Raven-Hamilton
First Secretary American Embassy
Lange Voorhout 102, The Hague
U.S.A.

(International organisations)

Mr. A. Milburn
1, Queen Anne's Gate
London SW1H 9BT
UNITED KINGDOM
IAWQ

Mr. L.R. Bays
1, Queen Anne's Gate
London SW1H 9BT
UNITED KINGDOM
IWSA

Mr. J.M.G. van Damme
P.O.Box 93190
2509 AD The Hague
THE NETHERLANDS
IRC INTERNATIONAL WATER
AND SANITATION CENTRE

Mr. Phillipe Pallas
Officer in Charge of Water Resources,
Development and Management Services
Via delle Terme di Caracalla
00100 Rome
ITALY
FAO

Mr. Pierre Najlis
Secretary ACC Subcommittee on Water
Resources, Energy & Resources Branch
1, United Nations Plaza
10017 New York, N.Y.
U.S.A.
UN-DPCSD

Mr. Frank Hartvelt
Deputy Director
Division for Global and Interregional Projects
1, United Nations Plaza
New York, 10017
U.S.A.
UNDP

Mr. Jorge Gavidia
UN Centre for Human Settlements
P.O. Box 30030
Nairobi
KENYA
UNCHS (Habitat)

Mr. Jaime Hurtubia
Co-ordinator Environmental Management
P.O.Box 47074
Nairobi
KENYA
UNEP

Mr. Walter Rast
Senior Programme Officer Water Unit
Water and Lithospere Unit
P.O. Box 30552
Nairobi
KENYA
UNEP

Mr. Gourisankar Ghosh
Chief, WES
3 UN Plaza (DH409)
New York 10017, N.Y.
U.S.A.
UNICEF

Mr. Tom Herwig
Officer, Public Affairs
3 UN Plaza
New York 10017, N.Y.
U.S.A.
UNICEF

Mr. John Briscoe
Division Chief
1818, H-Street N.W.
Washington DC 20433
U.S.A.
WORLD BANK

Dr. Dennis B. Warner
Manger, Community Water Supply and
Sanitation
World Health Organisation
20 Avenue Appia
1211 Geneva 27
SWITZERLAND
WHO

Mr. Ranjith Wirasinha
Executive Secretary
c/o WHO, 20 av. Appia
1211 Geneva-27
SWITZERLAND
WATER SUPPLY AND
SANITATION COLLABORATIVE
COUNCIL

Mrs. Lilia O. Ramos
Philippines Social Development Centre
Cor. Real and Magallanes Sts.
Intramuros, Manilla
PHILIPPINES
APPROTECH ASIA

Mrs. Deborah Moore
5655 College Av. Suite 304
Oakland CA 94618
U.S.A.
CAPE 2000/Environmental Defense Fund

Secretariat

THE NETHERLANDS

Mr. G.W. Ardon
Head Drinking Water Division
Ministry of Housing, Physical Planning
and Environment
P.O.Box 30945\630
2500 GX The Hague

Mr. P.M.H. Kendall
Consultant, Ministry of Housing, Physical
Planning and Environment
P.O.Box 30945\630
2500 GX The Hague

Mrs. A. Berghuizen
International Environmental Affairs Division
Ministry of Housing, Physical Planning
and Environment
P.O.Box 30945\670
2500 GX The Hague

Mr. R. uit de Bosch
Drinking Water Division
Ministry of Housing, Physical Planning
and Environment
P.O.Box 30945\630, 2500 GX The Hague

Ms. E. Hage
Drinking Water Division
Ministry of Housing, Physical Planning and
Environment
P.O. Box 300945, 2500 GX The Hague

Ms. M. Vogelaar
Drinking Water Division
Ministry of Housing, Physical Planning and
Environment
P.O. Box 3000945, 2500 GX The Hague

List of Resource Institutions

AFRICAN DEVELOPMENT BANK
Principal Contact Person
Mr. B. D'Ndiaye
B.P. 1387
Abidjan 01
Ivory Coast

ASIAN DEVELOPMENT BANK
Principal Contact Persons:
Mr. K. Tarumizu
Mr. Sayed A. Baha
P.O. Box 789
1099 Manila
Philippines

AUSTRALIAN COUNCIL FOR OVERSEAS AID
Principal Contact Person:
Mr. R. Hewson
G.P.O Box 887
Canberra ACT 2601
Australia

COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE (CARE)
Principal Contact Person:
Dr. P. Johnston
600 First Avenue
New York, N.Y. 10016
U.S.A.

COMMISSION OF THE EUROPEAN COMMUNITIES
Principal Contact Person:
Mr. D. Frisch
Rue de la Loi
B-1079 Bruxells
Belgium

DANISH INTERNATIONAL DEVELOPMENT AGENCY
Principal Contact Person:
Mr. E. S. Jensen
Asiatisk Plads 2
D-1448 Copenhagen K
Denmark

UN-DEPARTMENT FOR POLICY COORDINATION AND SUSTAINABLE DEVELOPMENT
Principal Contact Persons:
Mr. N. Desai
Mr. P. Najlis
Mr. Jorgen-Holz
United Nations Plaza
New York, N.Y. 10017
U.S.A.

EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT
Principal Contact Person:
Mr. J. De Larosieve
1 Exchange Square
London EC2A 2EH
United Kingdom

DEUTSCHE GESELLSCHAFT FÜR TECHNISCHE ZUSAMMENARBEIT (GTZ) GmbH
Principal Contact Person:
Mr. W. Hamacher
Wachsbleiche 1
5300 Bonn 1
Germany

ENVIRONMENTAL HEALTH PROJECT
Bureau of Research and Devevelopment
Agency for Int'l Development
Principal Contact Person:
Mr. D. Carroll
Washington D.C. 20523-1817
U.S.A.

FOOD AND AGRICULTURAL ORGANISATION
Principal Contact Person:
Mr. A. Kandiah
15 Via della Terme di Caracalla
00100 Rome Y 10017
Italy

INTERNATIONAL ASSOCIATION ON WATER QUALITY
Principal Contact Person:
Mr. A. Milburn
1 Queen Anne's Gate
London SW1H 9BT
United Kingdom

INTERNATIONAL LABOUR ORGANISATION
Principal Contact Person:
Mr. A. Konye
20 Avenue Appia
1211 Geneva 22
Switzerland

INTERNATIONAL RESEARCH & TRAINING INSTITUTE FOR THE ADVANCEMENT OF WOMEN FOR THE UNITED NATIONS (INSTRAW)
Principal Contact Person:
Ms. M. Shields
P.O. Box 21747
Santo Domingo
Dominican Republic

IRC INTERNATIONAL WATER AND SANITATION CENTRE
Principal Contact Person:
Mr. J.M.G. van Damme
P.O. Box 93190
2506 AD The Hague
The Netherlands

NORWEGIAN AGENCY FOR DEVELOPMENT COOPERATION
Principal Contact Person:
Ms. M. Gleditsch
P.O. Box 8034
0300 Oslo 1
Norway

OVERSEAS DEVELOPMENT ADMINISTRATION
Principal Contact Persons:
Mr. J. Hodges
Mr. H.B. Jackson
94, Victoria Street
London SW1E 5JL
United Kingdom

OXFAM
Principal Contact Persons:
Mr. D. Bryer
Mr. B. Fawcett
274 Banbury Street
Oxford OX2 7D2
United Kingdom

RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEUHYGIENE (RIVM)
Principal Contact Person:
Mr. R.B.J.C. van Noort
Mr. H. van Schaik
P.O. Box 1
3720 BA Bilthoven
The Netherlands

SAVE THE CHILDREN
Principal Contact Person:
Mr. J. Bausch
54, Wilton Road
Westport, Conn. 06880
U.S.A.

SWISS DEVELOPMENT COOPERATION
Principal Contact Person:
Mr. P. Peter
Eigirstrasse 73
3003 Berne
Switzerland

UNITED NATIONS CENTRE FOR HUMAN SETTLEMENTS
Principal Contact Person:
Mr. J.B. Hyland
P.O. Box 30030
Nairobi
Kenya

UNITED NATIONS COMMISSION FOR SOCIAL DEVELOPMENT
c/o ECOSOC
Principal Contact Person:
Mr. J.V. Acakpo-Satchivi
U.N. Building
New York, N.Y. 10017
U.S.A.

UNITED NATIONS DEVELOPMENT PROGRAMME
Principal Contact Person:
Mr. F. Hartvelt
1 United Nations Plaza
New York, N.Y. 10017
U.S.A.

UNITED NATIONS ENVIRONMENT PROGRAMME
Principal Contact Person:
Mrs. E. Dowdeswell
P.O. Box 30552
Nairobi
Kenya

UNITED NATIONS HIGH COMMISSION FOR REFUGEES
Principal Contact Person:
Ms. Sadako Ogata
P.O. Box 2500 Dépôt
CH-1211 Geneva 2
Switzerland

UNITED NATIONS CHILDREN'S FUND
Principal Contact Person:
Mr. G. Ghosh
3 United Nations Plaza
New York, N.Y. 10017
U.S.A.

UNITED NATIONS POPULATION FUND
Principal Contact Persons:
Dr. S. Sadik
Mr. A. Jorgensen-Dahl
220 E 42nd Street
New York, N.Y. 10017
U.S.A.

US AID
Principal Contact Person:
Mrs. M. Shovlin
515, 22nd Street N.W.
Washington, D.C. 20003
U.S.A.

WATER AID
Principal Contact Persons:
Mr. D. Collett
Mr. M. Robinson
1 Queen Anne's Gate
London SW1 9BT
United Kingdom

WATER SUPPLY AND SANITATION COLLABORATIVE COUNCIL
c/o WHO
Principal Contact Person:
Mr. R. Wirasinha
20 Avenue Appia
1211 Geneva 27
Switzerland

WORLD HEALTH ORGANISATION
Principal Contact Person:
Dr. W. Kreisel
Dr. D. Warner
20 Avenue Appia
1211 Geneva 27
Switzerland

WORLD BANK
Principal Contact Person
Mr. J. Briscoe
1818 H. Street
Washington D.C. 20433
U.S.A.

WORLD METEOROLOGICAL ORGANISATION
Principal Contact Person:
Mr. J.C. Rodda
Casa Postale No. 2300
Ch-1211 Geneva 27
Switzerland

WORLD VISION INTERNATIONAL
Principal Contact Persons:
Mr. G. Irvine
Dr. S. Commins
919 W. Huntington Drive
Monrovia, Calif. 91016
U.S.A.

List of Resource Persons

Prof.Dr. G.J.F.R. Alaerts
International Institute for Infrastructural Hydraulics and Environmental Engineering
P.O. Box 3015
2501 DA Delft
THE NETHERLANDS

Mr. W. Ankersmit
Ministry of Foreign Affairs
P.O. Box 20061
2500 EB The Hague
THE NETHERLANDS

Ms. Raquel Alfaro Fernandois
General Manager
Santiago Water & Sanitation Company
Avenida Bulnes 129
Santiago
CHILE

Mr. Ingvar Andersson
Infrastructure Division
SIDA
S 10525 Stockholm
SWEDEN

Mrs. Diana Arboleda
International Training Network (Philippines)
4th Floor LWUA Building
Katsysuman Road
Barara, Quezon City
PHILIPPINES

Mr. Saul Arlosoroff
Zafrif Weinstein
4, Levitan Street
16, Tel Aviv 9204
ISRAEL

Dr. S. Bergen
Consulting Engineers GITEC
P.O. Box 320446
40419 Düsseldorf
GERMANY

Mr. R.G.B. Beswick
P.O. Box 1104G
Grand Cayman
BRITISH WEST INDIES

Dr. Martin Beyer
84, Jefferson Road
Princeton, J.J. 80540-3301
U.S.A.

Prof. A.K. Biswas
IAWQ
76, Woodstock Close
Oxford, OX2 8DD
UNITED KINGDOM

Mr. Joep Blom
DST/TA
Ministry of Foreign Affairs
P.O. Box 20062
2500 EB The Hague
THE NETHERLANDS

Mr. John J. Boland
John Hopkins University
Dept. of Geography & Env. Engineering
Baltimore, Maryland 21218
U.S.A.

Dr. R.A. Boydell
Regional Manager
UNDP/WB Water & Sanitation Program
c/o World Bank
P.O. Box 1324/JKT
Jakarta 12940
INDONESIA

Prof. D.J. Bradley
Director
London School of Hygiene and Tropical Medicine
Keppel Street (Gower Street)
London WC1E 7HT
UNITED KINGDOM

Mr. B. Brandberg
SBI-Consulting
Rattaregarden
P.O. Box 217
53030 TUN
SWEDEN

Mr. John Briscoe
Division Chief
World Bank
1818, H-Street N.W.
Washington DC 20433
U.S.A.

Ms. Borjana Bulajich
INSTRAW
Cesar Nicolas Penson 102-A
Santo Domingo
DOMINICAN REPUBLIC

Dr. Sandy Cairncross
United Nations Children's Fund
01 B.P. 3420
Ouagadougou
BURKINA FASO

Minister J.G. Cardoso
Minister of Natural Resources
P.O. Box 399
Bissau
GUINEA BISSAU

Dr. M.A. Chitale
Secretary General
Intl.Commission on Irrigation & Drainage (ICID)
48, Nyaya Marg, Chnakyapuri
New Delhi 110-021
INDIA

Mr. Brian W. Christmas
New Zealand Communicable Disease Centre
P.O. Box 50348
Porirua
NEW ZEALAND

Ms. Rekha Dayal
UNDP/WB Water & Sanitation Program
Regional Water & Sanitation Group-South Asia
53, Lodi Estate
New Delhi 110003
INDIA

Mr. R.H. Dekker
Ministry of Transport and Public Works
P.O. Box 20906
2500 EX Th Hague
THE NETHERLANDS

Dr. J.H. Dewaide
Ministry of Housing, Physical Planning and Environment
P.O. Box 300945
2500 GX The Hague
THE NETHERLANDS

Dr. K. Erbel
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
Postbus 5180
D065726 Eschborn
GERMANY

Mr. S.A. Esrey
Nutritional Epidemiology
MacDonald College of McGill University
21.111 Lakeshore
Ste-Anne-de-Bellevue, Quebec H9X 1C0
CANADA

Professor R.G.A. Feachem
London School of Hygiene and Tropical Medicine
Keppel Street (Gower Street)
London WC1E 7HT
UNITED KINGDOM

Mr. T.G. Fowler
University of Witwatersrand
Private Bag 3
Wits 2050
Johannesburg
SOUTH AFRICA

Mr. Richard Franceys
Water, Engineering and Development Centre
Lobourough University
Leichestershire LE11 3TU
UNITED KINGDOM

Mr. H.M. Garn
Economic Adviser
World Bank
1818, H-Street N.W.
Washington D.C. 20433
U.S.A.

Dr. David Grey
Hydrology Group
British Geological Survey
McClean Building
Crowmarsch Gifford
Wallingord, Oxon OX10 8BB
UNITED KINGDOM

Mr. B. Grover
Chief, Water Sector
Canadian International Development Agency
200, Promenade du Portage
Hull, Quebec K1A O94
CANADA

Mr. A. Hajji
Chief Engineer
National Office of Potable Water
Rue Ogba 28, Agdal
Rabat
MOROCCO

Mr. S.A. Hajost
Environmental Defense Fund
1895, Connecticut Ave, N.W. 10th Fl.
Washington D.C. 20009
U.S.A.

Dr. Richard Helmer
Division of Environmental Health Engineering
WHO
1211 Geneva 27
SWITZERLAND

Mr. J.A. Hueb
World Health Organization
CH-1211 Geneva 27
SWITZERLAND

Mr. John Huyler
Keystone Center
P.O. Box 8606
Keystone, Colorado 80435-7998
U.S.A.

Mr. B. Jansen
Aquanet
P.O. Box 70
2280 AB Rijswijk
THE NETHERLANDS

Mr. J.G. Janssens
Eric Sasselaan 7, bus 2
B-2020 Antwerp
BELGIUM

Dr. Richard Jolly
Deputy Executive Director UNICEF
3, U.N. Plaza
New York, N.Y. 10017
U.S.A.

Mr. R. Jost
International Secretariat for Water
48, Rue le Royer Ouest
Montreal, Quebec
CANADA H2Y 1W7

Mr. Patric Kahangire
Directorate of Water Development
P.O. Box 20026
Kampala
UGANDA

Mr. John Kalbermatten
Kalbermatten Associates Inc.
3630, Garfield Street N.W.
Washington D.C. 20007-1443
U.S.A.

Dr. Tapio Katko
Tampere University of Technology
P.O. Box 600
SF-33101 Tampere 10
FINLAND

Dr. Peter Kolsky
London School of Hygiene & Tropical Medicine
Ross Institute of Tropical Hygiene
Keppel Street (Gower Street)
London WC1E 7HT
UNITED KINGDOM

Mr. R.H.F. Kreutz
The Netherlands Waterworks Association (VEWIN)
P.O. Box 70
2280 AB Rijswijk
THE NETHERLANDS

Prof. Heino Levald
Sutsiste St. 21
EE 00108 Tallin
ESTONIA

Ms. Mary-Ellen Lowe
UNDP Office for Europe
Palais des Nations
CH-1211 Geneva 10
SWITZERLAND

Mr. T. Lundqvist
Linkoping University
S-58183 Linkoping
SWEDEN

Ms. Diana Macharia
Environment Liaison Centre International P.O. Box 72461
Nairobi
KENYA

Mr. Vladimir L. Maksimchouk
Zelenyi Svit
Ukrainian Environmental Assoc.
Contractova Sg.4
KIEV-70.252070

UKRAINEMr. M. McGarry
Cowater International
411, Roosevelt Ave., Suite 304
Ottawa, K2A 3X9
CANADA

Mr. Th.G. Martijn
The Netherlands Waterworks Association (VEWIN)
P.O. Box 70
2280 AB Rijswijk
THE NETHERLANDS

Mr. E. Matser
Association for Nature and Environment
Donkerstraat 17
3511 KB Utrecht
THE NETHERLANDS

Mr. Anthony Milburn
Executive Director
International Association on Water Quality
1, Queen Anne's Gate SW1H 9BT
London
UNITED KINGDOM

Prof. L. Msukwa
Centre for Social Research
P.O. Box 274
MALAWI

Mrs. M. Mwangola
Executive Director
Kenya Water for Health Organization
P.O. Box 40128
Nairobi
KENYA

Prof. K.J. Nath
All India Institute of Hygiene and Public Health
110 Chittaranjan Avenue
Calcutta - 700073
INDIA

Dr. Letitia Obeng
P.O. Box C223
Accra
GHANA

Ms. E.A. Okeke
Federal Ministry of Water Resources
Garki, Abuja
NIGERIA

Dr. Atanas Paskalev
Union of Scientists in Bulgaria
35, Oborishte Street
Sofia 1504
BULGARIA

Mr. John Pickford
Water, Engineering & Development Centre
Loughborough University of Technology
Leicestershire LE11 3TU
UNITED KINGDOM

Mr. R.W. Pollard
Senior Environmental Adviser
UNDP/WB Water and Sanitation Program
c/o World Bank
P.O. Box 324/JKT
Jakarta 12940
INDONESIA

Mr. T. Ramjeawon
University of Mauritius
Faculty of Science
Reduit
MAURITIUS

Dr. J.C. Rodda
Director
Hydrology and Water Resources Department
World Meterological Organization
CASA Postale No. 2300
CH-1211 Geneva 2
SWITZERLAND

Mr. Sanjit (Bunker) Roy
Director
The Social Work & Research Centre
Tilonia 305816
Madanganj, Dist.-Ajmer
Rajesthan
INDIA

Ms. Vida Rutkoviene
Chairwoman of the ICSDW
Lithuanian Agricultural Academy
4324 Kaunus Academ
LITHUANIA

Mr. F.L. Schlingemann
Ministry of Foreign Affairs
P.O. Box 20061
2500 EB The Hague
THE NETHERLANDS

Mr. Gunnar Schultzberg
Regional Manager RWSG-EA
UNDP/WB Water and Sanitation Program
P.O. Box 30577
Nairobi
KENYA

Ms. Indrani Sen
Joint Secretary
Ministry of Urban Development
Room 126, C Wing, Nirman Bhawan
New Delhi 110 001
INDIA

Mr. A. Sendama Mulashi
Executive Director
African Water Network
P.O. Box 10538
Nairobi
KENYA

Mr. H. van Schaik
RIVM
P.O. Box 1
3720 BA Bilthoven
THE NETHERLANDS

Prof. L. Somlyódy
International Institute for Applied Systems Analysis (IIASA)
A-2361 Laxenburg
AUSTRIA

Mr. O. Starosolszky
Water Resources Research Centre (VITUKI)
Kvassay Jeno ut. 1
H-1095 Budapest
HUNGARY

Dr. Paul Taylor
Director
P.O. Box 2960
Harare
ZIMBABWE

Ms. Camila Toulmin
International Institute for Environment and Development
3, Endsleigh Street
London WC1H 0DD
UNITED KINGDOM

Mr. Cheikh Toure
Director
Centre Regional pour l'Eau Potable et l'Assainissement à Faible Coût
B.P. 7112
Ouagadougou 03
BURKINA FASO

Mr. P.J. Verkerk
Ministry of Housing, Physical Planning and Environment
P.O. Box 30945
2500 GX The Hague
THE NETHERLANDS

Mr. Philip Wan
Chief Water Section
United Nations Children's Fund
P.O. Box 58
Dhaka-5
BANGLADESH

Dr. G. Watters
WHO
CH-1211 Geneva 27
SWITZERLAND

Dr. Gilbert White
Natural Hazards Research and Applications Information Center
University of Colorado
Campus Box 482
Boulder, Colorado 80309
U.S.A.

Mr. Ranjith Wirasinha
Executive Secretary
WSSS Collaborative Council
c/o WHO
CH-1211 Geneva 27
SWITZERLAND

Dr. Albert M. Wright
UNDP/World Bank Water & Sanitation Programme
1818H Street, N.W
Washington, D.C. 20433
U.S.A.

Mr. J. Zeper
Platolaan 33
3707 GB Zeist
THE NETHERLANDS

Production: Dick de Jong, IRC International Water and Sanitation Centre, The Hague, The Netherlands
Design: Martijn Reeser bNO
Pre press: Studio Andela
Photographs: Hollandse Hoogte/Wijnbergh
Martijn Reeser bNO
Reproduction: VROM-Repro

This paper is printed on environmentally-friendly paper

ROUND  TABLE
on Water and Health
in underprivileged urban areas

THE SOPHIA ANTIPOLIS RECOMMENDATIONS

FEBRUARY 21-22-23 1994

SOPHIA ANTIPOLIS, FRANCE

for more information :
MINISTERE DE L'ENVIRONNEMENT
20, Avenue de Ségur 75302 PARIS 07 SP, FRANCE
Geneviève VERBRUGGE / Philippe GUETTIER
TEL : (33) 1 42 19 17 75 / (33) 1 42 19 12 37
FAX : 42 19 17 72 / 42 19 12 06

THE SOPHIA ANTIPOLIS RECOMMENDATIONS

Given the rapid increase of underprivileged populations in the periphery of large urban settlements in the developing countries and the countries in transition, the question of access to wholesome water requires high priority in view of its impact on the health, and often even the survival, of these populations, particularly the children.

Examining this issue in light of concrete experiences presented by some one hundred participants from all regions of the world, the Round Table has emphasized the following principles and the annexed conclusions of the four workshops. These principles should serve to guide the actions of the responsible authorities at all levels, as well as of donor agencies, and should be examined by those in charge of the implementation of the environmental and sustainable development programmes following the guidelines of Agenda 21 adopted at the Earth Summit (Rio 1992), in particular by the Ministerial Conference in Noordwijk and the United Nations Commission on Sustainable Development.

1• ALL HUMAN BEINGS, REGARDLESS OF THEIR LIVING CONDITIONS OR RESOURCES, HAVE AN INALIENABLE RIGHT TO DRINK WHOLESOME WATER.

2• The satisfaction of the fundamental needs of the populations of underprivileged urban areas, for drinking water and sanitation must be integrated with the public health and urban development policies implemented by the public authorities.

3• Only the determined commitment of Governments and the active participation of citizens can help solve these urgent issues. To achieve this purpose, a major communication and awareness-building effort must be undertaken very soon.

4• In order to combat exclusion, access to drinking water and sanitation needs to be underwritten by legal rights and duties to guarantee both a fair distribution of this scarce resource, of the benefit of the investments and of the burden of their financing and the proper maintenance of the installations.

5• The economic value of water must take into account its value in use. The lasting nature of investments in the water and sanitation sector requires that the beneficiaries should meet the corresponding costs. Redistribution mechanisms between the different strata of urban populations are needed. Some degree of subsidy may however be required.

6• In order to maximize the achievement of health goals, water supply and sanitation must be part of an approach which is integrated, realistic and participatory.

7• Services offered must cover basic needs while ensuring satisfactory health protection.

8◆ Solutions to the issues discussed must take into account an evolutionary context, characterized by greater decentralization and increased responsibilities for the local agents: municipalities, service providers, public and private firms, both large and small, and community leaders, both men and women, as well as NGOs. This new sharing of tasks must not relieve the state of its general and regulatory responsibilities

9◆ Partnerships linking these agents constitute an essential instrument for equitable access to wholesome water and to sanitation for all components of the population of underprivileged urban areas. The relationships between them and the definition of their respective functions must be clarified and organized possibly in the form of agreements so as to take into account the social and cultural context of each region.

10◆ Technical solutions should not be considered as a starting point but as the result of a process integrating other social, environmental, cultural, economic and institutional dimensions involving all the agents.

11◆ Coordination, training and information must accompany the identification and implementation of adaptable technologies.

12◆ Significant efforts are needed, involving a truly participatory approach, in the fields of evaluation, research and the production and dissemination of qualitatively satisfactory basic data, particularly in Southern countries.

13◆ The current tendency of donor agencies to give priority to the financing of heavy equipment in the center of cities must be rebalanced in favor of peripheral areas and smaller towns. Supplementary financing in significant amounts has to be mobilized in order to meet the needs of the poorest and to generate sustainable development.

14◆ As far as concerns the forms wich international cooperation can take, it is helpful to encourage more partnerships between local authorities,professional organizations and non-governmental organisations. These partnerships complement intergovernmental cooperation and give it a dimension which is extremely close to the concerns of the citizens of the communities of the South and East.

Sophia Antipolis, February 23, 1994.

◆◆◆◆◆◆◆◆◆◆

Thirst for life Soif de vie Sed de vida

CONCLUSIONS

I

INSTITUTIONAL PROBLEMS

A - Factual observation

Although real progress has been made in terms of knowledge of water resources, and of water production methods, of water transportation and supply, most city dwellers, particularly in developing countries, do not have access to drinking water. From this stand point, most large cities will face a water crisis at the beginning of the next century, in spite of the large international mobilization demonstrated during the Water and Sanitation Decade.

This water crisis is the result of consumption and management patterns which cause the resource to be wasted, discrimination in access to water and the marginalization of a larger and larger portion of the population, in particular in peri-urban areas of mega-cities.

Institutions in the water sector are largely responsible for social, economic and technical problems that plague the populations of the sub-urban areas. These institutions must be the primary targets of the following recommendations.

B - Core principles

These changes must be conducted according to the following principles:

1• The right to healthy water and safe sanitation systems must be guaranteed for all. All societies have a duty to provide access to water at an acceptable cost. Depriving people of their right to water should be interpreted as depriving them from their right to live and from full citizenship. Consequently, access to water in peri-urban areas must not be conditioned on land tenure and other contingencies.

2• Access to water must be equitable; the demand for water is diversified, with conflicting interests that can be either contrary or incompatible. Consequently, water is a source of power. All demands and all interests must be a part of decisions concerning use and allocation of the resource. Conflict resolution mechanisms must be set-up at the local, national and international levels.

3• Access to water for all does not mean free access for all. On the contrary, access to water must be organized within the framework of a system of rights and obligations of the various actors. This does not preclude the necessary solidarity which must be organized in order to allow the entire population to be supplied, irrespective of its means.

4• In order to ensure a sustainable approach to water problems, water resource conservation and efficient management systems must be set-up. Greater attention must be given to the consideration of the long-term stakes involved in short and medium term decision-making. Consistent policies should be implemented that integrate water problems into the planning and management of urban and regional areas.

In managing the resources, the Administrative Authorities must make certain that water users do not compromise the rights of future generations, nor encroach on the rights of up-stream populations.

5• All the actors involved in water management must be accountable for their actions. Thus, the following must be ensured:

→ free access to information on water volume and quality,
→ transparency in management of the service at every level of operation,
→ every actor involved be subjected to the same rules when services are provided by several actors,
→ the implementation of efficient control mechanisms, regardless of the status of the service providers.

In sum, conducting the necessary changes implies defining a new institutional arrangement based on a new partnership among the various actors involved: the state, the local authorities, the service providing companies, the NGOs and the grassroot communities. Institutional reforms to be undertaken must be adapted to the various situations and take into account current cultural practices. These reforms must also be designed so that the projects in the peri-urban areas contribute to change in the normal management structures. Finally, they must be integrated with larger reforms in zoning and city management aimed at avoiding the spread of uncontrolled human settlements.

C - Recommendations

In redefining and clarifying the role of the actors, global water supply management and user supply must be distinguished.

1• Regarding the volume and quality management of the resource, the Workshop recommends referring to the consistent physical framework of the watershed and so to establish institutions with jurisdiction over the management of the entire water cycle and its uses. The setting-up of watershed authorities which may eventually obtain cross-border jurisdiction, if need be, must be encouraged in all the regions of the world.

In the absence of watershed authorities, the Workshop recognizes that the state has a major role to play in allocating water among the various users and in guaranteeing that these allocations are respected. To play this role efficiently, the state must set-up consultation and arbitration mechanisms.

2• Regarding the supply of water to the users, the Workshop recommends acknowledging the diversity of services and suppliers that more adequately meet the diversity in demand than a monopolistic organization of the water sector. In view of the multiplicity of the actors involved, the workshop recommends that the Public Authorities define precisely the prerogatives and missions of each party involved. As much as possible such coordination and structuring must be done within the scope of contracts which allow for monitoring the quality of the execution of these missions. These contracts must be implemented, depending on the extent of the problems involved, by the State or the local authorities.

3• In order to achieve rapid results, and because of the urgency, the Workshop recommends broadening the specifications of the services provided by the companies, to include areas beyond those covered by water supply networks and to integrate the partnerships with municipalities and local groups.

4• The workshop recommends encouraging the establishment of professional organizations of service providers and user associations. The former must help, through internal training, their members become more aware of peri-urban issues, and of the technical and organizational innovations implied, the latter must become recognized and informed representatives.

5• Given the essential role played by women in daily water and sanitation management and preserving the health of the family, the Workshop recommends that a proportional number of women be present in the institutions in charge of water issues.

6• Following the decentralization process, municipalities have been given new powers in the area of water and sanitation. The municipalities serve as mediators, supervising the relationships between the service providers and the population, negotiating projects, arbitrating conflicts among the water users and between long-term and short term demands at the local level. Considering the scope of these new tasks, the Workshop recommends that greater attention be given to capacity-building for the municipalities and that they be given broader jurisdiction to exercise these new powers and responsibilities.

7• The Workshop recommends the implementation of structures and mechanisms for dealing with emergency situations due to risks in connection with water or a lack of sanitation, in particular in the poor areas of large cities.

8• In order to guarantee the acceptance of reforms, sizable information campaigns should be undertaken. The Workshop recommends that all the actors involved: the public authorities, the communities, the associations and the private sector, must take initiatives towards this end.

□□□□□□□□□□

HEALTH, HEALTH EDUCATION AND PARTICIPATION OF THE POPULATION

A - Introduction

The coordination of awareness campaigns and the involvement of communities in underprivileged urban areas are two major aspects of the problem.

These two goals are closely related to the way communication is set-up between the various actors involved in water and health. The public authorities, water and health professionals and the populations concerned represent the three groups within which and among which communication must be encouraged. Within this context, the assessment of changes in behavior concerns users as well as professionals.

Moreover, little is known of the health conditions in underprivileged urban areas and environmental protection appears to be obviously linked with drinking water supply and sanitation.

This is why the recommendations concern all the actors and are centered around three issues: dissemination and organization of information, involvement of the communities, water quality control and assessment of the sanitary impact.

B - Recommendations

1• States must endeavor to ensure a steady supply of drinking water and sanitation in the underprivileged urban areas and to abide by the World Health Organization's guidelines as much as possible.

2• It is essential to ensure that communication exists between the various groups concerned with water and health..To be efficient, the dissemination of the health "message" must involve the whole population as well as the public authorities.

3• Efficiency must be the determining factor in choosing the most appropriate method to disseminate information.

4• The population of underprivileged urban areas must be involved in activities from the design to the implementation stage, so that local practices and beliefs are taken into account. To do this, the methods, techniques and tools that exist and those that have been adapted to determine the health behavior patterns of the populations involved, must be applied.

5• The health message must associate environmental protection with drinking water supply and sanitation.

6• Dialogue and participation must always accompany the use of technologies required to solve water-related health problems.

7• Governments must allow for populations to become responsible without relieving public authorities from their own responsibilities.
NGOs, in addition to their role as mediators, must ensure the long-term durability of this commitment.

8• A partnership among the various actors: community organizations, NGOs, universities and researchers, water professionals and companies, public authorities, international organizations, is essential for developing a multidisciplinary approach.

9• In order to analyze, ensure the dissemination and take advantage of the actions undertaken by the communities in the underprivileged urban areas, national "water resource centers" must be established, while taking into account, as much as possible, existing structures.
These structures will serve as sources of information and support for the various partners.

10• Governments must commit themselves to build laboratories for water quality control :

- these will be adapted to the social and economic context,
- will be closely linked to the resource centers,
- must carry out an assessment of the various forms of pollution,
- and implement appropriate treatments.

11• Appropriate epidemiological surveys must be developed in the poorest communities to measure the impact of the different pollution sources on population health.

12• Assessment of these actions must be undertaken, focusing on the changes in health behavior and on the dissemination of the results.
Funding organizations must contribute to the assessments and take them into account.

□□□□□□□

APPROPRIATE TECHNOLOGIES AND KNOW-HOW

A wide consensus has emerged to recognize that technical solutions must not be considered as a starting point but as the result of a process integrating other social, environmental, cultural, economic and institutional dimensions. Their adaptation to the context requires new know-how, multidisciplinary and multi-sector based approaches, in essence a dialogue of experiences and knowledge, which is difficult to implement and for which technicians are not well prepared. Textbook solutions, which the populations must be made to accept and pay for, are not the answer anymore.

This approach requires better coordination among solutions offered at the following various levels: domestic and collective, economic and technical , drinking water supply and sanitation, basic research and development , state and the community.

Regarding drinking water supply, the standard urban model is outdated as to its standards and its organizational design: more flexible alternatives are available for production, distribution and management. What is important is that supply be adjusted to demand, expressed as a level of service for a given cost.

We emphasize the strong influence of technical choices on investment and operating costs, all the more so considering the low income levels of the populations of the sub-urban areas. Establishing a specific policy for supplying water to underprivileged urban areas should precede the selection of technical options.

Multiple water supply sources must be accepted and even encouraged, in particular depending on the type of water use, as well as the multiplicity of distribution modes, while remaining very strict on the quality of the water supplied.

At the same time, the dissemination of individual drinking water production systems will be studied and encouraged, in the areas where these may be justified.

Investments in the drinking water supply sector will have little effect on health if **sanitation** is not taken into consideration, all the more so since the underprivileged populations are relegated to the most unsanitary districts or to areas with steep slopes or which are subject to flooding. More generally, the goal is even to attempt to improve the quality of life of the populations through environmental protection: natural

resources conservation, expanded use of low-water using sanitation systems in high-income areas, leakage control, reuse of waste-water, solid-waste recycling and other clean technologies...

A integrated approach must be adopted which simultaneously deals with water and sanitation, implying the training and implementation of multidisciplinary teams.

Technical solutions must be adapted to a changing situation, characterized by more **decentralization** and more **responsibilities** given to the local actors: municipalities, formal and informal service providers, community leaders, both women and men, and NG0s.

This new sharing of tasks must not deprive the state of its overall responsibility, in particular of its mission to guarantee the right to water for all. With this objective, the state must promote more flexible standards and solutions. This delegation of responsibilities will require implementing control mechanisms adapted to each level of responsibility. The community must be allowed to participate in the technical choices and in management and control.

The implementation of this new strategy requires that a substantial effort be made in the field of **information, research and training.** The importance of high quality data production, acquisition and analysis must be emphasized.

Additionally, many projects have been achieved in the peri-urban areas over the last fifteen years. Few detailed assessments of these projects have been made or published.

Therefore, the following should be done:

• these assessments must be carried out, and new projects must be defined based on the results; as soon as they are launched, current projects must be systematically documented and the findings must be made available to engineers, technicians, users, scientists and university researchers within a broad context, in particular South-South cooperation. These exchanges must be based on establishing or strengthening the information and research means of the national centers.

• the development of multidisciplinary research in particular in technical and social areas (rain-water, techniques without chemical products, individual or local water potabilization systems, knowledge of the user habits...)

• the development of training or continuing education programs for engineer and technicians.

□□□□□□□□

FINANCIAL MEANS

A - The righth to drinking water

Water is an essential need and the right to drinking water for all was recognized. This right must be achieved through a fairer allocation in the supply of this rare resource, of investments and their financing, and by observing that the supply of water to underprivileged areas must not be isolated from the global issue of the urban economy.

The long-term durability of investments in the water sector (from drinking water production to waste water discharge in a manner which is compatible with the quality of the environment) requires that the beneficiaries pay for all (or most of) the costs involved: operation, maintenance, replenishment and, at the same time, an involvement of the beneficiaries in the design and implementation of the projects. Partial subsidies may prove necessary in the underprivileged areas, as long as the major budgetary balances are not destabilized.

More specifically, in the underprivileged urban areas, projects must be developed through a participatory approach with the populations involved, in particular concerning women who are in charge of supplying water to their families. This approach which transforms the beneficiaries into the actors of their own development, must cover: demand

identification and analysis, financial solvency assessment, choice of technical solutions, operation methods and cost recovery. Such a participatory involvement requires prior financing and the workshop recommends that the funding organizations agree to offer specific financing, considering their innovative and indispensable nature.

Water for everyone does not necessarily mean individual supply for all (an unattainable standard under current conditions) but the generalization of an "acceptable" quality service (i.e., a drinking water point of supply located within a reasonable distance of dwellings).

When the inhabitants already have access to free water, the supply of drinking water is not recognized as a priority, even if the water used free of charge is of poor quality (polluted river, lagoon, marsh). In these instances, the workshop recommends promoting improved low cost water points from these poor water supplies, enabling an improvement in the quality of the service furnished.

B - Cooperation

Solidarity systems must be established in order to finance quality water supply services:

- ***technical*** : by improving network performance in city centers, freeing larger volumes of water for the outer limits of the networks.

- ***financial*** : by rate adjustments, lowering the "survival" costs for the poorer (this presupposes that the fees are sufficient to ensure financial stability of the sector as a whole, and that it be adapted to the life styles).

- by allocating ***tax resources*** to priority community investments (water supply but mostly sanitation).

C - Funding

Regarding funding, the workshop recognized the existence of a variety of resources, the major problems being their mobilization in order to meet the needs of the beneficiaries: families, associations, local communities. The following were identified :

- "informal" monetary flows
- availability of loans from credit-unions or banks,
- local community or state budgets,
- contributions from financial institutions...

The problems identified involve:

- the mobilization of local savings,
- the interface between actors and funders (selection and technical formulation of feasible projects),
- the adaptation of external financial procedures to economic and social realities (status of the borrower, guarantees, eligibility of the actions)

It was also noted that the broadening of the range of actors operating in the sector allows for access to new financial resources; For example, the intervention of the private sector through contracting out or concessions allows for access to private sector financing, but this presumes, at the outset, that the real costs be known and a favorable legal framework.

In the same spirit, an important path must not be forgotten: water and sanitation, now considered as economic assets, must have a structure-building function, i.e., create jobs, promote new demand and become a source of savings for financing community project, in priority in the area of health.

A water supply system which is capable of growing in the long-term could be proposed to and discussed with the population (collective water supply points which can later be connected to the main network, gradual increase in service quality standards). This approach should allow for the mobilization of the beneficiaries capacity to contribute, as an alternative to the usual public funding. Public funds can thus better serve to incite, motivate, coordinate and enforce building and operational standards (water quality).

D - Sanitation

Regarding sanitation, the workshop recommends the following:

to associate water supply projects with waste water discharge and add the corresponding costs to each user's bill as soon as a sewer installation is planned in the user's street. Moreover, it is recommended that individual sanitation be improved in the peri-urban areas;

- to allocate to the non-commercial public services the public funding (and externall funding) of community investments, such as solid waste treatment and sanitation, which benefit the entire community but are not very compatible with individual billing;

- to systematically include educational, hygiene and health aspects in water and sanitation investment projects, in order to promote mulitidisciplinary work in the public services and in the field.

However, the mobilization of funding for urban sanitation is difficult. The suitability of regrouping the various resources in a common intervention fund for urban sanitation was mentioned. This joint funding for the benefit of the underprivileged urban areas can only be efficient when decentralization allows for technical and financial decisions to be made by the users. This funding would then increase the institutional leeway in solving public health and urban sanitation problems, according to local priorities.

E - General recommendations

The lack of current experience in the area of sanitation requires that a special effort be made in surveying and emphasizing on-going actions; likewise, the methodology for the participation of the users and experiments in real cost recovery must be the subject of wide dissemination, not limited to the projects' designers and funders, but directed towards the populations using these services.

The current trend of financing in priority large facilities in town centers must be balanced in favor of peri-urban areas and secondary towns. Further funding must be mobilized to meet the needs of the poor and towards balanced land use development.

National and external public funding must be allocated in priority to sanitation, the least profitable sector, considering that the private sector can intervene in sectors which can be made profitable. Such funding, which is not sufficient in comparison with the enormous current needs, can be usefully directed toward what may serve as potential financial leverage: the promotion of small and medium size businesses, artisans and their technical, management and commercial training.

Waste management is often considered as a non-profitable activity. However, instances of value-enhancing have been occurring all over the world: waste water recycling, solid waste sorting, garbage composting for peri-urban agriculture... These activities will be financed in priority wherever possible (research-development, assessment and extension on a large scale), considering the basically sustainable nature of this approach.

◆◆◆◆◆◆◆◆◆

World Bank Report Series Number 469

The World Bank

Environmental priorities

for Development

and

Sanitation and Clean Water

This reprint contains part of Chapter 2 and Chapter 5 of the *World Development Report 1992: Development and the Environment*, published by Oxford University Press for the World Bank.

Chapter 2:

Environmental Priorities for Development

Setting environmental priorities inevitably involves choices. Developing countries should give priority to addressing the risks to health and economic productivity associated with dirty water, inadequate sanitation, air pollution, and landdegradation,which cause illness and death on an enormous scale.

In poor countries:

- *Diarrhoeal diseases that result from contaminated water kill about 2 million children and cause about 900 million episodes of illness each year.*
- *Indoor air pollution from burning wood, charcoal, and dung endangers the health of 400 million to 700 million people.*
- *Dust and soot in city air cause between 300,000 and 700,000 premature deaths a year.*
- *Soil erosion can cause annual economic losses ranging from 0.5 to 1.5 percent of GNP.*
- *A quarter of all irrigated land suffers from salinization.*
- *Tropical forests - the primary source of livelihood for about 140 million people - are being lost at a rate of 0.9 percent annually.*

Concern over ozone depletion continues to grow. The consequences of loss of biodiversity and of greenhouse warming are less certain but are likely to extend far into the future and to be effectively irreversible.

Environmental degradation has three damaging effects. It harms human health, reduces economic productivity, and leads to the loss of 'amenities', a term that describes the many other ways in which people benefit from the existence of an unspoiled environment. Amenities are harder to measure than costs to health and productivity but may be valued just as highly (see Box 2.1). The subject of this chapter is priorities for environmental policy: in which cases are the benefits for developing countries most likely to exceed the costs of action? Chapter 3 goes on to discuss ways to contain the costs of action by making sure that environmental policies are as cost-effective as possible, and later chapters look at such policies in greater detail.

The health of hundreds of million os people is threatened by contaminated drinking water, particulate in city air, and smoky indoor air caused by use of such cooking fuels as dung and wood. Productivity of natural resources is being lost in many parts of the world because of the overuse and pollution of renewable resources - soils, water, forests, and the like. amenities provided by the natural world, such as the enjoyment of an unpolluted vista or satisfaction that a species is being protected from extinction, are being lost as habitats are degraded or converted to other uses. Because the interaction of various pollutants with other human and natural factors may be hard to predict, some environmental problems may entail losses in all three areas: health, productivity, and amenity.

Policymakers need to set priorities for environmental policies. In both developing and industrial countries governments rightly give greatest urgency to environmental damage that harms human health of productive potential. The priorities that developing countries set for their own environment will not necessarily be those that people in richer countries might want them to adopt. Thus, although some cultures in poor countries may value their natural heritage
strongly, most developing country governments are likely to give lower priority to amenity damage as long as basic human needs remain unmet.

National priorities will vary. In Sub-Saharan Africa, for example, contaminated drinking water and poor sanitation contribute to infectious and parasitic diseases that account for more than 62 percent of all deaths – twice the level found in Latin America and twelve times the level in industrial countries. Higher-income countries have virtually eliminated these waterborne health risks, but they face other health threats because of emissions from transport and industry. The importance that societies give to different environmental problems evolves, often rapidly, in response to gains in standards of living and to other social changes. For instance, as populations age in Latin America, the share in total mortality of adult chronic and degenerative diseases will more than double and the share of infectious childhood diseases will diminish. Some of the increase in adult mortality will be a delayed response to exposure to pollution today, and in many cases preventive action now will

be cheaper than remedial measures in the future.

Water

Access to safe water remains an urgent human need in many countries. Part of the problem is contamination; tremendous human suffering is caused by diseases that are largely conquered when adequate water supply and sewerage systems are installed The problem is compounded in some places by growing water scarcity, which makes it difficult to meet increasing demand except at escalating cost.

The most widespread contamination of water is from disease-bearing human wastes, usually detected by measuring faecal coliform levels. Human wastes pose great health risks for the many people who are compelled to drink and wash in untreated water from rivers and ponds. Data from UNEP's Global Environment Monitoring Systems (GEMS) demonstrate the enormous problem of such contamination, with poor and deteriorating surface water quality in many countries.

through larger cities or industrial centres. In China, only five of fifteen river stretches sampled near large cities were capable of supporting fish. High-income countries have seen some improvement over the past decade. Middle-income countries have, on average, shown no change, and low-income ones show continued deterioration (See figure 2.1).

Water pollution from human wastes matters less in countries that can afford to treat all water supplies, and it can in principle be reversed with adequate investment in treatment systems. But water quality has continued to deteriorate even in some high-income countries.

The capacity of rivers to support aquatic life is decreased when the decomposition of pollutants lowers the amount of oxygen dissolved in the water. Unlike faecal contamination, oxygen loss does not threaten health directly, but its effects on fisheries may be economically important.

Box 2.1 Environmental damage - why does it matter?

Values to people

The costs of environmental damage to humans - which may be borne immediately or at some point in the future - are principally losses in health, productivity, and amenity. There are practical methods for evaluating such costs, but not for evaluating the fundamentally ethical issue of costs of human activity to other species.

Health. Human welfare is reduced by ill health and premature mortality caused by degradation of air and water quality and by other environmental risks. Pollutants can cause health problems through direct exposure or indirectly through changes in the physical environment - the effects of which range from increased solar radiation to lower nutrition. The links between pollutants and health have begun to be identified through epidemiological studies undertaken primarily in high-income countries; the effects are expected to be more pronounced in lower-income countries where people are less healthy and less well nourished.

Productivity. Impaired health may lower human productivity of many resources used directly by people. Water pollution damages fisheries, and waterlogging and salinization of the soil lowers crop yields.

Some productivity declines result from damage to environmental assets that people use indirectly: if forested watersheds are heavily logged, economic losses from increased downstream flooding may ensue.

Amenity. A clear vista or a clean and quit neighbourhood adds to the quality of life. Environmental assets are often valued even by people who never enjoy them directly but who cherish the thought that they exist and the prospect that future generations will enjoy them too. Such values may increase when environmental resources are unique or endangered.

Intrinsic value

Many people believe that other living things in the natural world have 'intrinsic' value separate from their value to human beings. This belief is certainly not confined to the rich; many indigenous groups strongly hold such views. No measurement of intrinsic value is possible; the best that can be done is to measure people's opinions regarding such values. Thus, intrinsic values can be captured only imperfectly and partially under the notion of amenity values.

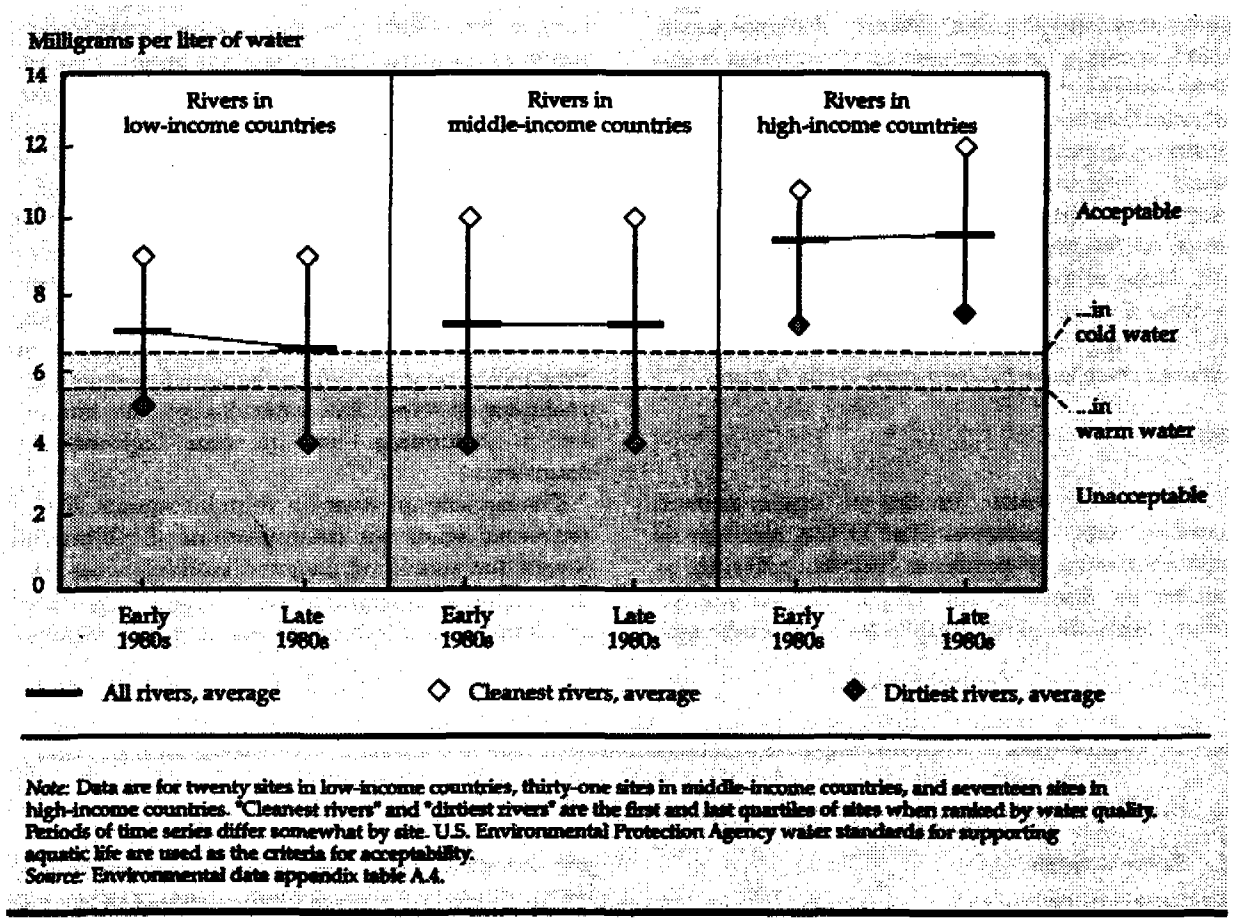
Human sewage and agroindustrial effluent are the main causes of this problem; nutrient runoff in agricultural areas with intensive fertilizer use is another contributor.

Although inadequate levels of dissolved oxygen tend to affect shorter lengths of rivers than does faecal contamination, a sample of GEMS monitoring sites in the mid-1980s found that 12 percent had dissolved oxygen levels low enough to endanger fish populations. The problem was worst where rivers passed

Where industry, mining, and the use of agricultural chemicals are expanding, rivers become contaminated with toxic chemicals and with heavy metals such as lead and mercury. These pollutants are hard to remove from drinking water with standard purification facilities. They may accumulate in shellfish and fish, which may be eaten by people who do not realize that the food is contaminated. In a sample of fish and shellfish caught in Jakarta Bay, Indonesia, 44 percent exceeded WHO guidelines for lead, 38 percent those

for mercury, and 76 percent those for cadmium. After Malaysia found that lead levels in twelve rivers frequently exceeded the national standard for safe drinking water, the country began monitoring rivers for heavy metals. During the 1980s lead also worsened or became a problem for the first time in some rivers in Brazil (Paraiba and Guandu), Korea (Han), and Turkey (Sakarya).

Figure 2.1 Dissolved oxygen in rivers: levels and trends across country income groups



Note: Data are for twenty sites in low-income countries, thirty-one sites in middle-income countries, and seventeen sites in high-income countries. "Cleanest rivers" and "dirtiest rivers" are the first and last quartiles of sites when ranked by water quality. Periods of time series differ somewhat by site. U.S. Environmental Protection Agency water standards for supporting aquatic life are used as the criteria for acceptability.
Source: Environmental data appendix table A.4.

As surface water near towns and cities becomes increasingly polluted and costly to purify, public water utilities and other urban water users have turned to groundwater as a potential source of a cheaper and safer supply. Monitoring of groundwater for contamination has lagged behind monitoring of surface water, but that is beginning to change as in many places groundwater, too, is becoming polluted. It is often more important to prevent contamination of groundwater than of surface water. Aquifers do not have the self-cleansing capacity of rivers and, once polluted, are difficult and costly to clean.

One of the principle origins of groundwater pollution is seepage from the improper use and disposal of heavy metals, synthetic chemicals, and other hazardous wastes. In Latin America, for instance, the quantity of such compounds reaching groundwater from waste dumps appears to be doubling every fifteen years. Sometimes industrial effluents are discharged directly into groundwater. In coastal areas overpumping causes salt water to infiltrate freshwater aquifers. In some towns contamination occurs because of lack of sewerage systems or poor maintenance of septic tanks. Where intensive agriculture relies on chemical inputs combined with irrigation,

the chemicals often leach into groundwater.

Water quality has continued to deteriorate despite substantial progress in bringing sanitation services to the world's population. Little has been done to extend the treatment of human sewage. The replacement of septic tank systems with piped sewerage systems greatly reduces the risks of groundwater pollution but leads to increased pollution of surface water unless the sewage is treated. yet in Latin America as little as 2 percent of sewage receives any treatment. Moreover, despite the expansion of sanitation services, the absolute number of people in urban areas without access to these services is thought to have grown by more than 70 million in the 1980s, and more than 1.7 billion people worldwide are without access (Figure 2.2).

Access to uncontaminated water has barely kept pace with population growth. Official WHO figures suggest that between 1980 and 1990 more than 1.6 billion additional people were provided with access to water of reasonable quality. In fact, however, many of those who officially have access still drink polluted water. At least 170 million people in urban areas still lack a source of potable water near their homes, and in rural areas, although access has increased rapidly in the past decade, more than 855 million are still without sage water (see Figure 2.2).

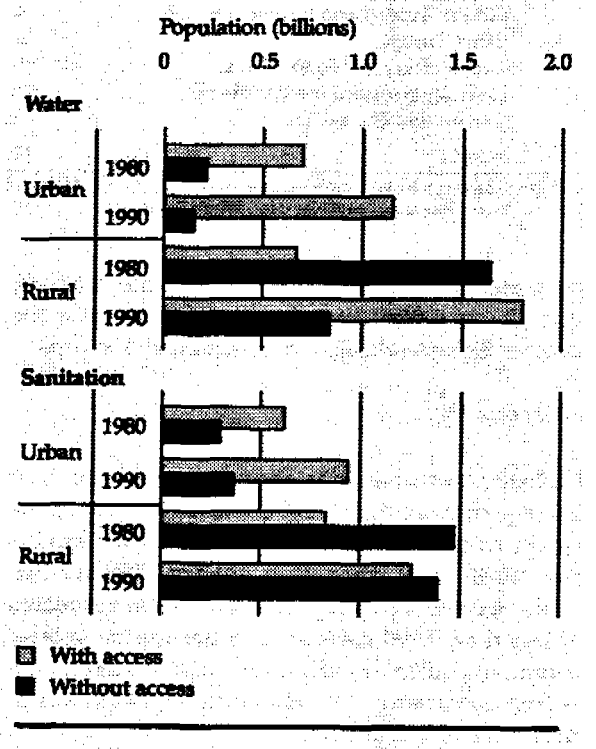
It is the poor - the woman in Niamey drawing water from an open sewage channel or the Bangladeshi child washing household utensils in a pool also used as a latrine - who bear the brunt of risks from contaminated water. The differences in access to safe water by income exist both within and across countries. The gap in access between lower- and higher-income countries has narrowed only slightly, and within countries inequities continue to be striking.

For example, a family in the top fifth income group in Peru, the Dominican Republic, or Ghana is, respectively, three, six, and twelve times more likely to have a house connection than a family in the bottom fifth income group in those countries. The rural poor are more likely to rely directly on rivers. Lakes, and unprotected shallow wells for their water needs and are least able to bear the cost of simple preventive measures such as boiling water to make it safe for drinking. In many cities in developing countries poor households in neighbourhoods unserved by the municipal water system buy water from private vendors, typically at prices several times greater than the charges for household with municipal hookups.

Figure 2.2 Access to safe water and adequate sanitation in developing countries, 1980 and 1990

More people have safe water, but urban sanitary conditions worsen

Figure 2.2 Access to safe water and adequate sanitation in developing countries, 1980 and 1990



Source: World Health Organization data.

Table 2.1 Availability of water by region

Region*	Annual internal renewable water resources: Total (thousands of cubic kilometres)	Annual internal renewable water resources: Per capita (thousands of cubic meters)	Percentage of population living in countries with scarce annual per capita resources: Less than 1,000 cubic meters	Percentage of population living in countries with scarce annual per capita resources: 1,000-2,000 cubic meters
Sub-Saharan Africa	3.8	7.1	8	16
East Asia and the Pacific	9.3	5.3	< 1	6
South Asia	4.9	4.2	0	0
Eastern Europe and former U.S.S.R.	4.7	11.4	3	19
Other Europe	2.0	4.6	6	15
Middle East and North Africa	0.3	1.0	53	18
Latin America and the Caribbean	10.6	23.9	< 1	4
Canada and United States	5.4	19.4	0	0
World	40.9	7.7	4	8

* Regional groups include high-income economies. Sub-Saharan Africa includes South Africa
Source: World Resources Institute data; World Bank data.

Water Scarcity

Globally, fresh water is abundant. Each year an average of more than 7,000 cubic meters per capita enters rivers and aquifers. It does not always arrive where and when it is needed. Twenty-two countries already have renewable water resources of less than 1,000 cubic meters per capita - a level commonly taken to indicate that water scarcity is a severe constraint. An additional eighteen countries have less than 2,000 cubic meters per capita on average, dangerously little in years of short rainfall. Most of the countries with limited renewable water resources are in the Middle East, North Africa, and Sub-Saharan Africa, the regions where populations are growing fastest (table 2.1). Elsewhere, water scarcity is less of a problem at the national level, but it is nevertheless severe in certain watersheds of northern China, west and south India, and Mexico.

Water scarcity is often a regional problem. More than 200 river systems, draining over half of the planet's land area, are shared by two or more countries. Overpumping of groundwater aquifers that stretch under political borders also injects international politics into the management of water scarcity.

When water is scarce, countries may sometimes have to make awkward choices between quantity and quality. As river flows decline, effluents are less diluted. In countries with inadequate effluent treatment, water quality can often be improved only if supplies from dams are used to maintain flows for dilution rather than for other economic uses. Often, the disparate agencies involved in water management cannot agree on tradeoffs between quantity and quality.

In many countries water scarcity is becoming an increasing constraint not just on household provision but on economic activity in general. Downstream cities can become so short of water as it is drawn off upstream that their industries are seasonally forced to curtail operations. That, indeed, has become routine during dry months in the Indonesian regional capital of Surabaya. As industry, irrigation, and population expand, so do the economic and environmental costs of investing in additional water supply. There is growing awareness of the need to integrate the management of water demand from the different sectors of the economy.

Health effects

The use of polluted waters for drinking and bathing is one of the principal pathways for infection by diseases that kill millions and sicken more than a billion people each year. Diseases such as typhoid and cholera are carried in infected drinking water; others are spread when people wash themselves on contaminated water. Because of their effect on human welfare and economic growth, deficient water supplies and sanitation pose the most serious environmental problems that face developing countries today. Consider first the consequences for health.

The direct impact of waterborne diseases is huge, especially for children and the poor (who are most at risk). Unsafe water is implicated in many cases of diarrhoeal diseases, which, as a group. kill more than 3 million people, mostly children, and cause about 900 million episodes of illness each year. At any one time more than 900 million people are afflicted with roundworm infection and 200 million with schistosomiasis. Many of these conditions have large indirect health effects - frequent diarrhoea, for instance, can leave a child vulnerable to illness and death from other causes.

A key question is what the reduction in this burden of disease and death would be if water and sanitation were improved. This is not a simple question to answer, or one on which all epidemiologists agree. Too little is known about how risks and diseases are distributed and interact with each other, and uncertainty remains over the extent to which modest changes in infrastructure account for long-run health improvements. But some impression can be gained

from a recent comprehensive review by the U.S. Agency for international Development (USAID), which summarized the findings from about 100 studies of the health impact of improvements in water supplies and sanitation (Table 2.2). Most of the interventions studied were improvements in the quality or availability of water or in the disposal of excreta. The review showed that the effects of these improvements are large, with median reductions ranging from 22 percent for diarrhoea to 76 percent for guinea worm.

Table 2.2 Effects of improved water and sanitation on sickness

Disease	Millions of people affected by illness	Median reduction attributable to improvement (percent)
Diarrhoea	900[a]	22
Roundworm	900	28
Guinea worm	4	76
Schistosomiasis	200	73

a. Refers to number of cases per year.
Source: Esrey and others 1990.

It also showed that environmental improvements have a greater impact on mortality than on illness, with median reductions of 60 percent in deaths from diarrhoeal diseases. A companion WHO analysis of the largest group of health impact studies - those on the effect of water and sanitation on diarrhoeal diseases - suggests that the effects of making several kinds of improvements at the same time (say, in the quality and availability of water) are roughly additive (Table 2.3). Project experience shows that the gains are reinforced by educating mothers and improving hygiene.

Taking these studies as a guideline, it is possible to make a rough estimate of the effects of providing access to safe water and adequate sanitation to all who currently lack it. If the health risks of these people were reduced by the levels shown in Table 2.2, then there would be:

* 2 million fewer deaths from diarrhoea each year among children under five years of age (as an indication of magnitudes, about 10 million infants die each year in developing countries from all causes)
* 200 million fewer episodes of diarrhoeal illness annually
* 300 million fewer people with roundworm infection
* 150 million fewer people with schistosomiasis
* 2 million fewer people infected with guinea worm.

Other effects

The costs of water pollution include the damage it does to fisheries, which provide the main source of protein in many countries, and to the livelihoods of many rural people. For instance, pollution if coastal waters in northern China is implicated, along with overfishing, in a sharp drop in prawn and shellfish harvests. Heavy silt loads aggravated by land development and logging are reducing coastal coral and the fish populations that feed and breed it, as in Bacuit Bay in Palawan, the Philippines. Fish are often contaminated by sewage and toxic substances that make them unfit for human consumption. Sewage contamination of seafood is thought responsible for a serious outbreak of hepatitis A in Shanghai and for the recent spread of cholera in Peru.

Excessive water withdrawal contributes to other environmental problems. In addition to displacing people and flooding farmland, damming rivers for reservoirs alters the mix of fresh and salt water in estuaries, influences stability by affecting sedimentation, and transforms fisheries by changing spawning grounds and river hydrology.

Table 2.3 Effects on water supply and sanitation improvements on morbidity from diarrhoea

Type of improvement	Median reduction in morbidity (percent)
Quality of water	16
Availability of water	25
Quality and availability of water	37
Disposal of excreta	22

Source: Esrey, Feachem, and Hughes 1985.

When groundwater is drawn off at a rate faster than the rate of natural recharge, the water table falls. In China's northern provinces, where ten large cities rely on groundwater for their basic water supply, water tables have been dropping - by as much as a meter a year in wells serving Beijing, Xian, and Tianjin. In the southern Indian state of Tamil Nadu a decade of heavy pumping has brought about a drop of more than 25 meters in the water table. The costs are often substantial and go beyond the additional costs of pumping from greater depths and replacing shallow wells with deep tubewells. Coastal aquifers can become saline, and land subsidence can compact underground aquifers and permanently reduce their capacity to recharge themselves. Sewers and roads may also be harmed as has happened in Mexico City and Bangkok.

Chapter 5:

Sanitation and Clean Water

For many people in developing countries water supply, sanitation and solid waste are the most important of all environmental issues. More than 2 million deaths from diarrhoea alone could be avoided each year if all people had reasonable water and sanitation services. And large economic and environmental costs are incurred in trying to compensate for poor-quality services.

The chapter argues that large gains--in environment quality, health, equity, and direct economic returns--can be made by adopting an approach which comprises four key elements:

* managing water resources better, taking account of economic efficiency and environmental sustainability;
* providing, at full cost, those "private" services which people want and are willing to pay for (including water supply, and the collection of human excreta, wastewater, and solid waste);
* using scarce public funds only for those services (specifically the treatment and disposal of human excreta, wastewater, and solid wastes) which provide wider communal benefits; and
* developing flexible, responsive, institutional mechanisms for providing these services, with community organizations and the private sector playing a larger part.

Although the provision of clean water and sanitation is often omitted from the list of priority environmental challenges, but in many parts of the developing world it ranks at the top. Two environmental issues are involved: the costs to human health and productivity of polluted water and inadequate sanitation and the stresses placed on water resources by the rapidly growing human demands for water. This chapter argues that to address the first problem, the second must be tackled as well. This will require better management and more efficient use of water. It may mean that agriculture will have to do with less water (discussed in Chapter 7), and certainly requires a shift in approach in how sanitation and water supply services are provided -- the main theme of this chapter.

Water supply and sanitation as environmental priorities:

Inadequate waste disposal is a major cause of the degradation of surface and water quality described in Chapter 2. Growing populations produce larger amounts of wastewater and solid wastes per capita. Inadequate investments in waste collection and disposal mean that large quantities of waste enter both ground and surface water. Groundwater contamination is less visible but often more serious, both because it can take decades for polluted aquifers to self-cleanse, and because large numbers of people drink untreated groundwater.

More environmental damage occurs when people try to compensate for inadequate provision. The lack or unreliability of piped water causes households to sink wells, often resulting in overpumping and depletion. In cities like Jakarta, where almost two-thirds of the population relies on groundwater, the water table has declined dramatically since the 1970s. In coastal areas this can result in saline intrusion, sometimes rendering the water permanently unfit for consumption. In Jakarta, seawater intrusion has contaminated a five to ten kilometre wide belt along the coast. In cities like Bangkok, Mexico City and Venice excessive pumping has also led to subsidence, cracked pavements, broken water and sewerage pipes, seawater intrusion, and flooding.

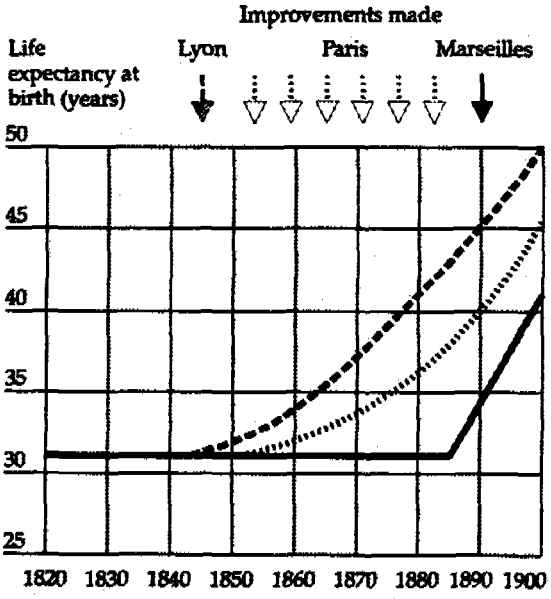
Inadequate water supply also prompts people, especially in Asia, to boil water. That uses energy. In Jakarta, over $50 million is spent each year by households for this purpose--an amount equal to one percent of the city's GDP. Investments in water supply can therefore reduce fuelwood consumption and air pollution.

Effects on health

The health benefits from better water and sanitation, as noted in Chapter 2, are large. When services were improved in the industrial countries in the nineteenth and twentieth centuries, the impact on health was revolutionary. Life expectancy in French cities, for example, increased from about thirty-two years in 1850 to about forty-five years in 1900--with the timing of changes corresponding closely to changes in water supply and wastewater disposal (Figure 5.1). Today, adequate water and sanitation services are just as vital: diarrhoeal death rates are typically about 60 percent less among children in households with adequate facilities than among those in households without such facilities. Box 5.1 describes the improvements which are critical for improving health.

Health gains follow investments in water and sewerage

Figure 5.1 Water, sewerage, and mortality declines in urban France in the nineteenth century



Source: Briscoe 1987.

Effects on productivity

Improved environmental sanitation has economic benefits. Consider the case of investments for sewage collection in Santiago, Chile. The principal justification was the need to reduce the extraordinarily high incidence of typhoid fever in the city. A secondary justification was the need to maintain access to the markets of industrialized countries for Chile's increasingly important exports of fruit and vegetables. To ensure the sanitary quality of these exports, it was essential to stop using raw wastewater in their production. Given the current cholera epidemic in Latin America, this was prescient. In just the first ten weeks of the cholera epidemic in Peru, losses from reduced agricultural exports and tourism were estimated at $1 billion--more than three times the amount invested in water supply and sanitation services in the country during the 1980s.

Improved access to water and sanitation also yields direct economic benefits. For many rural people, getting water is time-consuming and heavy work, taking up to 15 percent of women's time. Improvement projects have reduced the time substantially. In a village on the Mueda Plateau in Mozambique, for instance, the average time that women spent collecting water was reduced from 120 to 25 minutes a day. That is a gain of some kind in people's well-being, whether the time is used to cultivate crops, tend a home garden, trade in the market, keep small livestock, care for children, or even rest. Because these time savings are clearly perceived by users, they mean that users are willing to pay substantial amounts (as discussed later in this chapter) for easier access.

In the absence of formal services, people have to provide their own services, often at high cost. In Jakarta, for instance, about 800,000 households have installed septic tanks, each costing several hundred dollars (not counting the cost of the land). And in many cities and towns large numbers of people buy water from vendors. A review of vending in sixteen cities shows that the unit cost of vended water is always much higher--typically from 4 to 100 times,

Box 5.1: Specific investments that matter for health

The potential health benefits from improved water and sanitation services are huge. What improvements must made to secure these benefits?

- With *water quality*, there are two key points. First, contrary to common belief, contamination of water in the home is relatively unimportant. What matters is whether the water coming out of the tap or pump is contaminated. Second, in most developing countries the imperative is to get from "bad" quality (over 1,000 faecal coliforms per 100 ml, say) to "moderate" quality (below 10 faecal coliforms per 100 ml), not necessarily to meet the stringent quality standards of industrialized countries.

- With *water availability*, as long as families have to go out of the yard to collect water, the quantities used will remain low (typically between 15 and 30 litres per capita per day). The use of water for personal hygiene usually increases only when availability rises to around 80 litres per capita per day, and generally depends on getting the water delivered to the yard or house.

- With *excreta disposal*, it is necessary to distinguish among household and neighbourhood effects. For the household, the health impacts of improved sanitation facilities depend only on getting the excreta out of the house, and are thus similar whether family members use an improved pit latrine, a cess pool overflowing into a street drain, or a conventional sewerage system. For the neighbourhood, the key is the removal of excreta, a task done well by a wide range of technologies, but badly by many commonly used systems (such as night soil collection and unemptied septic tanks). Because all the faecal-oral transmission routes become much more important where people live in close proximity to each other, the ill effects of poor environmental sanitation are greatest in high-density urban settlements.

with a median of about twelve--than the cost of a unit of water from a piped city supply. The situation in Lima, Peru, is typical. A poor family pays a vendor $3 per cubic meter, which is more than twenty times what a middle-class family pays for water via a house connection. Thus, although a poor family uses only one-sixth as much water as a middle-class family, the monthly water bill for a poor family is three times that of the middle-class family. In the slums around many cities, water costs the poor a large part of household income --18 percent in Onitsha, Nigeria, 20 percent in Port-au-Prince, for example. Because so many people rely on vendors, these expenditures are huge. In Onitsha, for example, households pay vendors enough to provide for two-thirds of the full costs of providing piped water to 80 percent of the population.

The economic costs of compensating for unreliable services -- by building in-house storage facilities, sinking wells or installing booster pumps (which can draw contaminated groundwater into the water distribution system) -- are also substantial. In Tegucigalpa, Honduras, for example, the sum of such investments is large enough to double the number of deep wells providing water to the city. And the costs of compensating for poor water quality are great, too. In Bangladesh, for example, boiling drinking water would take 11 percent of the income of a family in the lowest quartile. With the outbreak of cholera in Peru, the Ministry of Health has urged all residents to boil drinking water for 10 minutes. The cost of doing this would amount to 29 percent of the average household income in a squatter settlement.

What needs to be done?

Investments in sanitation and water offer high economic, social and environmental returns. Universal provision of these services should and could become a reality in the coming generation. But the next four decades will see urban populations in developing countries rising by 160 percent, and domestic demand for water rising fivefold. Current approaches will not meet these demands, and there is a real possibility that the numbers unserved could actually rise substantially, even while aquifers are depleted and rivers degraded. The remainder of this chapter suggests that there are four key policy changes which need to be made.

Managing water resources better

The allocation of water between agriculture, industry and domestic users is politically difficult, but if mismanaged, will drive up costs and reduce the quality available for households. Meeting domestic needs will raise difficult issues of allocation and management. As countries and regions approach the limits of their supplies, it will become essential to allocate water efficiently among competing uses. For domestic users, an equally important issue will be the way water quality is managed. A city that discharges untreated sewage into a river imposes additional costs on other users downstream.

When there was little competition for water, it was (correctly) used in large quantities for activities in which the value of a unit of water was relatively low. In many countries the dominant "high-volume, low-value" user became irrigated agriculture. Today about 73 percent of all water withdrawals (and higher proportions of consumptive use) are for irrigation. This share is even higher in low-income countries, as shown in Table 5.1. In most countries this water is provided at heavily subsidized prices, with users seldom paying more than 10 percent of the operating costs.

Table 5.1. Sectoral water withdrawals, by country income group

Income group	Annual withdrawls per capita (cubic meters)	Withdrawls, by sector (percent)		
		Domestic	*Industry*	*Agriculture*
Low-income	386	4	5	91
Middle-income	453	13	18	69
High-income	1.167	14	47	39

Source: World Resources Institute 1990.

As demand by all three sectors increases, governments find it hard to change the existing arrangements. The allocation of water in all countries is a complex issue, governed by legal and cultural traditions. Users typically have well-established rights. Strong sectoral divisions between (often competing) ministries add to the difficulty of managing water resources efficiently. Reallocation is a contentious and ponderous process, generally responding only with long lags to changes in demand. Even though agricultural use of water has the lowest value per cubic meter, there is strong political opposition to diverting water from agriculture to other sectors. The result is that in many countries, industrialized and developing alike, large volumes of water are used to add little economic value in irrigated agriculture, while cities and industries, which would gladly pay more, cannot get enough.

This mismatch is most striking in the areas around large cities. In the Western United States, for example, farmers in Arizona pay less than 1 cent for a cubic meter of water, while residents of the city of Phoenix pay about 25 cents for a cubic meter of water. In the industrial heartland of China around Beijing and Tianjin, 65 percent of water is used relati-

vely inefficiently for low-value irrigation, while huge expenditures are contemplated to bring water from other river basins to the cities. Paradoxically, there is good news in these distortions. Their very size indicates that urban shortages could be met with only modest reallocation. In Arizona, for instance, the purchase of the water rights from just one farm is sufficient to provide water for tens of thousands of urban dwellers. Because of the low value of water in irrigated agriculture, the loss of this marginal water has little overall effect on farm output. To help such transfers, new market-driven reallocation methods have been developed. Thus the city of Los Angeles came to an agreement with farmers in the Central Valley of California whereby the city paid for improvements which reduced losses in the irrigation canals. For the city this was a good deal, since the unit cost of the released water was less than half that of the cheapest alternative; and the farmers got cash without a cut in their net quantity of water. In another instance, when a recent drought dangerously reduced available water, the State of California set up a voluntary "Water Bank", which purchased water from farmers and sold it to urban areas. The farmers made a profit by selling the water for more than it was worth to them, while the cities got water at a cost well below that of other sources of supply.

In developing countries, too, a start is being made in applying innovative water resource management methods. In the North China Plain, the State Science and Technology Commission determined that the economic rate of return to a cubic meter of water used for agriculture was less than 10 percent of the return to municipal and industrial users. Once agricultural and urban users accepted that they had to talk to each other and had to look at water as an economic commodity with a price, progress -- including reallocation -- was made. And Jakarta has been reasonably successful in reducing the overpumping of its aquifers by registering groundwater users (especially commercial and industrial establishments), and by introducing a groundwater levy.

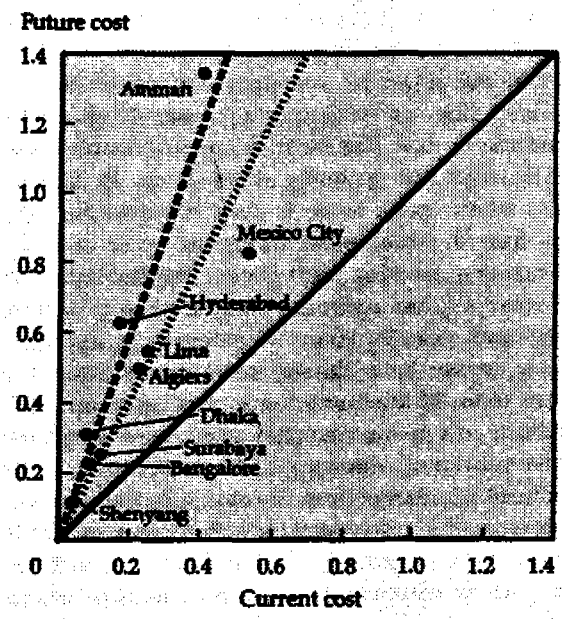
The striking feature of these "market-based" reallocation methods is that they are voluntary, they benefit both the buyers and sellers economically, they reduce the environmental problems resulting from profligate water use in irrigation (discussed further in Chapter 7) and they reduce the need for more dams. Up to now these methods have been applied primarily in industrialized countries, but they show a way forward for developing countries.

Without effective management of water resources, the cost of supplying water to cities has risen and will continue to rise. The most dramatic examples will be in large, growing urban areas. Thus in Mexico City, where much water is used in irrigation, the city has to contemplate pumping water over 1,000 meters elevation into the valley of Mexico; in Lima, upstream pollution has increased treatment costs by about 30 percent; in Shanghai, water intakes have already been moved upstream more than 40 kilometres at a cost of around $300 million; in Amman, the most recent works involve pumping water up 1,200 meters from a site about 40 kilometres from the city. A recent analysis of the costs of raw water for urban areas in World Bank-financed projects (Figure 5.2) shows that the unit cost of additional water from the "next" scheme is more than double the cost of water from the current scheme in most cases, and more than triple in several cases.

Industries and households also need to be given incentives to use water efficiently. Cities, like farmers, have tended to take demand as given and to see the task as increasing supplies to meet it. As was the case with energy twenty years ago, little attention is paid to conservation and demand management in the water sector. This is both economically and environmentally unsound. Consider the case of Washington, D.C. In the 1960s, the U.S. government concluded that sixteen dams and over $400 million were needed to meet the water needs of the metropolitan area. Because of resistance from environmentalists to the construction of the dams, the plan had to be reconsidered. Eventually the number of dams was reduced to one, and the total cost of the scheme to $30 million. The key changes were a revised plan for managing demand during droughts, and more efficient operating rules. Once again, this illustrates that better economics and a better environment are compatible.

Experience in industrialized and developing countries alike shows the potential for using water more cost-effectively in industry. In the United States freshwater withdrawals by manufacturing industries by the year 2000 are expected to be 62 percent less than withdrawals in 1977, primarily because of the increased costs industries have to pay for disposing of industrial wastewater. In Sao Paulo, Brazil, the imposition of effluent charges induced reductions of between 42 percent and 62 percent in water demand from three industrial plants. For Beijing, Figure 5.3 shows that a variety of conservation measures in industries and households could release large quantities of water at a substantially lower unit cost than that of the next supply augmentation project.

Figure 5.2: How the cost of supplying water is increasing



Note: Cost excludes treatment and distribution. "Current cost" refers to cost at the time data were gathered. "Future cost" is a projection of cost under a new water development project.
Source: World Bank data.

A particularly important conservation alternative is reclamation of wastewater. Water reclamation for urban, industrial and agricultural use is attractive both to improve the environment and to reduce the costs of water supply. Reclaimed wastewater has been used for flushing toilets in residential and commercial buildings in Japan and Singapore for many years. A recent reclamation scheme in the Vallejo area of Mexico City (Box 5.2) illustrates the great potential, both economic and environmental, of wastewater reuse (and, to anticipate a theme developed later in this chapter, the scope for the private sector).

At present, in most countries the management of water resources is fragmented (there are no mechanisms whereby the effects of one use of water on another potential user are signalled) and "command and control" (since most allocations are by administrative fiat). The challenge is to replace this system with one which recognizes the unitary nature of the resource and its economic value, and which relies heavily on prices and other incentives to encourage efficient use of water.

Box 5.2 Environmental improvement, water resources management and the private sector in Mexico

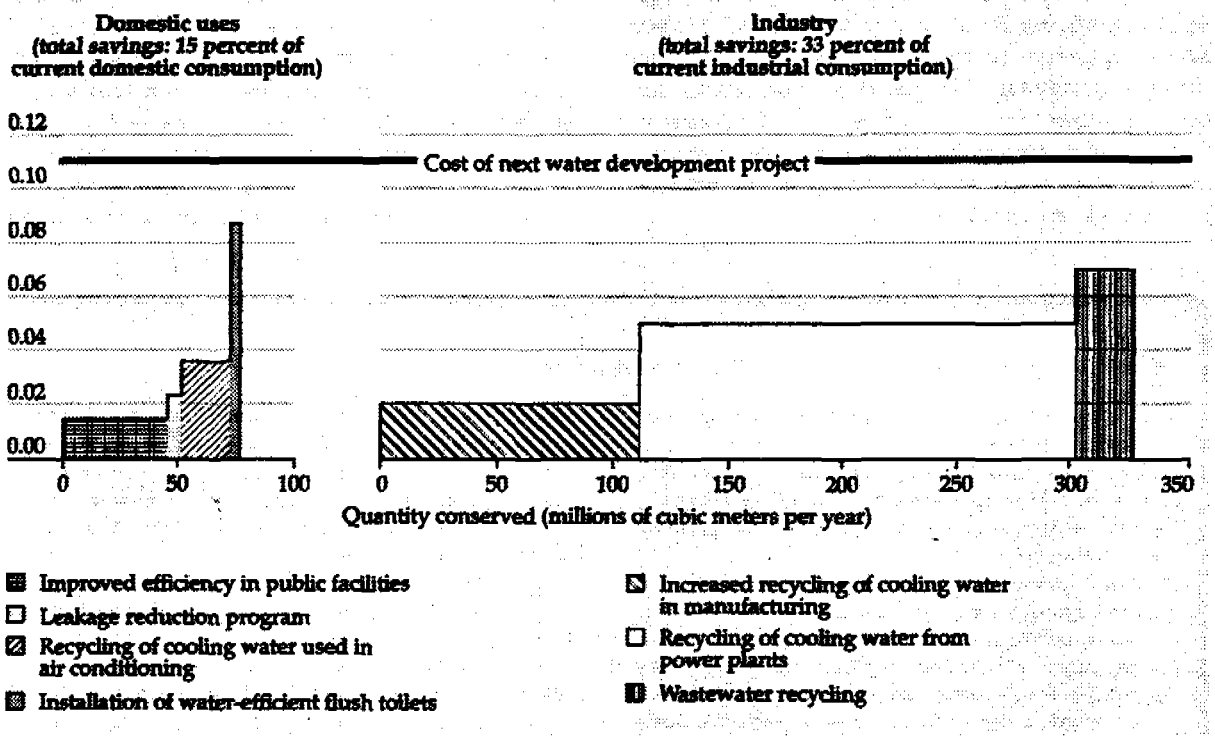
In 1989, faced with rising water prices and potential water shortages, a group of companies in the Vallejo area of Mexico City sought an alternative to water supplied by the public agency. About the same time the Mexican government decided to involve the private sector in water supply and wastewater treatment.

The industrialists realized that, if sewage flows could be adequately treated, this could be a cost-effective and reliable source of industrial water (and, incidentally, improve the environment by treating wastes and reducing the need for new water supplies). Twenty-six Vallejo companies organized a new, for-profit firm, Aguas Industriales de Vallejo (AIV), to rehabilitate an old municipal wastewater treatment plant. Each shareholder company contributed equity based upon its water usage requirements, with total equity totalling $900,000.

AIV operates the plant under a 10-year concession from the government. The plant now provides 60 litres/second to shareholders and 30 litres/second to the government as payment for the concession. The concession agreement gives AIV the right to withdraw up to 200 litres/second of wastewater from the municipal trunk sewer. AIV has plans to double the plant's capacity within five years at an estimated cost of $1.5 million. AIV provides treated water to shareholder companies at a price equivalent to 75 percent of the water tariff charged by the government (currently $0.95 per cubic meter).

Conservation can be cheaper than new supplies

Figure 5.3 Conserving water as an alternative to expanding supply in Beijing
(discounted cost in dollars per cubic meter)



Source: Hufschmidt and others 1987.

Providing services that people want and are willing to pay for

During the United Nations Drinking Water and Sanitation Decade of the 1980s coverage increased (see Chapter 2). But about 1 billion people do not have an adequate water supply and about 1.7 billion people do not have adequate sanitation facilities. The quality of service often remains poor. In Latin America, for example, the levels of leakage and pipe breakage are four times and twenty times higher than is normal in industrialized countries. In Lima, Peru, 70 percent of the water distribution districts provide inadequate water pressure. In Mexico, 20 percent of water supply systems have unreliable chlorination facilities.

What has been done:

Developing countries cannot afford to provide all people with in-house piped water and sewerage connections. The policy has usually been to concentrate primarily on the (subsidized) provision of water, often via house connections for the better-off, and standpipes or handpumps for the poor.

Urban consumers in most industrialized countries pay all of the recurrent costs (operations, maintenance, and debt service) for both water supply and sewerage services. They also pay most of the capital costs of water supply and a large (typically over half) and rising portion of the capital costs of sewerage. The limited data available on rural areas of industrialized countries suggest that subsidies are somewhat higher, but also decreasing sharply.

Solid waste collection and disposal facilities are usually financed by local government, with revenues from local taxes and intragovernmental transfers.

In developing countries, by contrast, consumers pay far less. A recent review of Bank-financed projects showed that the effective price charged for water is only about 35 percent of the average cost of supplying it. The proportion of total project financing generated by utilities points in the same direction: internal cash generation accounts for a paltry 8 percent of project costs in Asia, 9 percent in Sub-Saharan Africa, but more in Latin America and the Caribbean (21 percent) and in the Middle East and North Africa (35 percent). Unsatisfactory as these figures are, things are getting worse: internal cash generation financed 34 percent of costs in World Bank-financed projects in 1988, 22 percent in 1989, 18 percent in 1990 and just 10 percent in 1991.

Much the same applies with solid waste. Although household collection fees are successfully charged in some cities (including Cairo, Guatemala City, and Merida), in most cases these costs are met from local revenues, often supplemented by intergovernmental transfers. These expenditures typically account for between 30 percent and 50 percent of all municipal spending.

Only a small proportion (typically 5 percent in developing countries, compared with 25 percent in industrialized countries) of all spending on solid waste is directed to its safe disposal.

A new approach:

In urban areas there is abundant evidence that most people want on-plot water supplies of reasonable reliability, and most are willing to pay the full cost of these services. In some areas this standard solution will have to be adjusted, and special efforts made to accommodate poor people.

Box 5.3: The water services that rural people want and are willing to pay for

The World Bank in conjunction with other agencies recently completed a study of rural water demand in Brazil, Haiti, India, Nigeria, Pakistan, Tanzania, and Zimbabwe. The study suggests that, from this perspective, there are four broad categories of rural community.

Type I Communities: In which willingness to pay for private connections is high, and willingness to pay for public water points is low.

Such communities offer exciting possibilities because people want and are willing to pay the full costs of reliable water service delivered via private metered connections into the house or yard. The availability of free public taps (for the poor) will not appreciably affect the demand for private connections. The appropriate strategy is to offer and even encourage (specifically by amortizing connection costs into monthly water bills) private connections, to recover all costs via the tariff, and to deliver a reliable service. A striking finding from the World Bank study is that many more communities fall into this category than is commonly assumed, probably including many communities in Southeast Asia, South Asia, Central and Latin America and North Africa.

Type II Communities: In which only a minority of households are willing to pay the full costs of private connections, but the majority are willing to pay the full costs of public water points.

While the overall willingness to pay for improved water service is considerable in these communities, users vary greatly in their willingness to pay for different levels of service. In these villages the provision of free public water points (such as standpipes, wells or boreholes) would significantly reduce the demand for private connections. With a heavy reliance on public water points, there must be some charge for water from these in order to finance the system. Here the greatest challenge is to devise revenue collection systems that are sensitive to peoples' preferences about when they want to pay water and how they want to pay for it. Kiosks appear to be an attractive and flexible option for many households.

Those who wish to have house connections should be able to do so, but must have metered connections and must pay the full cost. Many of the better-off communities in Africa and poorer communities in Asia and Latin America probably fall into this category.

Type III Communities: In which households' willingness to pay for improved service is high, but not high enough to pay the full costs of an improved service.

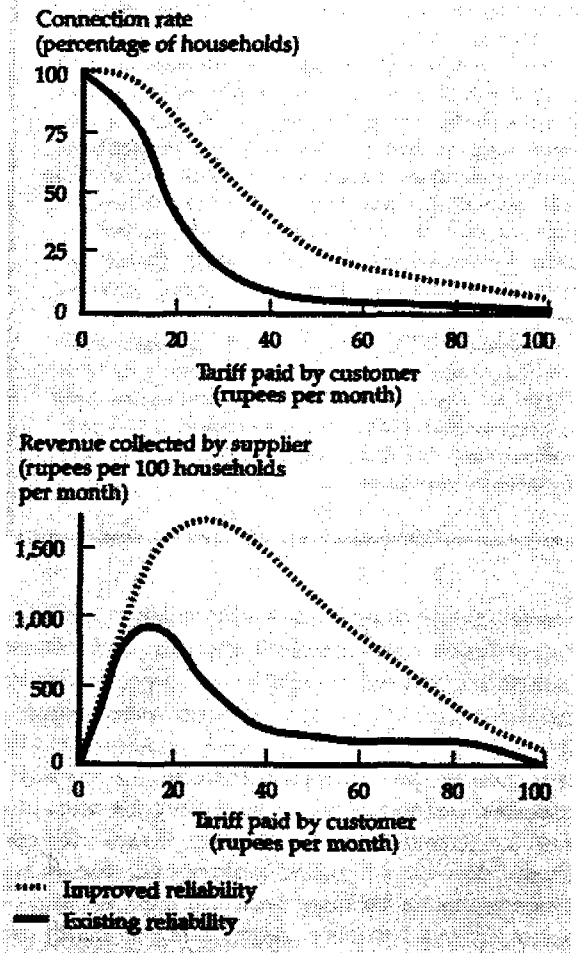
These are typically poor communities in arid areas. As in Type II villages, willingness to pay for improved water service is high (as a proportion of income). The distinction is that the costs of supply are so high (due to a combination of aridity and low population densities), that improved systems will not be built and operated without subsidies. Given the high priority which people give to improved water supply, if transfers are available from central government or from foreign donors, the households of the community would typically choose to spend the funds on an improved water supply. The primary service offered in such communities would be public taps, wells or boreholes, although metered yard taps should be allowed in the case of piped systems, with tariffs set to recover full costs. Type III communities are typically found in arid areas in South Asia and Africa.

Type IV Communities: In which willingness to pay for any kind of improved service is low.

These are typically poor communities in which (a) traditional water supplies are considered more or less satisfactory by the populations or (b) in which communities have come to see it as government's financial responsibility. In such communities self-financed improved water supplies are not feasible. Given the low priority afforded improved water supply, available subsidies could be better used in providing other, more highly valued, infrastructure services. For the time being, the appropriate rural water supply policy in such cases is simply to do nothing. For the second category, once government paternalism ceases, it may be that communities would express a willingness to pay and would become a Type II community.

Users want reliable supplies

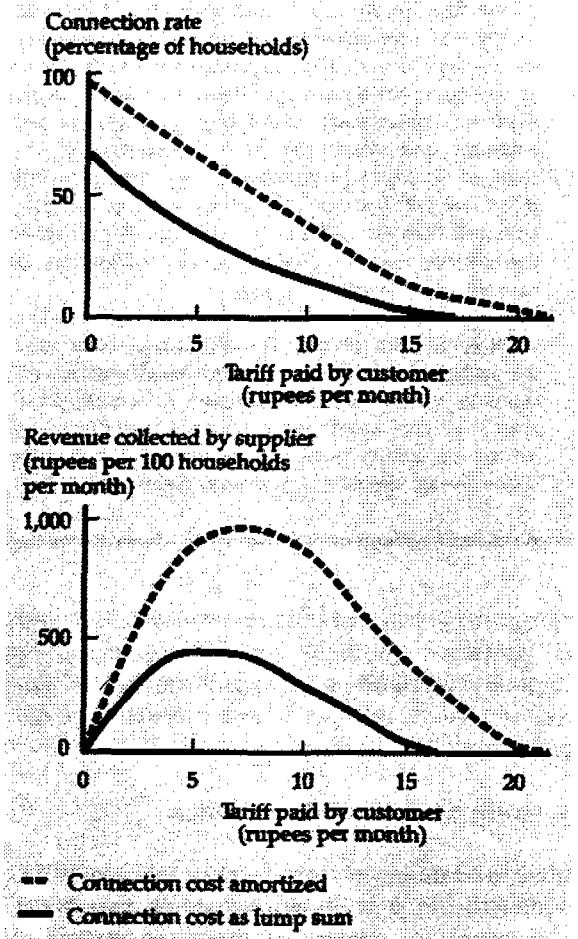
Figure 5.4 How reliability of supply affects willingness to pay for piped water: Punjab, Pakistan



Source: World Bank Water Demand Research Team forthcoming.

Credit for connections is vital

Figure 5.5 How spreading connection costs over time affects willingness to pay for piped water: Kerala, India



Source: World Bank Water Demand Research Team forthcoming.

In Latin America, and more recently in Morocco, utilities have helped poor families to install a connection and in-house plumbing by giving them the option of paying over several years. Another option is a "social tariff", whereby the better-off cross-subsidize the poor. Properly executed, such policies are both sensible (since the poor use relatively little water) and compassionate. But there are dangers. Social tariffs can lead to a general spread of subsidies. And the assignment of noncommercial objectives to a public enterprise generally has an insidious effect on the achievement of all its objectives--commercial and noncommercial alike.

It is widely assumed that the demand situation in rural areas is quite different, that there people have only a "basic need" which can be met via a public tap or handpump. However, a recent multi-country World Bank study of rural water demand (Box 5.3) found that most rural people want, and are willing to pay for, a relatively high level of service (yard taps). As shown in Figure 5.4, they will pay substantially more if that service is reliable. And, as shown in Figure 5.5, more people will make use of improved water supplies if innovative financing mechanisms are employed.

Twenty years of experience with the provision of water in rural Thailand (Box 5.4), shows how it is possible to break out of a "low-level equilibrium trap" (in which a low level of services is provided, for which willingness to pay and thus revenues are low, and where operation consequently deteriorates) to a "high-level equilibrium" in which users get a high level of service, pay for it, and maintain the desired system.

Box 5.4 Breaking the "low-level equilibrium trap" in Northeast Thailand

A well-documented case in Northeast Thailand, covering a twenty-year period, demonstrates the importance of discovering what users of rural water services want, rather than assuming the answers.

Since the people were poor, the initial project aimed to provide protected water at the lowest possible cost. Because groundwater is abundant in the region, the technology chosen was handpumps. After five years, most of the handpumps were not working, and people's water use habits were largely unchanged. In a follow-up phase, motor pumps provided piped water at community standpipes. Again the project failed. Five years after implementation, 50 percent of the systems were not working at all, and another 25 percent operated intermittently.

Consistent with conventional assumptions, the failures were attributed to technologies that were too complex to maintain and to the inability of poor villagers to pay for improved supplies. Gradually, however, it became apparent that the main problem was not the capabilities of the villagers, but the fact that the service being offered was not what they wanted. They did not want handpumps, which were not considered an improvement over the traditional rope-and-bucket system. And standpipes were no closer than their traditional sources and so offered no obvious benefits. Only piped water to yardtaps could meet people's aspirations.

In the next project yardtaps were allowed, with the users paying the full costs of connection. Five years later the verdict was in: 90 percent of the systems were functioning reliably, 80 percent of the people were served by yardtaps, meters had been installed and locally adapted charging systems had been developed. Not only had the systems been well maintained, but because the service was so popular, many systems had extended distribution lines to previously unserved areas.

In other words, in terms of the typology discussed in Box 5.2, when these (poor) people were treated as "Type IV" beneficiaries, the cycle was the familiar low-level equilibrium trap. When they were treated as "Type I" communities, the cycle was broken and a high-level equilibrium established.

Increasing investments in sanitation

Public investment in water supply and sanitation accounted for 10 percent of total public investment in developing countries, or about 0.5 percent of GDP. Spending on sewerage and sanitation accounts for substantially less than one-fifth of lending in World Bank-financed projects. Most of this has been for sewage collection, with little spent on treatment. An indication of the huge underinvestment in treatment is that only 2 percent of sewage in Latin America is treated. Similarly, only a small proportion (typically 5 percent in developing countries, compared with 25 percent in industrial countries) of all spending on slid wastes is directed to their safe disposal.

Take account of demand:

There is abundant evidence that urban families are willing to pay substantial amounts for the removal of excreta and wastewater from their household environment. People want privacy, convenience and status; polluted water smells unpleasant and fosters mosquitos; and the installation of sewers typically increases property prices. As with water supply, so with sanitation: where public provision is absent, people pay significant amounts for privately provided services. Even in poor cities, the amounts paid are considerable. In Kumasi in Ghana, for example, large recurrent expenditures are incurred by those who use public latrines and bucket latrines--about 2.5 percent and 1 percent, respectively, of family income. In Kumasi and Ouagadougou, Burkina Faso, families are willing to pay about 2 percent of household income for an improved sanitation system, or roughly the amount paid for water and for electricity. The examples of Orangi, Pakistan, and Northeast Brazil discussed later in this chapter show the willingness of households to pay for carrying (via a low-cost sewer) wastewater out of the neighbourhood.

Expand the menu of supply options:

A vital element of a demand-driven sanitation strategy is expanding the menu of services from which users can choose.

In city centres there is no alternative to waterborne systems. Here developers are often allowed to build without investing in the public sewer system. Even in relatively poor cities this problem is not insoluble. For example in Fortaleza, a poor city in Northeast Brazil, developers of all high-rise buildings are required to, and do, install package sewage collection and treatment systems. The point here is not that this is a good technical solution, but that developers can easily absorb such costs and pass them on to those who purchase units in these buildings, even in a relatively poor city.

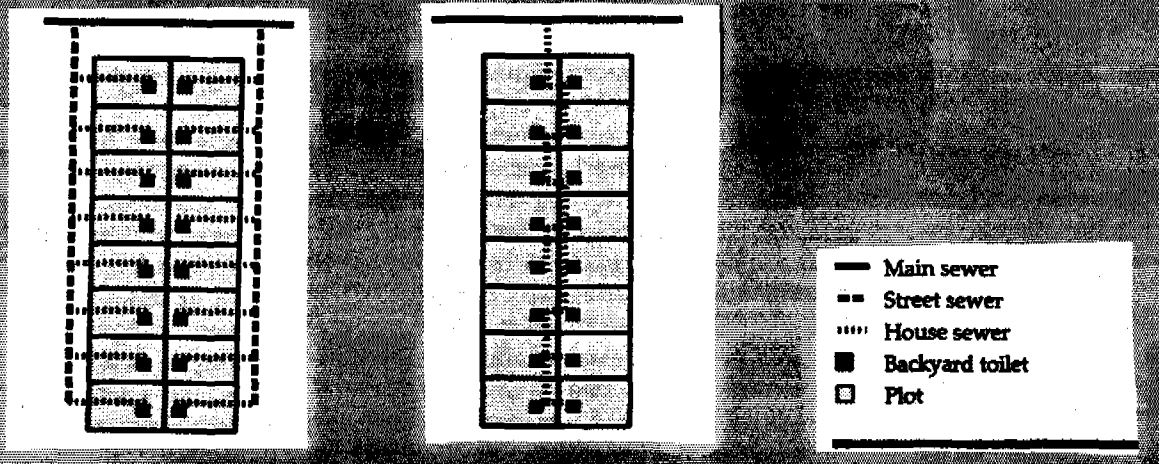
Beyond the urban core, however, conventional sewerage systems (with average household costs anywhere from $300 to $1,000) are too expensive for most developing countries. In recent decades there have been efforts to develop technological alternatives.

Box 5.5: Innovative sewerage in Northeast Brazil: The "condominial" system

The "condominial" system is the brain-child of Jose Carlos de Melo, a socially committed engineer from Recife. The name "condominial" was given for two reasons. First, a block of houses was treated like a horizontal apartment building -- or "condominio" in Portuguese (see Box figure 5.5). Second, "Condominio" was a popular Brazilian soap opera and associated with the best in urban life! As is evident in Box Figures 5.5a and 5.5b, the result is a radically different layout (with a shorter grid of smaller and shallower "feeder" sewers running through the backyards and with the effects of shallower connections to the mains rippling through the system). These innovations cut construction costs to between 20 percent and 30 percent of those of a conventional system.

Box figure 5.5a
Condominial sewerage

Box figure 5.5b
Conventional sewerage



The most fundamental and radical innovation, however, is the active involvement of the population in choosing their level of service, and in operating and administering the "feeder" infrastructure. The key elements are that families can choose: (i) to continue with their current sanitation system; (ii) to connect to a conventional sewerage system (as in Box figure 5.5b); or (iii) to connect to a "condominial" system.

If a family chooses to connect to a condominial system, it has to pay a connection charge (financed by the water company) of, say X cruzados, and a monthly tariff of Y cruzados. If on the other hand, it wants a conventional connection, it has to pay an initial cost of about 3X and a monthly tariff of 3Y (reflecting the different capital and operating costs).

Families are free to continue with their current system (which usually means a holding tank discharging into an open street drain). In most cases, however, those families who initially choose not to connect eventually end up connecting. Either they succumb to heavy pressure from their neighbours. Or they find the build-up of wastewater in and around their houses intolerable once the (connected) neighbours fill in the rest of the open drain.

Individual households are responsible for maintaining the feeder sewers, with the formal agency tending to the trunk mains only. This has several related positive results. First, it increases the communities' sense of responsibility for the system. Second, the misuse of any portion of the feeder system (by, say, putting solid waste down the toilet) soon shows up in a blockage in the neighbour's portion of the sewer. This means rapid, direct and informed feedback to the culprit. This virtually eliminates the need to "educate" the users of the system in the do's and don'ts, and results in fewer blockages than in conventional systems. And third, because of the greatly reduced responsibility of the utility, its operating costs are greatly reduced.

The condominial system is now providing services to hundreds of thousands of urban people in Northeast Brazil. The danger, however, is that the clever engineering is seen as "the system". Where the community and organizational aspects have been missing, the technology has worked poorly (as in Joinville, Santa Catarina) or not at all (as in the Baixada Fluminense in Rio de Janeiro).

Principal source: Jose Carlos de Melo: "Sistemas condominiais de esgotos", Engenharia Sanitaria, 24,2, 237-238, 1985.

Most of this work has been on the on-site disposal of excreta. Pour-flush latrines and ventilated improved pit (VIP) latrines are often the technologies of choice--they provide good service (privacy, few odours) at reasonable cost (typically about $100 to $200 per unit), and their installation and functioning does not depend on the municipality or other organization. At even lower cost, of course, there are yet simpler improvements (such as the latrine slab program which proved so successful in Mozambique).

For a variety of reasons -- high housing densities, impermeable soils and the need to dispose of considerable quantities of domestic wastewater -- on-site solutions do not function well in many urban areas. Sewerage and wastewater collect in the street and low-lying areas, creating major aesthetic and health

problems. And in many settings people aspire to "the real thing" (waterborne sewerage).

Current sanitation choices include a Rolls Royce (conventional sewerage), a motorcycle (an improved latrine), and a bicycle (an unimproved latrine). What is missing is the Volkswagen--something that provides much the same service as the Rolls Royce but which many more people can afford.

Several types of "sanitation Volkswagen" are being developed:

- Effluent sewerage is a hybrid between a septic tank and a conventional sewerage system. Its distinctive feature is a tank located between the house sewer and the street sewer, which retains the solids, thereby allowing smaller sewers to be laid at flatter gradients and with fewer manholes. Such systems have been widely used in small towns in the United States and Australia, and in Argentina, Brazil, Colombia, India, Mozambique and Zambia. The (limited) cost data suggest that solids-free sewerage costs about 20 percent less than conventional sewerage.
- Simplified sewerage, developed in Sao Paulo, allows smaller, shallower, flatter sewers, with fewer manholes. This simplified design works as well as conventional sewerage but cost about 30 percent less. It is now routinely used in Brazil.
- The condominial system (described in Box 5.5), has been developed and applied in Northeast Brazil. It comprises shallow, small-diameter backyard sewers laid at flat gradients and costs about 70 percent less than a conventional system.
- The Orangi Pilot Project in Karachi (described in Box 5.6) adapted the principles of effluent sewerage and simplified sewerage to the realities of a hilly squatter settlement in Karachi. The result--again, not just the result of clever engineering--was drastic reductions in the cost of sewers, from the $1,000 per household which was standard in Karachi to less than $100 per household (excluding the cost of the trunk sewers).

The achievement is extraordinary--about 600,000 people are now served with self-financed sewers in Orangi.

Investing in waste disposal:

There is an important difference between "private goods" (including water supply, and even wastewater and solid waste collection), in which the primary benefits accrue to individual households and waste treatment and disposal, in which the benefits accrue to the community at large. In the case of the former, willingness to pay is an appropriate guide to the level of service to be provided, and the main source of finance should be direct charges to the users.

In the case of waste disposal, however, public financing is essential. Governments that subsidize "private" water supply and wastewater collection services are left with less money to finance treatment and disposal services. No developing country, however, will have the luxury of collecting and treating wastewater from all households. Because the costs of meeting such goals are extremely high, even in industrialized countries the full population is not served by wastewater treatment facilities. For example, coverage is only 66 percent in Canada and 52 percent in France. In making the inevitable choices (about place and level of treatment), the best ratio of benefits to costs will usually be achieved by concentrating most public funds on waste treatment in large cities, and especially those with substantial "downstream" populations.

In recent decades some important advances have been made in innovative sewage treatment processes. At the lower end of the spectrum is the stabilization pond, a technology that has proved robust, easy to operate and (where land is not costly) relatively inexpensive. A promising intermediate (in both cost and operational complexity) is the upflow anaerobic sludge blanket, which has performed well in Brazil and Colombia. The point is the importance of developing technical solutions that are adapted to the climatic, economic and managerial realities of developing countries.

Rethinking institutional arrangements

A recent comprehensive review of forty years of World Bank experience in water and sanitation pinpoints "institutional failure" as the most frequent and persistent cause of poor performance. This section deals with the key areas for institutional reform.

Improving the performance of public utilities:

A World Bank review of more than 120 sector projects over twenty-three years concludes that only in only four countries--Singapore, Korea, Tunisia and Botswana--have public water and sewerage utilities reached acceptable levels of performance.

A few examples illustrate how serious the situation is:

* In Accra, Ghana, only 130 connections were made to a sewerage system designed to serve 2,000 connections.
* In Caracas and Mexico City an estimated 30 percent of connections are not registered.
* Unaccounted-for-water, which is 8 percent in Singapore, is 58 percent in Manila and around 40 percent in most Latin American cities. For Latin America as a whole, such water losses cost between $1 and $1.5 billion in revenue foregone every year.

Box 5.5. Innovative sewerage in a Karachi squatter settlement: The Orangi pilot project

In the early 1980s, Akhter Hameed Khan, a world-renowned community organizer, began working in the slums of Karachi. He asked what problem he could help resolve. He was told that "the streets were filled with excreta and waste water, making movement difficult and creating enormous health hazards". What did the people want, and how did they intend to get it, he asked. What they wanted was clear — "people aspired to a traditional sewerage system... it would be difficult to get them to finance anything else." And how they would get it, too, was clear — they would have Dr. Khan persuade the Karachi Development Authority (KDA) to provide it for free as it did (or so they perceived) in the richer areas of the city.

Dr. Khan then spent months going with representatives from the community pestering the KDA to provide the service. Once it was clear that this would never happen, Dr. Khan was ready to work with the community in finding alternatives. (He would later describe this first step as the most important thing he did in Orangi — liberating, as he put it, the people from the demobilizing myths of government promises.)

With a small amount of seed external funding the Orangi Pilot Project (OPP) was started. The services that people wanted were clear; the task was to reduce the costs so that these were affordable and to develop organizations that could provide and operate the systems. On the technical side, the achievements of the OPP architects and engineers were remarkable and innovative. Coupled with an elimination of corruption, and the provision of labor by community members, the costs (in-house sanitary latrine and house sewer on the plot, and underground sewers in the lanes and streets) are less than $100 per household.

The (related) organizational achievements are equally impressive. The OPP staff has played a catalytic role — they explain the benefits of sanitation and the technical possibilities to residents and conduct research and provide technical assistance. The OPP staff never handled the community's money. (The total costs of OPP's operations amounted, even in the project's early years, to less than 15 percent of the amount invested by the community.) The households' responsibilities include financing their share of the costs, participating in construction, and election of a "lane manager" (who typically represents about fifteen households). The lane committees, in turn, elect members of neighbourhood committees (typically around 600 houses) who manage the secondary sewers.

The early successes achieved by the Project created a "snowball" effect, in part because of increases in the value of property where lanes had installed a sewerage system. As the power of the OPP-related organizations increased, so they were able to bring pressure on the municipality to provide municipal funds for the construction of secondary and primary sewers.

The Orangi Pilot Project has led to the provision of sewerage to over 600,000 poor people in Karachi and to attempts by at least one progressive municipal development authority in Pakistan to follow the OPP method and, in the words of Asif Hasan "to have government behave like an NGO." Even in Karachi, the sewer has now formally accepted the principle of "internal" development by the residents and "external" development (including the trunk sewers and treatment) by the municipality.

Principal sources: Asif Hasan: The Low Cost of Sanitation Programme of the Orangi Pilot Project and the Process of Change in

* The number of employees per 1,000 water connections is between 2 and 3 in Western Europe, around 4 in a well run developing country utility (Santiago in Chile), but between 10 and 20 in most Latin American utilities.

Financial performance is equally poor. A recent review of Bank projects found that borrowers often broke their financial performance covenants. A corollary is that the shortfalls have to be met by large injections of public money. In Brazil from the mid-1970s to mid-1980s about $1 billion a year of public cash was invested in the water sector. The annual federal subsidy for water and sewerage services to Mexico City amounts to over $1 billion a year or 0.6 percent of GDP.

Public utilities play a dominant role in the provision of water and sanitation services throughout the world. There are many examples of such utilities working effectively in industrialized countries and, as described above, a few in developing countries. An essential requirement for effective performance is that both the utility and the regulatory body (necessary for such natural monopolies) be free from undue political interference.

In the case of the utility the vital issue is managerial autonomy, particularly as regards personnel policies; in the case of the regulatory body, the setting of reasonable tariffs. Although this recipe is simple and well-tested in many industrialized countries, it has been extraordinarily difficult to implement in developing countries other than those with high levels of governance. Sometimes utilities and regulators are nominally autonomous, but usually key policies (on investments, personnel policies and tariffs, for instance) are effectively made by government and heavily influenced by short-term political considerations.

Many projects financed by external agencies have addressed the problems of public water utilities via sizable action plans, technical assistance components, and conditionality. As with public enterprises in other sectors, most of these efforts failed, in the words of a recent Bank review because "public enterprises in developing countries are key elements of patronage systems,... overstaffing is often rife, and appointments to senior management positions are frequently made on the basis of political connections rather than merit." And things have been getting worse rather than better.

Achievement of institutional objectives in World Bank-financed water and sanitation projects fell from about two in three projects in the late 1970s to less than one in two projects ten years later.

Improving the performance of public utilities nevertheless remains an important goal, for two reasons. First, in the medium-term public utilities will continue to provide services to many. Second, improvement in the performance of public utilities is often a pre-condition if private operators (discussed below) are to be induced to participate.

Separate provision and regulation:

Experience in industrialized countries shows that a central problem in improving environmental quality is that the public sector acts both as supplier of water and wastewater services and as environmental regulator. It is both gamekeeper and poacher. The results of this conflict of interest are similar throughout the world. In the United States, for example, publicly owned municipal wastewater treatment plants are the most persistent violators of effluent discharge standards. In England and Wales prosecutions of those responsible for sewage treatment were rare when the river basin authorities were responsible for water resource management, environmental protection, and services. Since 1989, when private agencies were given responsibility for the delivery of water and sewerage services (with public agencies retaining regulatory authority), fines have been increased substantially and prosecutions are diligently enforced. The flip side of separating powers is that service delivery agencies are, in the process, liberated from serving multiple tasks and can pursue well-defined and specific objectives.

Expanding the role of the private sector:

Increased private sector involvement is warranted in two areas. One is in services to public utilities. In industrialized countries the engineering of public works is dominated by private firms, which depend for their survival on their reputation for performance and assume a legal liability for the consequences of any professional negligence. These factors provide powerful incentives for providing cost-effective and high-quality services, and concurrently provide a stringent environment for the supervised "apprenticeship" training that is a required part of professional certification in these countries. By contrast in many developing countries (particularly in Asia and Africa) the engineering of public works is dominated by large public sector bureaucracies. Employment security is total, promotion is by seniority alone, good work goes unrecognized, poor work is not subject to any sanctions and an atmosphere of lethargy prevails. The direct consequence is the construction of high-cost, low-quality facilities; the indirect effects include a weak professional labour force. The obvious answers are, first, to decrease the direct involvement of the government in public works; and second, to nurture the private engineering consulting industries.

More private involvement is also warranted in the operation of water, sewerage, and solid waste companies. Numerous studies in industrialized countries show that private energy, telecommunications and water utilities are more efficient than public ones. Many industrialized countries have found it difficult to reform public enterprises, except as part of a move to privatize them. Indeed, privatization is increasingly seen as a way not only to effect performance improvements, but also to lock in the gains achieved under reforming public ownership.

In developing countries there has been some experience with private sector operation of water and sanitation utilities. Cote d'Ivoire was a pioneer. SODECI, the utility in Abidjan, is considered to be one of the best-run utilities in Africa. The water utility of Macao was privatized in 1985, and showed dramatic improvements in performance, with consumption doubling and the percent of unaccounted-for-water falling by over 50 percent in six years. More recently Guinea has let a lease contract for water supply to its principal cities, with dramatic improvements in the financial condition in just the first eighteen months (as a result of raising the efficiency of collection from 15 percent to 70 percent).

Other countries have taken more incremental approaches. EMOS, the utility serving Santiago, Chile, has used private contracts for functions such as meter reading, pipe maintenance, billing and vehicle leasing. As a result, EMOS has one of the highest staff productivity rates among water and sewerage companies in Latin America, even when the labour content of contracts is taken into account.

The ratio for water supply operations (including contracts) is about 3.5 employees per 1,000 connections--3 to 6 times lower than that for other companies in the region. The example of the Aguas Industriales de Vallejo in Mexico (see Box 5.1) shows that the involvement of the private sector can take remarkably innovative forms and can even deal with the "public good" issues such as wastewater treatment. Faced with persistently poor performance of their public utilities, many other countries are now seriously considering greater private sector involvement, in general following variations of the French model. For example, in Latin America, concession contracts are currently being let for the supply of water and sewerage services in Buenos Aires and Caracas.

Private involvement in this sector is not a panacea and never a simple business. In the United Kingdom water privatization is generally considered to be

the most complex of all privatizations undertaken. In developing countries there are formidable problems. For the private operator, the risk involved in developing countries is typically high. In addition to the obvious political and macroeconomic risks, there is usually only rudimentary knowledge of the condition of the assets and uncertainty about the government's compliance with terms of the contract. There will often be strong opposition from groups--such as existing agencies and labour unions--who stand to lose from greater private sector involvement.

For the government, there are problems, too. Because of economies of scale, it is virtually impossible to have direct competition among suppliers in a specific area. Countries have tried a variety of solutions. In France there is periodic competition for markets. In England and Wales, economic regulators are mandated to reward efficiency by comparing the relative performance of different companies (a practice which is unlikely to be applicable elsewhere). In addition, in many developing countries it is often difficult to attract private sector interest. Only a handful of firms compete internationally for such contracts. And in Guinea, for example, only two of these international firms bid on the Conakry concession contract. Furthermore, in many instances there are serious questions regarding protection of the public interest when the negotiations involve, on the one hand, sophisticated private companies and, on the other hand, relatively incapable and sometimes corrupt government agencies.

The case for private sector involvement is simpler and stronger still in the solid waste collection business. Whereas foreign control of water supply is often perceived to involve losing sovereignty over a strategic sector, no one cares if foreigners pick up the garbage. In addition, for populations over about 50,000 there are no economies of scale, and thus no natural monopoly. Experience in many countries--including Argentina, Brazil, Canada, Chile, Colombia, Japan, Switzerland and the United States--has shown that the private sector almost invariably collects solid waste more efficiently than municipalities. Unit costs for public systems are 50 percent to 200 percent higher, with the private sector efficiency gains apparently greatest in developing countries.

Increasing community involvement:

Community groups and other non-governmental organizations (NGOs) also have a role to play in the supply of water and sanitation services and the collection of waste. As the Orangi and condominial examples show, in the urban fringe the most productive relationship between community groups and the formal sector is that of partnership, with public financing of the "external" or "trunk" infrastructure (which may be operated by either the public or, preferably, the private sector) and the community paying for, providing and managing the "internal" or "feeder" infrastructure. Poor communities throughout the world have also demonstrated that they can collect solid waste. A frequent problem is that of the transfer and disposal of the waste collected by the community.

Because many water and sanitation services are monopolies, consumers cannot force suppliers to be accountable by giving their business to a competitor. To give consumers a voice in the political process, consumers' associations and rate-payers' boards becomes vital. Paradoxically, because there is such an obvious need for oversight of the activities of a private operator of a natural monopoly, greater private sector involvement stimulates greater consumer involvement. In the United Kingdom, for example, water users have had a much greater say in the running of the industry since privatization.

The performance of water and sanitation institutions in rural areas has often been poor, with innumerable examples of malfunctioning and abandoned public water supplies. Until recently many external agencies--which have had great influence in the rural water sector--have argued that rural people are too poor to contribute to either the construction or the recurrent costs of this "basic need". In many countries users contribute nothing even to the maintenance of supplies.

In recent years external agencies and governments alike have become aware that involvement of the users is essential if water supplies are to be sustained. Generally it has been assumed that support --in the form of information, motivation and technical assistance -- to the community will come from the government. The difficulty is that governments, especially in rural areas, are often weak, and their officials rarely have an incentive to provide such support. Here the private sector (including NGOs) may be able to help.

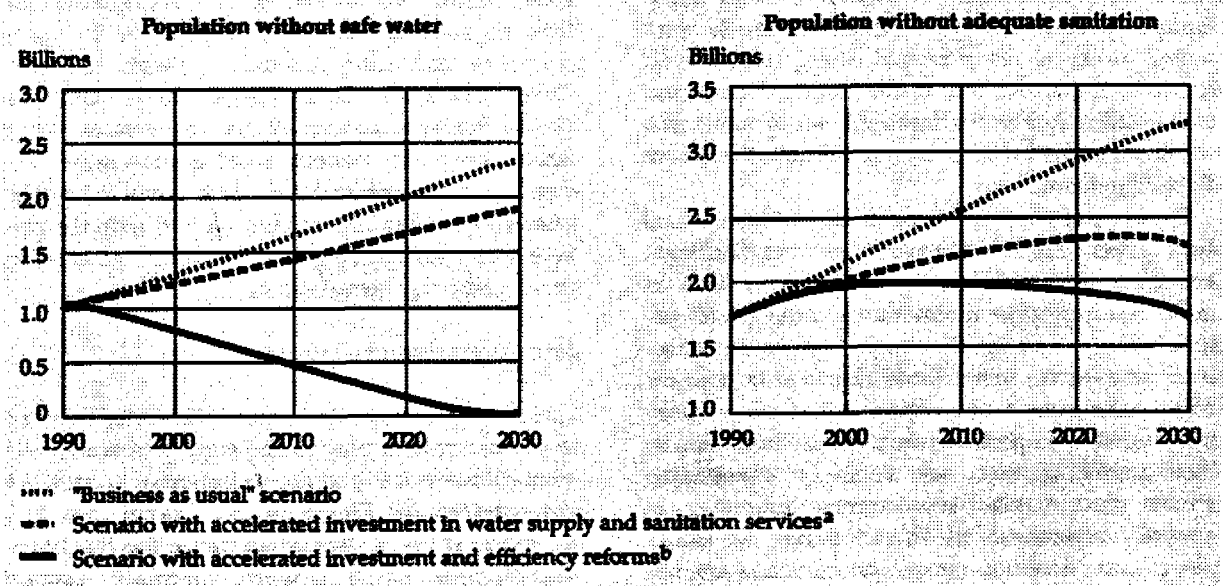
Promising examples of the involvement of small-scale private operators in developing countries include:

In rural Pakistan there are about 3 million families have wells fitted with pumps, many of which are motorized. These supplies are paid for in full by the families, with all of the equipment provided and serviced by a vibrant local, private sector industry.

. In Lesotho, bricklayers were trained (by government) to build improved pit latrines. Government banks also provided (unsubsidized) credit for the financing of improved latrines. The program has been a singular success, thanks mainly to the aggressive role played by the bricklayers in expanding their markets (and, incidentally, providing services).

. In West Africa a private handpump manufacturer has developed a "Sears Roebuck"-type scheme

Figure 5.6 Safe water and adequate sanitation: three scenarios, 1990-2030



Note: Assumptions are as follows: growth of per capita income and population as in Chapter 1; per capita income elasticity, 0.3; price elasticity, -0.25; initial prices 60 percent of marginal costs, gradually rising to efficiency levels over a twenty-five-year period; initial supply costs 50 percent higher than with good practices (due to managerial inefficiencies), gradually being reduced in step with price efficiency reforms; and marginal costs rising at 3 percent per year.

a. Investment in water supply increases 30 percent, and investment in sanitation services increases 50 percent over the period.

b. To realize this scenario in low-income countries, efficiency reforms - and the resulting increase in investment shares - would need to be greater than average.

Source: World Bank estimates, based on Anderson and Cavendish, background paper.

whereby purchase of a pump includes five years of support, including training and the provision of spare parts. Later on, the community will be able to maintain the pump and will purchase the necessary spare parts from local traders. Because the private sector agent has clear incentives to provide such services effectively, this arrangement may work better than government support for communities.

Finally, women have a central role to play in these reforms. In most countries the collection of water has been considered "women's work" (except where the water is sold!). Only recently, however, have systematic efforts been made to include women in project identification, development, maintenance and upkeep. The results have generally been encouraging.

In an urban slum in Zambia a women's organization improved drainage around public taps; women have been trained as handpump caretakers in Bangladesh, India, Kenya, Lesotho and Sudan; in Mozambique women engineers and pump mechanics perform alongside, and as effectively as, their male counterparts; in Sri Lanka, women's cooperatives have been set up to assemble and maintain a locally-manufactured handpump; women's cooperatives manage communal standpipes and collect money to pay for metered supplies in Honduras, Kenya and the Philippines. Where women are trained to manage and maintain community water systems, they often perform better than men, because they are less likely to migrate, more accustomed to voluntary work and because they are more trusted to administer funds honestly.

Creating an enabling environment:

This chapter has argued that massive improvements are possible, in the environment, health, economic efficiency and equity. The key is firmly in the hands of governments, for the single most important factor needed is political will. Where there are long-established and deeply-entrenched traditions of good governance (such as in Botswana, Korea, and Singapore) it is evident that autonomous, accountable public sector agencies can provide efficient and equitable services. For the large majority of developing countries, however, such levels of governance are not attainable in the short run, and an important means for providing accountable and efficient services is greater involvement of the private sector. In this chapter the examples of Chile, Cote d'Ivoire, Guinea, and Mexico have shown that once a political decision is taken to involve the private sector, it can be done successfully.

Where there is a will, there is a way.

To allow helpful change to occur, government must concentrate on the things that it, and only it, can do. Its job is to define and enforce an appropriate legal, regulatory, and administrative framework. This includes tasks as fundamental and diverse as: rewriting legislation so that water markets can come into existence; rewriting contract laws so that the private sector can participate with confidence; building a capacity for environmental and, where appropriate, economic regulation; developing financial mandates for utilities which encourage conservation; and setting and enforcing quality standards for equipment. Governments must also create conditions under which others--the private sector, NGOs, communities and consumers--can play their parts.

What might be accomplished

More than 1 billion people are still without access to safe water and 1.7 billion people without access to adequate sanitation facilities. Elementary calculations show a "business-as-usual" scenario will lead to a rise in the number of people without service in the coming decades (Figure 5.6). This is a result of rising unit costs, as well as unprecedented increases in population. If the shares of total investment allocated to sanitation (currently 0.6 percent of gross investment) and to water supply (currently 1.7 percent) were raised by, say, 50 and 30 percent, respectively, the numbers unserved might still rise, although not as much (the middle curves of the figure). Far more important (as shown by the bottom curves) is the combination of policy reforms and accelerated investment. By attracting financial, managerial and skilled labour into the sector and by freeing enterprises to invest more and improve maintenance, this new approach, which is already being adopted in some countries, could bring about dramatic increases in access to sanitation and clean water within the next generation.

UNITED NATIONS CHILDREN'S FUND
Executive Board
1993 session

CHILDREN, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT: UNICEF RESPONSE TO AGENDA 21

SUMMARY

Recognizing that the goals of the World Summit for Children are consistent with those of Agenda 21 of the United Nations Conference on Environment and Development, UNICEF places special emphasis:on the concept that "our planet must be preserved in order ;to nurture our children; equally, our children must be better nurtured to preserve our planet". The present report contains recommendations for UNICEF-implementation of relevant parts of Agenda 21.

To this effect, UNICEF advocates "primary environmental care", a community-based approach to meet basic needs.through the empowerment of local communities, while ensuring the protection and optimal utilization of natural resources within the community. Priority should be given to the most vulnerable - especially children, women and the very poor - who are threatened by drought and desertification, urban poverty and the destruction .of tropical forests and fragile mountain ecosystems. Environmental education should be promoted to encourage the active participation of women and children, to enhance their life skills and adaptability and to enable them to attain a sustainable livelihood. Attention is also needed in building partnerships among government agencies, non-governmental organizations, research institutions and local communities.

It is recommended that environmental soundness and sustainability become prominent features in the UNICEF programming process and that analytical tools be developed to facilitate that process. Advocacy and social mobilization are also necessary to incorporate the concerns of children and women into relevant policies and strategies at local, regional and national levels.

CONTENTS

I. BACKGROUND

1. At its 1992 session, the Executive Board requested the Executive Director to "submit at its 1993 regular session a report that incorporates recommendations for the UNICEF response, primarily through country programmes, for effective implementation of relevant parts of Agenda 21 with due consideration to appropriate inter-agency coordination and collaboration" (E/ICEF/-1992/14, decision 1992/31). The present report is in response to that request. Chapter I describes Agenda 21 from the UNICEF perspective and outlines General Assembly resolution 47/191 of 22 December 1992 concerning the institutional arrangement for follow-up to the United Nations Conference on Environment and Development (UNCED). Chapter II contains the UNICEF response to these important developments. It is based on two earlier decisions of the Executive Board regarding (a) the broad policy framework for UNICEF action in support of environment and sustainable development (E/ICEF/1989/12, decision 1989/18); and (b) UNICEF development goals and strategies for children in the 1990s (E/ICEFll99O/13, decision 1990/2). Recommendations for Executive Board approval are contained in chapter III.

A. Human-centred, poverty-alleviating focus of Agenda 21

2. Agenda 21, the operational document on environment and sustainable development for the twenty-first century, provides a framework for comprehensive and far-reaching action to grapple with the challenges that lie ahead. From the point of view of UNICEF and, indeed, children, there are three areas of particular importance.

3. First, UNCED has accorded human beings a central role in the search for solutions to environmental problems. Agenda 21 emphasizes social and economic dimensions as much as conservation and management of resources, thus advocating balanced models of sustainable development. Therefore, combating poverty will be as important as curbing profligate consumption, and the principles of equity and justice as important as the physical environment. Furthermore, UNCED has recognized that all groups in society have distinct roles to play in the proper management of the earth through a unified, mutually reinforcing, multisectoral effort. It is especially noteworthy that emphasis has been placed on the full participation of marginalized groups - women, children and youth, indigenous persons and those under domination or occupation - and on mobilization of their creativity, ideals and courage, recognition of their knowledge and traditional practices and support for their identity, culture and interests.

4. Second, UNCED has made the most significant attempt to date to unite the dual concerns of environmental degradation and poverty. The Rio Declaration states that the eradication of poverty is indispensable to sustainable development and that the developmental and environmental requirements of present and future generations must be met equitably. From the point of-view of millions of the poorest families on earth, the principal environmental concerns are: the ever-present threat of disease; the decline in household food security, often related to inadequacies in agricultural practices and loss of fertility of farmland; and the lack of clean water supply and safe sanitation. For the poor, environmental degradation threatens their means of livelihood. To protect the environment, they must have alternative opportunities for a better livelihood and their participation and empowerment are essential in the search for sustainable solutions. However, if one fifth of the world's population continues to consume four fifths of the world's resources - and produce most of the pollution and waste - disparity will remain, poverty will continue, population growth will escalate, the environment will deteriorate and no lasting solutions to the crises will be found.

5. Third, UNCED went further than any other international meeting in emphasizing the importance of collaboration between Governments and non-governmental organizations (NGOs) and the need for a democratic, participatory approach to environment and development. NGOs are at the cutting edge of the environmental movement; no Government or international agency can afford to ignore their vital contribution. The scores of NGO events that took place prior to UNCED and during the UNCED Global Forum provided a wealth of new ideas, insights and practical suggestions. The time has come to cement new partnerships, alliances and coalitions among Governments, international agencies, NGOs, the private sector and social, civic and religious movements of all kinds.

B. Children and Agenda 21

6. Agenda 21 recognizes that infants and children need special protection and education. Paragraph 6.19 states: "Approximately one third of the world's population are children under 15 years old. At least 15 million of these children die annually from such preventable causes as birth trauma, birth asphyxia, acute respiratory infections [ARI], malnutrition, communicable diseases and diarrhoea. The health of children is affected more severely than other population groups by malnutrition and adverse environmental factors, and many children risk exploitation as cheap labour or in prostitution". Accordingly, Agenda 21 acknowledges that "specific major goals for child survival, development and protection were agreed upon at the World Summit for Children and remain valid also for Agenda 21 (para. 6.24).

It urges Governments to take the necessary measures to ensure the fulfilment of these goals and to ratify the Convention on the Rights of the Child as early as possible.

7. Second, Agenda 21 emphasizes that children are very aware of environmental concerns and their interests need to be taken into account so that they can participate fully in safeguarding the environment (para. 25.12). It urges all concerned to:

(a) Support programmes that "involve young people and children in environment and development issues, such as children's and youth hearings, building on decisions of the World Summit for Children" (para. 36.10 (j));

(b) Design work plans on environmental activities in all schools "with the participation of students and staff" by involving schoolchildren in "local and regional studies on environmental health, including safe drinking water, sanitation, food and ecosystems" (para. 36.5 (e));

(c) "Make child-oriented material available to media as an educational tool, ensuring close cooperation between the out-of-school public information sector and the school curriculum, for the primary level" (para. 36.10 (e)).

8. UNICEF was requested specifically to "develop programmes for children and programmes to mobilize children" (para. 25.15) by fostering cooperation and collaboration among Governments, NGOs and other United Nations agencies, with specific focus on:

(a) Primary environmental care (PEC) to meet basic needs of communities, improve the environment for children at household and community levels and encourage the participation and empowerment of local populations;

(b) Expansion of educational opportunities for children and youth, especially the girl child, to inculcate environmental and developmental responsibility;

(c) Mobilization of children and parents, through schools and health centres, to sensitize communities to environmental issues;

(d) Advocacy to incorporate children's concerns into relevant policies and strategies for environment and development at local, regional and national levels. In addition, together with the United Nations Development Fund for Women, UNICEF was given the responsibility to "[promote] operational programmes ... that will strengthen the participation of women, especially low-income women, in sustainable development and in decision-making" (para. 24.9).

9. All these activities are intersectoral and are linked to other chapters and programme areas in Agenda 21. Of particular relevance to UNICEF are: combating poverty (chap. 3); demographic dynamics and sustainability (chap. 5, programme area C); protecting and promoting human health (chap. 6, programme areas A to E); human settlements and development (chap. 7, programme areas D and F); combating deforestation (chap. 11, programme area B); combating desertification and drought (chap. 12, programme areas B, D, F); sustainable mountain development (chap. 13, programme area B); sustainable agriculture and rural development (chap. 14, programme areas B, C, K); protecting fresh water resources (chap. 18, programme areas D and E); and education, public awareness and training (chap. 36, programme areas A, B, C). 1/

C. Institutional arrangements for the follow-up to the United Nations Conference on Environment and Development

10. General Assembly resolution 47/11 of 22 December 1991 requests the Economic and Social council to establish at its 1993 organizational session a high-level Commission on Sustainable Development to ensure an effective follow-up to UNCED, as well as to enhance international cooperation and rationalize intergovernmental decision-making capacity for the integration of environment and development issues. A multi-year thematic programme of its work will be discussed at its first session. The resolution also requests the governing bodies of all specialized agencies and related organizations of the United Nations system to review their policies, programmes, budgets and activities and to strengthen and adjust those pertaining to sustainable development along the lines suggested in Agenda 21. The Commission on Sustainable Development will be assisted in its function by a high-level advisory board.

United Nations machinery for sustainable development

11. At the initiative of the Secretary-General, the Administrative Committee on Coordination, at its second regular session in October 1992, established the Inter-Agency Committee on Sustainable Development. Its main task is to identify major policy issues relating to the follow-up to UNCED by the United Nations system and to advise the Administrative Committee on how to ensure effective cooperation and coordination of the United Nations system in the implementation of Agenda 21. Before the April 1993 session of the Administrative Committee, the nine-member inter-agency committee is expected to launch a process utilizing inter-agency consultations to assist the Administrative Committee in streamlining the coordinating machinery; allocating and

sharing responsibilities for implementation of Agenda 21 by the United Nations system; monitoring new and additional financial requirements of United Nations system organizations related to Agenda 21, taking into account the decisions of their governing bodies; and assessing new and existing reporting requirements related to implementation of Agenda 21 and making recommendations on how these requirements can be streamlined.

12. In addition, a new Department of Policy Coordination and Sustainable Development, headed by an under-secretary-general, has been created within the United Nations to provide support for the Commission on Sustainable Development, the Inter-Agency Committee on Sustainable Development and the high-level advisory board. It will also work closely with relevant organs, organizations and bodies of the United Nations system (including the Joint Consultative Group on Policy), as well as other expert bodies outside the United Nations system, to coordinate activities concerning environment and sustainable development, in particular the follow-up to Agenda 21.

II. UNICEF RESPONSE TO AGENDA 21

A. Current involvement of country offices in environment

13. UNICEF country offices have reported an increasing interest in the environment, spurred by dialogue with various partners in preparation for, and as a follow-up to, UNCED. At the request of Governments, several country offices assisted in conducting studies and situation-analyses linking the state of the environment to the plight of the poor, with particular reference to children and women, and in co-sponsoring national seminars and conferences on the topic. These were included in the national reports prepared for UNCED. A large number of country offices initiated public campaigns and children's hearings to increase environmental awareness among schoolchildren and to involve them in the protection and improvement of the environment around their school, home and community.

14. These activities supplemented regular country programmes where environmental components were included as integral parts, at household and community levels, to improve the well-being of children and their families. Programmes that bear particular relevance in this context are: (a) provision of clean water, adequate sanitation and health education, including personal and household hygiene; (b) ensuring household food security and promoting knowledge of food preparation techniques to reduce malnutrition; (c) delivery of primary health care (PHC) services, including the Bamako Initiative, through community participation and control; (d) enhancing basic life skills as part of "education for life" through formal and non-formal education, "third channel" activities and mobilizing people to use Facts for Life; (e) promotion of such activities related to women and development as food processing, handicrafts, appropriate technologies for reducing women's workload, small business promotion and raising of livestock; and (f) provision of integrated basic services in rural and urban areas related to maternal and child health, water supply and environmental sanitation, food and nutrition, education and training, income-generating activities and, to a certain extent, fuel-efficient cooking stoves, alternative energy supplies and small-scale agroforestry.

15. These programmes are characterized by community participation and empowerment, education, cost-effective solutions, appropriate technologies and adaptation to local cultures and priorities. A close working relationship with NGOs and local communities is promoted, as is the involvement of local women. Advocacy and social mobilization constitute an essential part of the programmes. Although it is not possible to disaggregate the budgetary allocation to the environmental component as such, these related activities constitute at least $100 million, or 12 per cent of total UNICEF programme expenditure. If immunization and other health-related expenditures designed to improve the immediate environment of children and women are included, the total amounts to at least one half of UNICEF programme expenditure.

16. These human-centred, poverty-focused UNICEF programmes are crucial for reducing child illness and malnutrition and for reaching the goals of the World Summit for Children. But they also help, as the Secretary-General of UNCED noted, "to slow population growth and make possible environmentally sustainable development in the twenty-first century and beyond". 2/ There is, however, much more to be done to strengthen these programmes further. The environmental dimension has to be made more explicit in the UNICEF country programming process. For achieving sustainability of the important achievements made so far, PEC holds great promise. It provides an approach that integrates the effort to meet basic needs through empowerment of people to improve their environment. This is consistent with the recent multi-donor evaluation of UNICEF activities that recommends that empowerment and capacity-building be given greater attention, in conjunction with delivery of basic services.

B. Primary environmental care

17. Environmental concerns are wide-ranging and encompass all facets of life. As in the case of health, where the concept of PHC is distinguished from higher-level referral services and specialized medical care, or in education, where basic primary education is distinguished

from secondary and tertiary level education, UNICEF finds it effective to concentrate its actions in PEC. The concept of PEC is a community-based development approach that has three interrelated elements: meeting basic needs; empowering local communities; and ensuring the protection and optimal use of natural resources in and around the community. The basic premise is that environmental considerations must be linked to economic and social progress because environmental fragility and degradation directly threaten the livelihood of most people in developing countries. Innovative environmental interventions at the community level are necessary to enable people, especially the poor, to manage their resources responsibly and creatively so that they can meet the key World Summit goals related to PHC, nutrition, household food security and access to low-cost water supply, environmental sanitation and basic education. At the same time, experience shows that meeting these social development goals can be particularly beneficial in protection of the environment.

18. The empowerment of children and women is crucial. Any society that cannot care for its children cannot regard its development as sustainable. The growing minds of children must be infused with the fundamental precepts of: their rights to a "first call" on resources for decent livelihood as outlined in the Convention on the Rights of the Child and agreed to at the World Summit for Children; and their responsibility to future generations to pass on a healthy environment that will enable children to enjoy the fruits of a better world. Women are the most important resource managers and must have access to and rights over land and other resources, education and safe and equal employment, in accordance with the United Nations Convention on the Elimination of All Forms of Discrimination against Women and the Nairobi Forward-looking Strategies. Apartheid based on gender must be stopped.

19. There are two types of environmental deterioration that PEC seeks to prevent:

(a) Resource degradation (erosion of topsoil, deforestation) poses a threat, especially in such ecologically fragile and vulnerable areas as arid and semi-arid zones, mountainous regions, rain forests and urban slums, due to drought, desertification, deforestation and inappropriate development activities. The objective of PEC, in this respect, is to improve the availability, in terms of quantity and quality, of the natural resources that provide food, fuel and clean water;

(b) Pollution in the form of biological pathogens and chemical pollutants causes ill health and premature death due to water-borne diseases attributable mainly to the lack of clean water and safe sanitation and air-borne diseases spread by overcrowding, poor ventilation and indoor air pollution from burning of coal and fuelwood. PEC activities are directed to bringing about effective behavioural changes, at both household and community levels, in alleviating the hazards of pollution. 3/

C. Lessons learned from selected case examples of primary environmental care

20. PEC activities, although not known explicitly by that name except in a few recent cases, have been an integral part of UNICEF health, nutrition, education, and water supply and sanitation programmes. The environmental perspective is often more prominent in area-based development programmes which seek to provide integrated basic services in rural and urban areas. Seven cases are described in the annex to illustrate the various types of innovations pursued in different ecosystems in response to specific social, cultural and economic circumstances.

21. The project in Bangladesh illustrates the mobilization of resources with the objective of changing the method of excreta disposal by building household latrines and by providing hygiene education. The project in Botswana provides an example of using local resources more effectively to generate alternate income-generating opportunities by building new businesses based on indigenous knowledge and capability. The Brazil project, as a part of the Amazonia subregional project, is a response to the problems of the indigenous population and other poor communities caused by massive deforestation in the Amazon Basin a result of logging, monoculture, gold mining and petroleum extraction, and further compounded by the decline in world market prices of primary commodities. The Madagascar project represents an example of effective advocacy of a pilot initiative at the district level that led to national efforts in the area of environmental education and development, with a specific focus on children and women. In Nepal, community development initiatives have been achieved by reviving the traditional technique of handmade paper making and the production of greeting cards, through use of locally available resources. The Niger case exemplifies the struggle against the scourge of drought and desertification which is devastating people's livelihood, thereby requiring emergency operations on a frequent basis. In the Philippines, UNICEF- assisted relief and rehabilitation measures were transformed into sustainable means of livelihood by introducing low-cost, affordable technologies for food production.

22. Lessons derived from these examples, as well as those of the International Institute for Environment and Development, the Oxford Famine Relief Campaign and Action Aid, are highly relevant to the integration of PEC more thoroughly and more systematically in UNICEF country programmes. 4/ They demonstrate that:

(a) Development must provide opportunities for the poor to enhance their livelihood by focusing on food security, health, water supply, sanitation, basic education and income generation, in accordance with their own priorities;

(b) Technological and organizational approaches must be oriented to the generation and extension of small-scale, low-cost technologies that are appropriate in the local context and that benefit the poor in particular, by building on indigenous knowledge and awareness of the environment and by devising new solutions where old approaches are no longer effective;

(c) Local responsibility and action must be promoted to improve the productivity and protection of existing land, water, forest and other natural resources by ensuring rights of tenure and access to new information and financial resources;

(d) Government institutions and local functionaries must provide the necessary political support to encourage community-based environmental management;

(e) Outside agencies (including government organizations, NGOs, university groups and international agencies) must commit themselves to enter into dialogue for long-term human resources development at the local level by adopting a flexible approach and accepting a longer time-frame for support.

D. Strategic focus for implementing primary environmental care

23. In response to the recommendations of Agenda 21, the UNICEF mandate and operational flexibility for community-level action, through partnership with government agencies, NGOs and local community groups, should be pursued more actively to implement PEC and encourage innovative grass-roots activities. The role of UNICEF as facilitator, through modest seed funding and subsequent emphasis on advocacy and social mobilization, needs to be encouraged so that local capability is strengthened and goals of self-reliance and sustainable development are realized. Three strategic priorities are noteworthy in this regard.

Priority groups needing special attention

24. PEC has special relevance for the poor who are unreached or difficult to reach. The worst victims of environmental degradation include indigenous populations, ethnic minorities, urban slum dwellers and others living on the fringes of society who have been denied the basic services necessary to maintain their livelihood. At least 850 million persons are estimated to be at risk due to desertification; 500 million in the highlands live in jeopardy from soil tropical forests are affected by reckless exploitation of resources; and more than 1 billion of the world's urban dwellers live without garbage disposal or waste-water drainage facilities and breathe air filled with excessive suspended particulate matter. 5/ According to the United Nations Development Programme Human Development Report 1992, 80 per cent of the poor in Latin America, 60 per cent in Asia and 50 per cent in Africa live on marginal lands characterized by low productivity and high susceptibility to environmental degradation. 6/

25. Priority should be given to developing programmes that provide these groups with the opportunity to earn sustainable livelihoods in accordance with specific geographic and ecological criteria. The emphasis should be on such integrated human development policies and strategies as empowerment of local community groups, increased local control of resources, income generation, strengthening of local institutions and capacity-building of NGOs and local-level government to be involved in effective delivery mechanisms.

Building environmental awareness among children and women

26. Among the poor, women and children are the most vulnerable. Women are now under increasing stress as they are forced to spend more time in food production and processing under precarious conditions, in collecting water from ever more distant springs and in gathering fuelwood from depleted forests, farther from home. Children become more susceptible to disease and malnutrition as they are left to fend for themselves in polluted areas with scarce resources. If this continues, today's environmental degradation will be felt even more acutely by tomorrow's children.

27. Children must have the "first call" on resources and women must receive priority attention in the process of environmental improvement. They need to be empowered to become active participants in the development process and in environmental improvement. In this connection, children and youth should be given the opportunity for solid environmental education, with particular emphasis on enhancing life skills and bolstering ethical and moral principles. Their enthusiasm and energy need to be engaged at home and at school in looking for new and innovative opportunities to meet today's basic needs and to save the earth for future generations, and hence become environmentally and socially responsible citizens. From the point of view of women, the necessary emphasis is on achieving equality in all aspects of life, including the promotion of literacy, education and training, nutrition and health status and participation in key decision-making and in management of the environment, particularly as it pertains to access to resources and child spacing.

Advocacy and social mobilization

28. Poverty and environmental degradation of the worst kind call for large-scale operations on different fronts: grass-roots activism; poverty-focused technological developments; national policies oriented towards decentralized PEC activities; and international public support for addressing the problems of human deprivation in developing countries. What is needed, as advocated in The State of the World's Children 1993, is a "movement for basic needs".

29. The UNCED process has succeeded in motivating government agencies, local communities, NGOs and bilateral and multilateral donors to pursue environmental and sustainable development initiatives in many countries. The proliferation of interest and opportunities at national and international levels has been remarkable. The tremendous energy and commitment of NGOs is evident from the numbers that attended the UNCED Global Forum: 18,000 persons from 11,000 organizations and 171 countries. It is encouraging that this diverse group, representing a variety of social movements in both developed and developing countries, found common ground on environmental issues as they drafted the NGO treaties for reinforcing mutual support. From the point of view of UNICEF, building solidarity among these diverse groups, particularly at the national level, is a high priority.

30. Based on the mandate, experience and operational flexibility of UNICEF for activities concerning children and women, the strategy for advocacy and social mobilization should be pursued in a number of different ways:

(a) Providing modest seed funds to government agencies, university and research institutions, NGOs and
community groups to initiate innovative activities for improved livelihood at household and community levels, especially among the poorest;

(b) Going to scale, by incorporating innovative ideas and opportunities derived from PEC into country programmes and national programmes of action (NPAs);

(c) Social mobilization to promote PEC initiatives at household and community levels, modelled after the success of Facts for Life, by producing similar publications emphasizing the steps to sustainability in the context of the country's social, economic and ecological conditions:

(d) Support for advocacy campaigns: (i) to highlight the concerns of children and women, modelled after the children's hearings organized by the Voice of the Children International Campaign; (ii) to organize children to write their own version of Agenda 21, as initiated by Peace Child International; and (iii) to hold women's hearings and tribunals at national, regional and global levels, as organized by UNIFEM, Worldwide Network and the Women Environment and Development Organization.

E. Including the primary environmental care perspective in the UNICEF programming process

31. The strategic priorities approved by the Executive Board to achieve the development goals for children in the 1990s (E/ICEF/1990/13, decision 1990/2) provide a comprehensive framework to respond to Agenda 21. Furthermore, the procedure to make the environment more prominent in the country programming process is contained in Executive Board decision 1989/18 (E/ICEF/1989/12). This assumes even greater relevance today, since UNICEF, along with other agencies in the United Nations system, has been asked to contribute towards implementation of Agenda 21. As noted in "Children and environment: a UNICEF strategy for sustainable development" (E/ICEF/1989/L.6):

(a) "Whenever UNICEF undertakes to prepare or update the situation analysis of children and women in the context of its country programming exercise, it should contain a brief chapter or sections highlighting issues of environmental concern not only for the present but also for future generations"; 7 /

(b) "UNICEF representatives will be asked to systematically analyze the environmental impact of proposed actions and, where appropriate, to include programme components that are specifically designed to contribute to environmental protection and sustainability"; 8/

(c) "In the programme appraisal and review processes ... in addition to examining budgetary costs and project outputs or service coverage, long-term environmental costs and the risks and benefits of a given programme should be examined"; 9/

(d) "Environmental concerns" and issues should "be included in the appropriate training and orientation programmes for staff". 10/

These steps should be pursued more systematically and with increased vigour.

32. It is now necessary to develop and refine such tools, indicators and methods as situation analyses, programme reviews, strategy formulations and programme evaluations that can be used by country offices to analyze the causes and consequences of environmental change at different stages of the programming process. The purpose of such analysis is to incorporate the principles of PEC in country programme strategies and NPAs to achieve the goals of the World Summit for Children, on a sustainable basis.

III. RECOMMENDATIONS

33. The Executive Director recommends that the Executive Board approve the following recommendations:

The Executive Board Decides that

(a) UNICEF take active steps, by maintaining close cooperation and collaboration with the Commission on Sustainable Development and other agencies of the United Nations system, as well as Governments and NGOs, and in accordance with the recommendations contained in Agenda 21, to develop programmes for children and women, incorporating PEC as a fundamental approach to ensure the active participation and empowerment of children and women for meeting their basic needs on a sustainable basis and for the protection and optimal utilization of natural resources in and around the community;

(b) While implementing PEC, priority be given-to: (i) the poorest who are hardest to reach and are living in the most environmentally degraded and vulnerable conditions; (ii) the empowerment of children and women through greater awareness of opportunities for enhanced livelihood and environmental improvement; and (iii) solidarity with NGOs, to include the concerns of children and women as essential components of social movements in support of environment and sustainable development;

(c) Emphasis be given to developing and refining tools, indicators and methods for the systematic analysis of environmental causes and consequences during situation analyses, programme reviews, evaluations and strategy meetings, in order to assist

Governments and UNICEF field offices in ensuring that NPAs contain PEC elements and that UNICEF country programmes provide support for PEC wherever feasible and appropriate;

(d) The UNICEF mandate, experience and operational flexibility be used to: (i) give modest seed funds to UNICEF partners to initiate innovative PEC activities to demonstrate their viability prior to larger-scale implementation; (ii) encourage social mobilization through schools and health centres so that children and their parents become effective focal points for sensitization of communities to environmental issues; and (iii) support advocacy campaigns to incorporate the concerns of children and women in relevant policies and strategies at the local, regional and national levels;

(e) The proposal on the global fund for environment, which seeks $ 2.5 million in general resources and $ 6.0 million in supplementary funding as part of the Programme Funds for the 1990s Goals, be approved in

order to support planning, project preparation and specific actions over the 1994-1995 biennium to encourage the inclusion of more and better quality environmentally-oriented actions within UNICEF country programmes;

(f) The Executive Board invite the Commission on Sustainable Development to include the goals and strategies for children in the 1990s in its deliberations on the multi-year thematic programme of work at its first substantive session and in the monitoring of progress concerning the implementation of Agenda 21;

(g) The Executive Board call upon donor countries, international financial institutions and all agencies of the United Nations system to increase funding for child-related PEC activities, as recommended in Agenda 21, with a view to allocating 20 per cent of official development assistance to human development priorities.

Notes

1/ UNICEF, Children and Agenda 21: A Guide to UNICEF Issues in the Earth Summit's Blueprint for Development and Environment into the 21st century (Geneva, 1992).

2/ Quoted in UNICEF, The State of the World's Children 1993 (Oxford and New York, Oxford university Press, 1993).

3/ UNICEF/United Nations Environment Programme, The State of the Environment - 1990: Children and the Environment (New York and Nairobi, 1990).

4/ Joan Davidson, Dorothy Myers and Manab Chakraborty, No Time to Waste: PovertY and the Global Environment (Oxford, Oxfam, 1992; and Johan Holmberg (ed.), Policies for a Small Planet (London, Earthscan Publications Ltd., 1992).

5/ Alan B. Durning, Poverty and the Environment: Reversing the Downward Spiral, Worldwatch Paper 92 (Washington, D.C., Worldwatch Institute, 1989).

6/ United Nations Development Programme, Human Development Report 1992 (New York and Oxford, Oxford University Press, 1992).

7/ "Children and Environment: a UNICEF strategy for sustainable development" (E/ICEF/1989/L.6), para. 87.

8/ Ibid., paragraph 34 (d).

9/ Ibid., paragraph 39.

10/ Ibid., paragraph 91.

Annex

EXAMPLES OF PRIMARY ENVIRONMENTAL CARE

I. ENVIRONMENTAL SANITATION IN BANGLADESH

1. In Bangladesh, unsanitary disposal of human excreta and inadequate personal hygiene account for high incidences of diarrhoeal disease and child deaths (about 250,000 persons every year). In 1987, in response to these problems, the Department of Public Health Engineering introduced a system of tube-well installation in the community that requires the construction and use of 5 (and later 10) latrines. This resulted in a reduction in diarrhoeal disease by 25 per cent due to the increase in the number of sanitary latrines (from 4 per cent in 1985 to 26 per cent in 1991), combined with high coverage of water supply and sanitation and hygiene education.

2. Social mobilization was pursued actively as part of the campaign. "Court meetings" were arranged where field workers discussed sanitation, family planning and immunization with groups of 25 to 30 families. High school students undertook visits to the local community. These efforts were strengthened by the distribution of communication packages for sanitation and hygiene education and the use of tube-well water for all domestic purposes. In addition, curricula were upgraded and change agents were trained.

3. It is a positive sign that the demand for latrines is growing. The number of private latrine manufacturers is increasing rapidly and low-cost latrines are being developed to provide more options at a lower cost. The current UNICEF water supply and sanitation programme (1992-1995) is allocating 35 per cent of funds to the sanitation sector.

II. SUSTAINABLE PRODUCTION OF VELD PRODUCTS IN BOTSWANA

4. Because of the drought-prone, semi-arid climate in Botswana, household food security and economic security have been major problems. Thusano Lefatsheng, a local NGO, responded to these problems by initiating an innovative undertaking involving sustainable production of the under-used veld (grassland) products as a viable income-generating alternative. Veld products are adapted to the harsh and variable climate and their harvesting and processing do not compete for time at peak periods of the agriculture calendar.

5. A small research farm, Thusego, was created in 1984. Remarkable achievements have been accomplished since then through a range of activities, among them purchasing, processing and marketing (nationally and internationally) of the "Kalahari devil's claw", a natural cure for various ailments; and developing, processing and promoting jam and local beer out of morula fruit, oil out of morula kernels, staple food out of morama tubers, protein-rich butter and livestock feed out of morama beans, as well as a range of herbal "bush teas". This has resulted in: (a) the employment of 1,700 people, 70 per cent of whom are women and 85 per cent of whom are from disadvantaged ethnic groups in districts where economic opportunities are extremely limited; (b) the development and promotion of ecologically sound harvesting and protection techniques for wild plants and wildlife; and (c) the development of a profitable "whole farm" approach with traditional and new crops, medicinal plants, trees and livestock.

6. The enterprise is expected to be self-supporting by 1993. Initial funding for the project was provided mainly by HIVOS, an NGO in the Netherlands. UNICEF provided support for expansion of the project. In 1993-1994, the activities will extend to a fourth district, with support in part from the Norwegian Agency for International Development and UNICEF.

III. PRIMARY ENVIRONMENTAL CARE IN BRAZIL AND THE AMAZON BASIN

7. The "Poverty and Environment Project" in Brazil, coordinated locally by the Federal University of Para, promotes a community-based development approach by drawing on local knowledge of Amazonian conditions and mobilizing State and municipal governments, local communities and university researchers to cooperate closely to meet basic needs of the poor in ways that protect and regenerate the environment. The project has already created an effective, low-cost, decentralized potable water technology that can both reduce water-borne illnesses and protect water resources from contamination in the humid lowlands. Chlorination takes place when the contaminated water mixed with drops of salt solution passes through titanium alloy plates charged with a very low electrical current. The project has also drawn on indigenous forest management practices to develop highly productive, small-scale agroforestry techniques that protect land and forest resources while providing adequate family nutrition and a reasonable income.

8. Within a year of operation, local talent and ideas have proved to be highly productive; community organization has made implementation quick and efficient; and collaboration between organizations has facilitated the mobilization of substantial resources in support of community activities. This approach is being advanced through an Amazon subregional project in which six UNICEF offices serving eight Amazon Basin countries participate.

Supplementary funds are now being requested for the participating countries to undertake exploratory projects similar to those carried out in Brazil.

IV. ENVIRONMENTAL EDUCATION AND COMMUNITY INITIATIVES IN MADAGASCAR

9. A primary school programme was initiated in 1989 in Fenerive in the Toamasina province of Madagascar. School textbooks were prepared for three successive grades by incorporating relevant concepts of nutrition, hygiene and environmental protection and were integrated into classroom teaching. Twice a week, throughout the school year, children, teachers and parents participated in school gardening and fruit tree planting. In 1989, an area-based programme was initiated to involve teachers and interested parents in family gardening and agroforestry, as well as in the construction of latrines, improved stoves and tree nurseries. Low-cost community child-care centres and vocational training for youth were also part of the programme. Local NGOs and relevant government ministries participated in the implementation.

10. Within two years of operation, the project succeeded in fostering a number of community initiatives as evidenced by: the creation of peasants' associations in 5 out of 11 subdistricts; the training of association members in establishing small nurseries; the introduction of new vegetable seeds and coconut and fruit seedlings; the reforestation and soil protection measures in selected sites; and the promotion of improved stoves and ovens.

11. Encouraged by the success in Fenerive, the Ministry of Education announced in 1992 that the model will be introduced in all 13,000 schools around the country. A master plan is currently being prepared. Another initiative has been taken by the National Office of the Environment and the Cellule Mere-Enfant (Mother-Child Unit) of the Prime Minister's Office, in conjunction with the multi-donor effort on the Environmental Action Plan. UNICEF assisted in the design of a programme of action with the help of a group of international and national consultants. Program A-Z, Ankizy sy Zavaboahary: Solofo Dimbin'ny ala, meaning "children and environment: young shoots who renew the forest", is the outcome of this effort. This project is now evolving into Madagascar's NPA, in pursuit of the goals of the World Summit for Children. It will be launched in 1993, first by implementing the new curriculum in the drought-stricken southern province in conjunction with a food relief programme centred in the primary schools.

V. COMMUNITY DEVELOPMENT THROUGH HANDMADE PAPER PRODUCTION IN NEPAL.

12. In 1981, UNICEF and the Small Farmers Development Programme of the Agricultural Development Bank of Nepal initiated an innovative project that helped to revive and revitalize the 800-year-old technology of making paper out of the bark of lokta bushes (Daphne Bholua and D. Papyracea). This provided opportunities for additional income to lokta cutters and paper makers during the slack season when demand for agricultural labour is low. The locally made paper was used by Bhaktapur Craft Printers in Kathmandu Valley to print cards for world-wide sale through outlets of the UNICEF Greeting Card and related operations (65 per cent) and through other mechanisms (35 per cent).

13. The project was initiated with UNICEF technical support and a small financial grant over a three-year period. The Small Farmers Development Programme mobilized and organized rural lokta cutters and paper makers in three districts of western Nepal through training in group formation, marketing and accounting. Several critical inputs, not found locally, were also made available.

14. Local income increased threefold in nine years as the number of families engaged in all related processes increased steadily. Gross income from sales increased fourfold during the same period, and in 1985 the company became self-supporting. Plans are under way to make it a private company, with 50 per cent of shares to be held by the Agricultural Development Bank of Nepal, 5 per cent by company staff and 45 per cent by participating communities.

15. Some 50 per cent of the company's net income has been used for a community development fund; 3,000 families have consequently benefited from the installation of potable water supplies and public latrines, school improvements, health centres, veterinary services, flood control and soil conservation and a micro-hydroelectric installation. All projects identified by the participating families were implemented with at least a 40 per cent contribution from the community. In 1991, annual expenditure on these activities was close to $150,000 (65 per cent from the community).

16. There were many notable innovations during the development process, for example: adoption of sustainable forest management practices, reduction in fuelwood consumption through energy efficient techniques and search for alternative raw materials to substitute for lokta. Over the next five years, the project will be extended to 11 districts. If it succeeds, it will be expanded nationwide.

VI. FIGHT AGAINST DESERTIFICATION IN NIGER

17. Niger, a vast, land-locked Sahelian country, suffers from serious drought and ecological degradation. Such human intervention as tree-felling for fuelwood exacerbates the problem. Consequently, the very survival of people has become threatened. Since 1985, the Government of Niger has responded to the crisis by initiating a campaign to mobilize both the government machinery and local communities to protect the environment and fight against the calamity.

18. Accordingly, UNICEF has included an environmental component in its programmes on nutrition and food security, emergency operations and rehabilitation, water supply and sanitation and education in the provinces of Zinder, Maradi, Tahoua and Tillaberi. A situation analysis with specific focus on the environment was carried out and major constraints related to the ecosystem were identified through dialogue with community members.

19. The process resulted in the implementation of grass-roots programmes in cooperation with government agencies and NGOs, for example: (a) stabilization of sand dunes and restoration of 300 hectares of land; (b) planting of 120 one-kilometre hedge rows as wind-breaks to protect 40 farms, 500 water sources and 12 hectares of forest; (c) protection of pastoral areas from brushfires by digging 60 kilometres of fire-breaks and training and equipping 50 firefighters; (d) establishment of 40 village nurseries and training and equipping 88 caretakers; and (e) education and training of 4,300 students in environmental protection and planting of trees around schools.

VII. FAMILY FOOD PRODUCTION PROGRAMME IN THE PHILIPPINES

20. The economic crisis brought about by a persistent decline in the price of sugar resulted in the displacement of 250,000 sugar workers in 1984 in the province of Negros Occidental. Children died at a rate of 25 per month due to severe malnutrition. In response to the crisis, the Family Food Production Programme was implemented in 1986 by the International Institute for Rural Reconstruction, with UNICEF assistance.

21. The first two years focused on bio-intensive gardens, along with the provision of other basic services for relief and rehabilitation. Bio-intensive gardens are a simple, low-external-input technology that relies on the use of 50 square metres of land, together with organic fertilizers, natural pesticides and indigenous seeds, to provide daily vegetable needs. As a result of the effort, malnutrition was reduced from 40 per cent in 1986 to 25 per cent in 1988. The food-lot module, introduced in the third year, involves the integration of various components on 1,000 square metres of land, such as crops, livestock, fish-ponds and trees, to respond to cash and food needs of the family. Starting in the fourth year, emphasis was placed on institutionalization, concentrating on training for community organizing, technology update and formation of family food production committees at the municipal level.

22. Other notable initiatives during this process included: establishment of school nurseries for vegetable seed production, in which close to 18,000 pupils from 88 schools distributed 34,000 vegetable seedlings and 33 kilograms of vegetable seeds; promotion of farmer-to-farmer transfer of ideas, including sharing of implements, teaching and learning technology and follow-up work; and formation of the Foundation of Community Garden Promoters to help in the transition from relief to self-sufficiency. The forthcoming challenge lies in overcoming such constraints as insecurity in land tenure that has hindered further promotion of food-lot modules and the absence of irrigation water to maintain bio-intensive gardens during the summer months.

PROANDES (SUMMARY) (2/92)
Bolivia - Colombia -Ecuador - Peru - Venezuela

The fundamental proposal of the programme was defined as improving the condition of life of the 13 million children and adolescents living in the subregion who are especially vulnerable to the period of crisis and economic adjustment. PROANDES was approved by the Executive Board of UNICEF in 1988, (for US $29 million), as a strategy to be developed in each of the five countries of the subregion, as well as an important component at the subregional level. The objectives, strategies and activities of the programme contribute in direct form towards the goals established In the Plan of Action of the WSC, celebrated in New York in 1990 with the participation of 72 heads of state, 22 of which belong to the Latin American and Caribbean Region.

Objectives: The general objective of PROANDES is to assist, in specific zones where the effects of poverty are especially severe, actions for the development of children and women, particularly in health, nutrition, provision of water and sanitation. The programme places emphasis on social mobilization and participation of civil society with the purpose of including the child in the political agenda making it the central principal of programmes of social services in the Andean countries. The programme also promotes the integration of countries of the subregion and augments significantly technical cooperation between them, while developing projects of common interest.

Concrete Goals:

- Extend the basic health services and the strategy of PHC.
- Reduce infant morbidity-mortality.
- Improve the psycho-physical development of the child.
- Improve the health of the woman and increase her role in the processes of civic decision-making of social development.
- Augment the availability and access to basic services, especially health and nutrition.
- Augment the production and consumption of foods and improve nutritional vigilance.
- Improve services of sanitation and the availability and access to water.
- Diminish illiteracy, especially female illiteracy.
- Strengthen communal organizations, especially women.

Strategies of the Programme:

At the sub-regional level, it proposes an intensive use of instruments to promote social mobilization of governments, organisms of civil society and international organization of financing and technical cooperation to promote concrete actions in favour of the women and child. At the national level, it promotes 'going-to-scale' and the institutionalization of successful experiences at the local level.

Venezuela: For the child under 6 years, it assisted in the programme of child care homes. Provides assistance to the project of renovation of basic rural education, that looks to adapt education to the needs of rural children, adopting the Colombian "New School" methodology. Also implemented important programmes of survival and child development with NGOs, especially the Catholic Church and the Association of Boy Scouts. In the State Trujillo, PROANDES expanded coverage of infant-maternal services to 41 % of the target population (expectant mothers, children between 0-6 years), including incorporating actions with NGOs in favour of children. (Financed 75 % of the programme).

Subregional Strategic Support: Contribute to the training of human resources in social planning and management, mass communication and social mobilization, and to the summation and exchange of experience among the five countries of the region. Promotion of iodized salt, especially in Bolivia and Peru. Both countries also require improving systems of distribution and commercialization and social communication to stimulate its consumption. In Ecuador, assist with a system of epidemiological vigilance; in Colombia/Venezuela, more precise diagnostic elements. Principal Activities of the Programme:

A. Social Policy and Planning which are "Human-centred"
B. Monitoring and Evaluation
C. Development of Social Technologies
D. Basic Education/Education for Peace and Democracy
E. Health and Nutrition
F. Capacity Building
G. Technical Cooperation between Countries of the Region
H. Communication and Mobilization

Summary of Country Activities:

Bolivia: Coverage of PHC in rural areas considered the most deprived through community health promoters and Federations of Farmers, Teachers, local authorities. Programmes of efficient systems of potable water and modules of sanitation. Local production, through construction of systems to minimize risks, grain banks of seeds/agricultural products, seeds, fertilizers, sanitary fixtures and technical agrofishery assistance, working with organized farmers unions, agencies of intl. cooperation and govt. agencies. (83 % financing complete).

Colombia: Actions in the areas of health, nutrition, education, literacy, water, sanitation and social mobilization. Assistance has helped reach 80% of EPI coverage, attention to cholera epidemic and implementation of a Plan for Maternal Breastfeeding. Universalization of Primary Rural Education through spread of the "New School" methodology. Within the programme of Basic Social Services of the Pacific Coast, programme actions include productive projects for women (agriculture and animal husbandry), clean water supply systems, construction and use of latrines and the treatment of garbage, etc. (Financed 67% of the programme).

Ecuador: Strategy of integrated family health initiated with the assistance of UNICEF. Deals with control of cholera epidemic, growth monitoring, projects of production and marketing of food. Utilizing techniques of low-cost resources, construction of systems of potable water and latrines as much as sanitary facilities and community washing centres. Teacher training in the use of modern and traditional medicine. Formation of 3 matrix educational centres that cover 23 rural schools each one utilizing the "New School" methodology (Financing 59%).

Peru: The programme reached 16,520 rural inhabitants with improved quantity and quality of available water resources. It involved 23,450 persons in productive agrofishery projects, techniques to improve food availability, family income and the nutritional levels of families, especially children and women. Another important achievement is the putting in place of a Vigilance System of Food-Nutrition "SISVAN", as a pilot project. Almost 5000 kitchen gardens were established by families to improve nutritional status of children and to conserve the soil.
(Financing reached 30% which impeded reaching project objective).

PROANDES - BOLIVIA

Background:

The urban population is 50% with a growth rate of 4.3% higher than the rural areas. Fertility rates are the highest in the subcontinent (6.0%) and life expectancy is 53, the lowest in the all America. Malnutrition is rampant with 46% of children under 5 malnourished, rising to 50% in rural areas. This is related to native food production patterns which has led to nutritional deterioration, such as iodine deficiency. Rural access to services of potable water is barely 13% (44% urban). Lack of access to educational services is also significantly higher in the rural areas. This is one of the reasons PROANDES has targeted the rural areas as "fields of action", particularly mountain districts. The situation of children in these areas is characterized by "extreme poverty". The principal causes of high infant mortality rates (190-250/1000) was identified as ARI followed by acute dehydration.

Goals:

Nutrition: Develop food-nutrition vigilance systems in 90% of the communities.

WATSAN: Provide water services for human consumption to 40% of the communities; provide systems of sanitary evacuation of excreta to 4)% of the communities.

Programmes of Action:

Health:

ARI: Attention at the community level was initiated to low/moderate ARI by volunteer promoters. 14,692 cases of low/moderate ARI were attended to along with 277 serious cases, which quite an advance. UNICEF assisted with studies, expenditure on training and supervision.

CDD: 36,843 cases of mild diarrhoea and 217 serious cases were attended. 60% of the communities use ORT packets, 10% before the programme. UNICEF assisted with provision of ORT, logistical assistance, training and supervision.

Traditional Medicine: UNICEF - German Technical Cooperation assisted Bolivian scientists to investigate medicinal plants that the "colliris" y "kallawayas" (local traditional medical experts) use for the treatment of diseases. A "Manual of Traditional Medicine" resulted that uniformed the nomenclature of the plants, their scientific description, their curative properties and form of treatment. The intention is minimize the risks of traditional medicine and maximize its efficiency by giving it a technical and scientific base;

establish a source between traditional and modern medicine in community pharmacies to provide access to population for basic and plant medicine~.

Local Health Systems: To extend the major services of PHC, PROANDES has promoted the tactic of Local Systems in the districts of Health as efficient mechanisms of concertization and decentralization. This has concertized the focus of health by integrating general health actions with those of nutrition - feeding - production of foods with the construction of systems of water, sanitation, under the administration of the Health District.

Water and Sanitation:

204 systems of potable water constructed by PROANDES was reached with the lowest per capita cost and shortest construction time. Their function is guaranteed by operation and maintenance by the beneficiaries themselves mediated through the local authorities. PROANDES contributes to technical assistance, payment to specialized workers, construction materials, supervision costs, etc. NGOs collaborate in organizing the community, are responsible for construction work and the delivery of the materials to the community. Local farmers form administrative committees, have been trained in the management and repair of water systems for which they have been provided with a Manual for the Management, Operation and Conservation of Potable Water Systems. In 37 densely populated communities, they have contributed to sanitation modules that consist of public latrine services, public showers with solar panels, washing centres, etc.

Education:

Community Education: PROANDES has bridged a technical assistance programme and training materials for "Community Schools", an alternative education for children of high mountain zones where most teachers don't want to serve.

Community Development and Income-Generation:

Agricultural Campaign: The functioning of 38 community nurseries were launched for forestation, construction of 38 stations/terraces to prevent erosion, construction of 163 systems of risk prevention, execution of an agricultural campaign with rotational funds with provision of seeds, fertilizers, sanitary fixtures and technical assistance to 4000 families.

Other Partners: UNDP, FAO, WHO, 'Project on Poverty', World Bank, 'Emergency Plan - with a focus on health' by the German Technical Agency, FAO & Technical Cooperation of Holland initiated projects on fertilizers, cereals, forestation, production of potato seeds and training of women in agrofishery activities.

Diseases component concentrated in zones of high epidemic risk (the Pacific and Atlantic Coasts). An emergency purchase of 400,000 ORT packets were made, volunteer training, etc. The Government is also implementing a special emergency plan which incorporates medium-term actions with emphasis on environmental sanitation at a cost of US $ 400,000.

In concertation with the Ministry of Health and ICBF, UNICEF sponsored a rapid evaluation (RAPS) of the Food and Nutritional Vigilance System of Colombia. It identified the state as advancing the system, its strengths and weakness and recommended new institutional and operational directions.

To promote personal health according to OPS norms in relation to ARI, the following materials were published: a) a manual on norms for the management of ARI, b) documents on norms and behaviour necessary for personal health with modifications.

Organization and Training of Rural Women:

Activities: regulation of the Inter-institutional Committee for Women with institutional participation of the agrofishery sector. Proposed design of a system of information, follow-up and evaluation of policy and women's projects in agrofishery institutions which have axis the Ministry of Agriculture and the Council of the Presidency on Youth, Children and Family.

Programme of Basic Social Services in the Pacific Coast:

The programme in addition to serving as the base for the design of programme of national protection such as Welfare Centres and regional adaptation of "New Schools" has reached important coverage levels in health, education activities for children under the age of 7.

Small Productive Projects: This project that encompasses its actions in the forest reserve of the rivers Escalerete and San Cipriano in the municipality of Buenaventura, has focused on integrating productive projects in management of the forest reserve at the level of educational recreation. With this end, it has realized physical adaptation of housing, capacity building to natives in ecological management of forests and constructed water solutions. At the same time, it continues assisting productive agriculture and mining projects with technical teaching and studies.

PROANDES - COLOMBIA

Background:

42% of the population (incl. 2,438,755 children) found in conditions of poverty and 23.6% (1,347,884) in conditions of misery which represent high multiple risk not only in health and nutrition states, but also for the adequate and harmonious psychological development of children. Although IMR has been declining over the years, there still persists enormous differences in mortality, morbidity and in effective socio-economic groups, major causes being diarrhoeal diseases, ARI. Global malnutrition for children U/5 was reduced from 1980-90 from 19.4 to 13.1 respectively. Most affected by malnutrition being children from 12-23 months belonging to rural zones and marginal areas of cities. School-going levels too are lower in rural areas and in the most poor departments. Only 57% of the homes have electricity, piped water and drainage.

Goals:

- Diminish mortality caused by dehydration produced by Diarrhoea and caused by ARI, in more than 50% of the cases.
- Reduce the most severe manifestations of poverty in the Pacific Coast even by 20%.

Lines of Action:

Basic Health and Nutrition "National Plan for Child Survival and Development" - Supervivir. Among its objectives are to reduce morbidity/mortality caused in children U/5 by diarrhoeal diseases, ARI, preventible diseases by vaccines, malnutrition and other sicknesses.

Education and Literacy: Universalization of Basic Primary Rural Education: Contributes to improving the quality of education for 1,500,000 children in rural schools through the application of "New School" programmes.

Primary Attention en Health, Water and Sanitation, Literacy, Social Mobilization and Communication in Productive Projects: Basic Social Services in the Pacific Coast - PSSB The Pacific Coast is one of the poorest regions in the country, registering one of the highest levels of infant mortality in Latin America. Its inhabitants find themselves in absolute and critical poverty.

Programmes of Action:

Health:

Supervivir: To respond promptly to an emergency generated by a cholera epidemic, PROANDES resources for the Control of Diarrhoeal.

PROANDES - ECUADOR

Background:

Ecuador has a demographic structure in which children predominate; its estimated that more than 40% are between 0 -14 years. Actually, the urban population constitutes 55% of the total and grows at a rate of 4.8%, substantially more than the rural population which reflects the great disparity life in the city and the countryside, such as the limited perspectives the rural life offers to young people. The majority of the poor population live in the rural areas where it is estimated that 33% are indigenous. The PROANDES programme in Ecuador assists rural populations severely affected by poverty, with convergence of services for the survival/development of the child and woman. In addition to very high infant mortality rates, more than 70% of the homes lack potable water. A large number of children do not have access to education with high drop-out and repetition rates.

Specific Objectives:

Water and Environmental Sanitation: Contribute to the search and application for alternative technologies at low cost to provide water to the farmers; assist educational processes for use and conservation of water, elimination of waste and excreta, implementing technologies for soil preservation, tree planting.

Education: Develop non-conventional educational models, especially the "New School" methodology developed in Colombia.

Income-Generation Assist Activities related to improving nutrition and give priority to rural women in training of agrofishery activities.

Goals:

Nutrition: Contribute to the development of a system of food nutritional vigilance in 100% of the communities of the project.

WATSAN: Provide, through economic solutions, potable water and drainage to approximately 100% of the communities.

Education: Initiate "New school" pilot projects for the attention of 12,000 children. Train 80% of the teachers belonging to the project area, involved in basic education.

Lines of Action:

Health: Administer supplies and teams for its treatment (medications, diagnostic teams, etc.)

Nutrition: Assist the implementation of a System of Vigilance for Food - Nutrition; propagate native crops and the growth of domestic animals to increase proteins in the diet; proportion seeds and herbs for the programme of vegetable gardens in school and communities; improvement of commercial systems of foods; train in the preparation and conservation of food; assist putting in place of community kitchens.

Water and Sanitation: Investigate alternative adequate technologies for the provision of water; administer projects for the treatment and distribution of water. Collaborate in the construction of sanitary latrines.

Primary Education: Assist in the study and adaptation of the experiences of "Escuela Nueva", such as the formation and training of rural teachers for the application of the model.

Programmes of Action:

Health:

With the purpose of revitalizing and bringing to scale traditional medicine, the programme trained community and institutional personnel and prepared a video on the subject. One of the major results is respect and use of traditional medicine combined with the use of western medicine.

Nutrition and Food Security:

To increase the availability ad consumption of foods at the family and community levels, it organized 23 community stores, 160 horticulture gardens with organic agricultural techniques and constructed 25 farms to assist in the growth of small animals. It assisted in the production of milk and other derivatives of soya for the consumption and children and pregnant mothers.

Water and Sanitation:

It provides potable water and latrines to around 30,000 beneficiaries through different techniques and alternatives at low-cost. It also constructed sanitary bases and community washing centres in some day care centres and in indigenous schools. It constructed a system of drainage for the collection of used water, actions for conservation of soil and environment.

Potable water is the most felt need for rural communities even though the cost for this service are elevated, it has maximized resources using appropriate technologies of low-cost and community works through "mingas".

Education:

In the province of Imbabura, assisted in the formation of 3 educational matrix centres (CEM) that cover a range of action of 23 rural schools: among its results are training teachers, school directors and members of the community in this methodology that responds to the reality of farming communities.

PROANDES - PERU

Background:

PROANDES in Peru has adopted the term "water for hungry land", an expression Quechwa that tries to synthesize the conceptual orientation of the project. PROANDES is executed in the Andean mountains, space that defines the historic-cultural personality of the country. Prehispanic civilizations knew of the immense potential of the Andes, basically through optimization of management of its critical resources: water and land. Andean lands are characterized by marked rainy periods, which makes them particularly vulnerable to erosion, if the agriculture is not executed following certain practices that guarantee ecological equilibrium of the environment. Inadequate agricultural practices, intensive use of the earth and pastures constitute a problem in the Peruvian Andes. In addition, according to studies of the pluvial precipitation, there exists a progressive diminishing of the volume of available water.

The highest malnutrition rates are prevalent in the rural Andes to the point that 63% of the children U/6 present this deficiency. Clean potable water and elementary sanitation services such as latrines are also scarce in the Sierra, with only 17.5% of farmers having access to these. In certain departments, only 3% of homes have water. Among PROANDES' major objectives are to improve the development and nutritional level of the Andean infant population through the stimulation of productive projects which are executed with a

conservationist view, with the concept of converting 'drops of water into graneries of food'.

Objectives:

- Introduce agrofishery projects which contribute to conservation and improvement of the environment.

- Introduce practices to improve and optimize water resources as much for human consumption as for agrofishery uses.

Goals:

- Assure that 20 - 30% of the population of the beneficiary community assumes practices of conservation agrofishing, coherent in the topography of the environment.

- Improve the quality of water consumed in the environment, augment by at least 15% the distribution of water through hygienic procedures (tubed water and communal basins). On the other hand, this water should be recycled for its use in agrofishery, under the precept of converting 'drops of water into grains of food', which should result in large part in the recuperation of the volume of water resources in the Andes.

Strategies:

In the context of a social process in a generally adverse and restrictive physical environment, the project articulates three central elements for the psycho-physical development of the child: women's organization, educational action and productive activities. Under 'productive activity' is markedly the concept of protection/ improvement of the environment, which guarantees conditions for the permanent replicability of the process.

Food and Nutrition: Promotion of cultivation in small groups with integrated use of water systems. Stimulation, extension or recuperation of community solutions for cultivation such as slopes, terraces to improve the production, protection of crops and rational use of water. Install communal seed banks with improved seeds for community soils at low cost with local materials, assure protection and commercialization of harvests or seeds, including dehydration of potatoes for conservation.

Basic Sanitation Promotion in integrated and community use of water (potable for human consumption, drunk by animals, for washing and irrigation) through the institution of sinks outside of springs and piped water, utilization of communal wells with handmade drums; utilization of multifamily filters for superficial sources of water.

Programmes of Action:

1360 PRONOEIs received modules on basic hygiene education, with the purpose of generating preventive habits in 33,000 participating children in PRONOEIs, to counteract the cholera epidemic and other diseases. Stimulus to small productive agrofishery projects, activities involved 23,446 persons, the majority women, orienting approximately half towards the establishment of vegetable gardens and fish farms.

In effect, this provided 4,623 farms that served to improve the diet of children (in many cases through child community kitchens associated to PRONOEIs). It also financed 21 community plots managed by groups of mothers and provided 107 projects of infrastructure of soil conservation (recuperation of terraces, slowly formed terraces, benches, etc.) It also assisted in animal raising (chickens and roosters) benefitting 3,697 persons, and financed 21 projects of agro-artesenal activities.

In the area of improvement of water resources, the fifth line of action of PROANDES, thanks to the realization of 109 small works benefitted 16,518 persons, with the improvement of the water quality consumed. The works contemplate the establishment of "piped water", construction of reservoirs and conduct canals, protection of sources of water and establishment of family wells. Equally, in Cajamarca it assisted the construction of approximately 3,000 latrines and realized training workshops for the construction and maintenance of water works and latrines.

PROANDES - VENEZUELA

Background:

During the decade of the 80's, Venezuela suffered a economic-social deterioration unique in its history, especially after the petrol boom of the 1970s where the annual growth rate was 8%. The crisis of debt adjustment and disparities of income has particularly affected the woman and the child manifested by IMR and MMR rates. Malnutrition of children under 15 years for 1987 was 13.7%, partial product of reduction of per capita income in nutritional programmes.

Objectives:

PROANDES in Venezuela is composed of two great components: Assistance to National Policies and the project of basic services for children of the State of Trujillo. The objectives planted are the following: a) Propicate policies and strategies that the Government implements to confront poverty, assisting in the coordination of public organisms in the design and implementation of social policies to rationalize the use of resources and improve the efficiency of programmes and social projects, b) improve conditions of health, nutrition, environmental sanitation, education and literacy of communities in the state of Trujillo and other specific districts.

Lines of Action:

Action oriented to families in situations of critical poverty: Improvement and conditioning of housing; use of potable water and environmental sanitation; community organization to conceive improved conditions of living.

Community Activities: Promotion of organization and popular participation; development of appropriate technologies to improve the supply of water and elimination of garbage and excreta.

Programmes of Action:

In accordance with the Ministry of Education the project "Let's Renew the Basic Rural School" was initiated oriented to reduce incidents of desertion and repetition in rural areas, adapting curriculums to the needs of the rural child and to launch a major intervention of the community in the school. Resources of the PROANDES programme permitted the initiation of the project with the selection of 10 demonstrative schools, incorporating 35 documents ~ of manuals/guides in adaptation of the methodology of "Escuela Nueva" Colombian to the rural Venezuelan school.

Ministerial Conference on Drinking
Water and Environmental Sanitation:
Implementing UNCED Agenda 21
19-21 March 1993
Noordwijk, The Netherlands

Hosted by the Netherlands Minister of Housing,
Physical Planning and Environment

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

Overview of UNDP's technical cooperation activities in the field of water and environmental sanitation

Frank Hartvelt
Deputy Director
Division for Global and Interregional Programmes
United NaUons Development Programme
Tel (212) 906 5858
Fax (212) 906 6350

Introduction

Drinking water and environmental sanitation is directly related to "environment and natural resource management", "poverty eradication and grassroots participation" and "women in development" which are three of the six UNDP themes in support of building national capacity for human development.

UNDP supports technical cooperation programmes at the country, regional, interregional and global levels. UNDP is supporting many projects related to water resources management e.g. water master plans, sector strategies for water supply and sanitation, sector strategies for irrigation, water exploration projects, pilot and demonstration projects, and training projects. These projects reflect national priorities as set by the governments. At the regional level (e.g. Latin America, Africa, Asia) similar types of projects have been supported and are still being supported in the same areas except that the emphasis is on strengthening regional co-operation and institution building; also, cross-boundary river and lake basin projects are being supported.

At the interregional level UNDP is supporting "upstream" water sector development programmes which are mentioned on page 3 of the attached paper on "Capacity building for water sector development" I presented during the Technical Consultation on Integrated Rural Water Management organized by FAO from 15-19 March 1993. This paper reflects UNDP's views on capacity building for water sector development in the light of the Dublin and Rio conferences. The four programmes mentioned are examples of innovative approaches in the field of water and sanitation, irrigation and drainage, urban water and sewage and water sector capacity building. While these programmes were already under way before the Dublin and Rio conferences, their direction clearly reflects the recommendations of these two conferences.

1. Administrative aid structure

UNDP is represented in more than 150 countries by a Resident Representative, who is in most instances coordinating all UN technical and other cooperation programmes in the country. The UNDP Field Offices assist the respective governments to establish the Country Programmes. The Country Programmes reflect the needs and priorities of the governments.

They are the primary guides to the allocation of the indicative planning figures (IPF), i.e. the resources allocated by UNDP for the developing countries. The five Regional Bureaux at Headquarters work in support of the Field Offices and coordinate the planning of major activities.

The Division for Global and Interregional Programmes (DGIP) is the venture capital arm of UNDP. It is responsible for programmes with targets areas which extend beyond the countries and regions. For example, DGIP is the co-sponsor and co-financier of the UNDP/World Bank Water and Sanitation Programme, active in over forty countries.

The United Nations Capital Development Fund (UNCDF) provides small grant investments primarily for the poor in the least developed countries. Water supply and sanitation and irrigation projects are a significant segment of their programme.

The Bureau for Programme Policy and Evaluation (BPPE) provides technical support to all the Regional Bureaux and other UNDP units. There are two specific groups within BPPE which provide technical advice in the field of water sector development. One is the Environment and Natural Resources Group; the other is the Urban Development Unit within the Public Sector Management Group.

2. Staffing

The total UNDP staff on a worldwide basis is 8000, including 1700 professionals. There are 450 professionals at Headquarters. Thirty percent of the professional staff are women. BPPE has a full-time senior adviser dealing with water and the environment. DGIP, UNCDF, the Regional Bureaux and other units have senior officers who are responsible for the water sector among other duties. Each UNDP Field Office has a programme officer dealing with the water sector, among other matters.

3. Aid policies and strategies

The statement of purpose of UNDP is attached. In addition, UNDP is currently sharpening its focus to concentrate more on sustainable human development including governance, poverty and equity, environment and natural resource management.
UNDP supported projects in the water sector fall in the following categories: water sector planning, groundwater exploration; water supply and

sanitation; irrigation and drainage;

international waters, including lakes: institution building for coastal zone management, or lake restoration;

rivers and watersheds: watershed management, pollution control, environmental impact analyses in connection with major new construction, and the reversal of adverse land use practices.

Most projects have a component dealing with institution building and training. UNDP has adopted the following approach to "upstream" water sector development translated into four interrelated global programmes supported by UNDP's Interregional Programme and partner agencies.

(1) The UNDP/World Bank Water and Sanitation Programme, supported by ten bilateral agencies, which concentrates on capacity building and supporting sustainable investments in low-cost community-based water and sanitation, and increasingly in urban sanitation.

(2) The International Programme for Training and Research on Irrigation and Drainage, supported by UNDP, the World Bank and bilateral partners.

(3) The Utility Partnership: Capacity Building for Urban Water and Sanitation Utilities, initiated by UNDP and the World Bank, which concentrates on improving the efficiency of utilities and water conservation/demand management.

(4) The Capacity Building Programme for Water Sector Development which is currently being initiated by UNDP,UNDDSMS(UN Water Branch) and the World Bank. It places capacity building squarely among the financial, technical, social and economic elements of water sector programmes. To enhance the capacity building process in developing countries, water sector assessments are undertaken as a necessary first step.

These four programmes are prime factors in shaping "downstream" programmes supported by UNDP and other external support agencies at the country level. Under the umbrella of capacity building, UNDPwill devote increased attention to the following approaches. In terms of financing, greater efficiency should be combined with mobilization of additional resources. Secondly, new public-private partnerships are vital for sustaining water sector programmes. Thirdly, there is a need for concrete coordination among all participants in this effort both nationally and internationally. Indeed, much money can be saved by avoiding duplicative efforts and applying proven solutions. Fourthly, innovation is essential: fresh ideas, imaginative approaches, appropriate technologies and new attitudes. In this connection, a wide array of technologies and methodologies is available for testing, adaptation and adoption. And finally, strengthening and adaptation of institutions is required at all levels, as well as human resources development, within developing countries and the external support agencies.

The table below provides an estimate of UNDP'sIPF and cost-sharing resources allocated to currently operational water sector programmes and projects according to the four areas mentioned

Sector	UNDP IPF	Cost-sharing from ESAs	Total
Water Supply and Sanitation	104,60 3,00	45,06 3,00 0	149,66 6,00 0
Water Resources Planning and Development	119,05 9,00	13,85 6,00 0	132,91 5,00 0
Irrigation and Drainage	311,32 7,00	52,94 2,00 0	364,26 9,00 0
Hydro-Electric Power	24,88 7,00 0	4,84 2,00 0	29,72 9,00 0
Total	559,87 6,00 0	116,70 3,00 0	676,57 9,00 0

3. Intervention tools in the water sector

Policy

UNDP supported programmes and projects are reflecting national and international priorities, as determined by national governments and the UNDP Governing Council. At the country level, the UNDP Resident Representative, jointly with the foreign aid coordinating government agency, technical ministries and other bodies, prepares a multi-year country programme outlining the technical cooperation projects supported by UNDP, the UN specialized agencies and, in many cases, other donors. As a result of UNCED many countries have prepared or are preparing action plans dealing with environment and development. The UNDP managed Capacity 21 programme supports an increasing number of countries in this planning process.

4. Technical co-operation programmes and projects

The Office of the Resident Representative actively participates in the identification, formulation, appraisal, monitoring and evaluation of projects. In this process the Office is using generic guidelines on the project cycle, technical notes, and, increasingly the principles and recommendations emanating from the New Delhi, Dublin, Delft and Rio conferences. The outcome of these conferences have all been communicated to the UNDP Resident Representatives to serve as guidance for technical co-operation projects.

5. Research, training and information support

The four global programmes mentioned above (pages 2,3) focus on applied research, capacity building, large-scale demonstration projects and technical support to government projects funded by the World Bank, UNDP and other ESAs. A Field Office training programme which uses tools developed at UNDP Headquarters for handling the environmental issues in the projects (ref. "Handbook and Guidelines for Environmental Management and Sustainable Management", Environment and Natural Resources Group, UNDP, 1992) is currently under way. The guidelines are generic and not specific to water. Training courses have so far been given for 80 Field Offices as well as for Headquarters. Virtually, all UNDP supported projects have a training component. Generally speaking, information support could stand improvement.

6. Partners in project planning and implementation

The principal partners of UNDP are the government coordinating and technical ministries, institutes, universities, municipalities and other state or parastatal agencies.

Increasingly UNDP is working with national non-governmental organizations (NGOs) which are active at grassroots and intermediary levels in rural and urban areas.

At the international level UNDP's principal partners are WHO, UNICEF, FAO, UNESCO, UNDDSMS (UN Water Branch), the World Bank, regional development banks, bilateral and non governmental organizations including the IRC Water Supply and Sanitation Centre andfoundations. At the interregional level UNDP is co-sponsor of multi-donor partnerships such as the UNDP/World Bank Water and Sanitation Programme and others (see pages 2,3).

7. Countries where development cooperation is concentrated

Although the largest share of UNDP resources goes to the least developed countries (currently 52), UNDP is active in all developing countries. Water sector projects are concentrated in 95 countries.

8. Examples of promising approaches in water resource projects

Regional Water and Sanitation Groups have been established by the UNDP/World Bank Water and Sanitation Programme in Abidjan (Cote d'Ivoire), Nairobi (Kenya), New Delhi (India), Jakarta (Indonesia) and Guatemala to work with governments and ESAs to develop sector policy frameworks, support applied research and demonstration projects, identify and prepare investment projects for funding by external support agencies. Over forty governments are receiving assistance from the Regional Water and Sanitation Groups.

A Regional Network Centre (within the ITN) is hosted by the African Medical Research Foundation (AMREF) in Nairobi. The Centre works with local trainers from Kenya, Ethiopia, Somalia, Sudan, Tanzania and Uganda in promoting low-cost water supply and sanitation services. Under the auspices of the UNDP/World Bank Water and Sanitation Programme's International Training Network, the Regional Network Centre is supported by the Swiss Development Cooperation and GTZ. Training workshops on environmental health, water resource management, women and VIP latrines are among the topics included.

Another programme which is consistent with the Dublin Conference recommendation is the Capacity Building Programme for Water Sector Development which emerged from the Delft Symposium (June 1991). This programme, which is currently being initiated by UNDP, UNDDSMS and the World Bank, places capacity building squarely among the financial, technical, social and economic elements of water sector programmes. To enhance the capacity building process in developing countries, water sector assessments are undertaken as a first step. (see attached fact sheet for a detailed description of this new international initiative).

UNDP launched in 1991 a programme called the Sustainable Development Network (SDN) designed to provide an access to information systems via computer communication networks which are being installed in over 12 developing countries where UNDP has offices. The SDN builds country capacities to access and manage information on sustainable development. The SDN focuses on issues such as natural resources management, urban and industrial programmes, environmental education and development policies, among others.

9. Coordination

At the country level, the UNDP Resident Representative is - in most cases - also the Resident Coordinator of the operational development activities of the UN system. Although, as a matter of principle, governments are responsible for coordination of development cooperation programmes and projects, in many cases the UNDP office plays an active role in this process. UNDP supported water-sector development programmes and projects are tailor-made through discussions with the government ministries concerned such as - depending on the case - ministries/authorities/agencies responsible for planning, finance, water resources, environment, public works, irrigation/drainage, health, water supply and sanitation, social affairs, community participation, local government. In many countries, UNDP participates in informal ESA meetings. During the UN International Drinking Water Supply and Sanitation Decade (1980-90) UNDP chaired the UN inter-agency steering committee for cooperative action and coordinated water and sanitation activities at the country level. In the absence of a 'Water Decade" for the nineties coordination at the country level depends on the interest and dynamism of the UNDP office, government and the ESAs.

UNITED NATIONS DEVELOPMENT PROGRAMME

We, the peoples of the United Nations, determined
- to reaffirm faith in fundamental human rights, in the dignity and worth of the human person, in the equal rights of men and women and of nations large and small,
- to promote social progress and better standards of life in larger freedom, and for these ends - to employ international machinery for the promotion of the economic and social advancement of all people, have resolved to combine our efforts to accomplish these aims.

From the Preamble to the
United Nations Charter

A Statement of Purpose

* UNDP's goal is human development. We seek to create opportunities in which people's abilities, talents and creatively can find full expression. We aspire to a world in which people can better their lives in a manner of their own choosing. We recognize that development today must safeguard the options of future generations.

* UNDP invests in people. In this way, we help countries to develop the capacity to manage their economies, fight against poverty, ignorance and disease, conserve the environment, stimulate technological innovation, and recognize and enhance the contribution of women to society.

* UNDP builds partnerships to foster human development. We forge alliances with the people and governments of developing countries, with the donor community, with the specialized agencies of the United Nations, and with private institutions and non-governmental organizations.

* UNDP works in more than 150 developing countries. Through our worldwide network of offices - and in dialogue with governments and other development partners - UNDP supports programmes for human development. These spring from national priorities and are shaped by local culture. Beyond this, UNDP country offices manage an increasingly diverse range of development services.

* UNDP plays a leading role in coordinating the development efforts of the United Nations. In times of disaster - whether natural or human - UNDP's Resident Representatives help orchestrate the United Nation's response.

* UNDP also works across national boundaries. We sponsor programmes that are regional, interregional and global in scope. We promote the share of experience among developing countries and draw international attention to issues of global concern.

* UNDP is universal and politically neutral. We receive voluntary contributions from nearly every country in the world. In the distribution of these resources, UNDP favours the poorest countries.

* UNDP is people serving people. We are men and women, from countries around the world, who value the quality of professionalism, leadership and integrity. In the years ahead, UNDP will strive for excellence and prepare for change. We will advocate the full participation of all people in the pursuit of human progress.

CAPACITY BUILDING FOR WATER SECTOR DEVELOPMENT

Population and economic development can no longer be considered separately from water resources and the environment. Based on the experience of the past decade, UNDP and its partner agencies are better equipped with know-how about managing water resources. The best guardians of water resources and the environment are people working hand in hand with institutions. We find institutions at all levels, with each of them playing its part and interacting within a larger whole: e.g. women caretakers of wells, farmers' associations, utilities, government ministries and external support agencies.

Better trained people and responsive institutions are essential if we are to stay ahead. In addition, people, both as providers and users of water for domestic purposes, agriculture, and industry can no longer live in blissful ignorance of each other. Consumers, technicians, engineers, economists, managers and politicians have no other choice but to understand each other better and to work together if social and economic needs are to be met in a balanced and equitable manner.

Clearly, safe water supply and sanitation, and availability of water for agriculture and industry are the basic underpinnings of an environment for sustainable development.

The international cooperation agenda for the nineties was shaped by four global meetings, each of which looked at the water sector from a different perspective. A common theme in these meetings was the importance of capacity building, which will be the UNDP's area of focus in the years to come.

Near the conclusion of the International Drinking Water Supply and Sanitation Decade, in September 1990, UNDP organized and the Government of India hosted the Global Consultation on Safe Water and Sanitation for the 1990s. The Consultation reviewed the progress during the Decade and made a number of recommendations for the future. These recommendations, endorsed by the UN General Assembly, formed the basis of actions which should be taken during the 1990s. During the Decade, the international community as a whole made the provision of improved water supply and sanitation facilities a top priority and rallied support to Decade goals and objectives. Some 1300 million people in the developing world gained access to safe drinking water and 700 million to sanitation facilities for the first time in their lives.

The New Delhi Statement prepared at the Global Consultation in India contained four guiding principles, two directly related to capacity building: "Strong institutions are essential for sustainable development", and "capacity building is necessary to make community management effective...." Two others, environment and health, and financing and technology, depend for their implementation on strong sustainable institutions. The concept of and prospects for capacity building were further elaborated during the UNDP Symposium, "a Strategy for Water Resources Capacity Building", held in Delft, The Netherlands, in June 1991.

A major issue addressed in the Delft Declaration is the daunting challenge:

"to satisfy the water needs of the exploding cities, given the equally increasing need for water and irrigated agriculture and the problems arising from urban and industrial pollution. In addition, to do this in a sustainable way, measures have to be taken to protect and conserve water as a major resource and unifying element of our environment. Experience shows that institutional weaknesses and malfunctions are a major cause of ineffective and unsustainable water services. This requires urgent attention to building institutional capacity at all levels. Pressure for improved local delivery of water services suggests that development of institutional capacity be more demand-responsive. Also, the need to manage overall water resources coherently, and to facilitate the allocation of water among all users suggests an expansion of national, integrated planning".

The participants in the Delft Symposium, coming from developing countries, external support agencies and institutions, recognized the importance of the capacity building process for sustainable development at national, sub-regional and local levels. The capacity building concept was articulated as follows:

KEYNOTE PAPER 3
Frank Hartvelt, Deputy Director, Division for Global and Interregional Programmes, United Nations Development Programme, New York, USA

the creation of an enabling environment with appropriate policy and legal frameworks; institutional development, including community participation; and human resources development and the strengthening of managerial systems.

Subsequently, on the road to the Earth Summit in Rio (the United Nations Conference on Environment and Development - UNCED), a unique event took place in January 1992 in Dublin, Ireland: the International Conference on Water and the Environment. This Conference made recommendations for action at local, national and international levels, based on four guiding principles: the finiteness and vulnerability of water resources; participatory approaches to water management involving users, planners and policy-makers; women playing a central part in the provision, management and safeguarding of water; and the economic value of water. Again, capacity building was recognized as a principal element in the development, use and management of water resources.

Finally, the United Nations Conference on the Environment and Development (UNCED, Rio de Janeiro, June 1992) articulated the concept of sustainability in its Agenda 21, which contains numerous recommendations for actions in the water sector from different vantage points, e.g. poverty, human settlements, agricultural and rural development, and integrated approaches to development, management and the use of human resources. Consistently, the vital role of people, communities and institutions was underlined.

What is the response of the international community to the expectations raised and recommendations made by the Conference in New Delhi, Delft, Dublin and Rio?

Virtually all international development agencies support water-related programmes. International and regional development banks and many bilateral agencies have a substantial part of their grant or lending portfolios devoted to irrigation, water supply and sanitation. Likewise, United Nations system agencies are very active in this area. This is illustrated in Figure 1.

By supporting the principles and recommendations of the above conferences, developing countries and the external support agencies have committed themselves to adapt their water sector programmes to the needs of the nineties and beyond.

In spite of promising initiatives by a number of agencies, it is difficult to discern the contours of a concerted programme support by the international community.

In our view, the United Nations agencies are well placed to take a leading role in the response of the international community by providing policy, technical and financial support to countries which are committed to re-orienting their water sector programmes in line with the afore-mentioned principles and recommendations, as applicable to the countries' conditions. Similarly, there is the need for the United Nations agencies to re-examine and reorient their role in order to be better equipped for their task.

For its part, UNDP has adopted the following approach to "upstream" water sector development translated into four inter-related global programmes support by UNDP and partner agencies.

(1) The UNDP/World Bank Water and Sanitation Programme, supported by ten bilateral agencies, which concentrates on capacity building and supporting sustainable investments in low-cost community-based water and sanitation, and increasingly in urban sanitation.

(2) The International Programme for Training and Research on Irrigation and Drainage, supported by UNDP, the World Bank and bilateral partners.

(3) The Utility Partnership: Capacity Building for Urban Water and Sanitation Utilities, initiated by UNDP and the World Bank, which concentrates on improving the efficiency of utilities and water conservation/demand management.

(4) The Capacity Building Programme for Water Sector Development which emerged from the Delft Symposium. This programme, which is currently being initiated by UNDP, UNDESD and the World Bank, places capacity building squarely among the financial, technical, social and economic elements of water sector programmes. to enhance the capacity building process in developing countries, water sector assessments are considered a necessary first step.

These four programmes are prime factors in shaping "downstream" programmes supported by UNDP and other external support agencies at the country level. Under the umbrella of capacity

building, UNDP will devote increased attention to the following approaches.

In terms of financing, greater efficiency should be combined with mobilization of additional resources. Secondly, new public-private partnerships are vital for sustaining water sector programmes. Thirdly, there is a need for concrete coordination among all participants in this effort both nationally and internationally. Indeed, much money can be saved by avoiding duplicative efforts and applying proven solutions. Fourthly, innovation is essential: fresh ideas, imaginative approaches, appropriate technologies and new attitudes. In this connection, a wide array of technologies and methodologies is available for testing, adaptation and adoption. And finally, strengthening and adaptation of institutions is required at all levels, as well as human resources development, within developing countries and the external support agencies.

In conclusion, UNDP is joining UN partner agencies, development banks, bilateral agencies and other public sector agencies in the urgent human development venture to serve the unserved.

MINISTERIAL CONFERENCE ON DRINKING WATER

AND ENVIRONMENTAL SANITATION

(22-23 March 1994, Noordwijk, The Netherlands)

ACTIVITIES ON FRESHWATER RESOURCES, DRINKING WATER AND ENVIRONMENTAL SANITATION

United Nations Environmental Programme (UNEP)

United Nations Centre for Human Settlements (Habitat)

INTRODUCTION

Freshwater resources, drinking water and sanitation constitute fundamental requirements for advancing the human condition on this planet. In recognizing this reality, the United Nations has given considerable emphasis to assisting countries to use these resources in a rational manner, so that they do not degrade the human environment, that they are not depleted in an unsustainable manner, and that the ultimate result will be the material well-being of humanity on a global scale.

All agencies of the United Nations system, external support agencies, and countries have a role to play in implementing the goals of Agenda 21 within their respective areas of competence. They also have their comparative advantages to offer. To this end, this statement represents a first effort in joint reporting between UNEP and UNCHS (Habitat). It is meant to demonstrate the possibilities of cooperative action between sister UN agencies as well as to provide relevant information on the policies and activities of both agencies.

Both agencies have taken initial steps to integrating UNEP's traditional focus on monitoring and assessing trends regarding the condition of the global environment, evaluating the relation between the environment and sustainable development in a holistic, integrated manner, and assisting Governments in developing environmentally-sound plans of action on regional drainage basin scales with UNCHS (Habitat) research, capacity building and direct support activities on urban water resources management at the country level.

Nevertheless, both agencies clearly recognize the need for further work in conceptualizing the linkages between management requirements for drinking water and sanitation at both the urban and drainage basin level, and especially in attempting to translate them into effective operational mechanisms to implement the recommendations of Agenda 21.

POLICIES

United Nations Environment Programme (UNEP)

The environment comprises the physical surroundings in which all humans live, including the natural resources upon which they depend for their existence and betterment, and for drinking water and waste deposition.
Thus, the condition of the environment is of critical importance to people. Effectively protecting and conserving the environment, however, can be a very difficult goal to achieve. This is because environmental concerns are not only technical or scientific in nature, but also involve the whole sphere of human activities, including culture, economics, law and politics. This reality dictates that, in addition to strictly technical issues, an holistic perspective of the environment is required.

However, people also strive for a higher standard of living, including access to basic services such as drinking water and sanitation. This desire typically requires increased socio-economic development, with its accompanying stresses and demands on the environment and its natural resource base. Prior to about two decades ago, it was generally thought that socio-economic development carried an obligatory price tag of some degree of environmental degradation or stress on the supply of natural resources

Since then, however, it has become clearer that the opposite view is more correct. Sustainable or long-lasting development cannot be achieved without also considering the impact of the development on the physical environment and the natural resource base supporting it, including freshwaters.

To this end, Agenda 21 identified the need to further enhance and strengthen the role of UNEP in the field of environment, particularly with regard to policy guidance and coordination. Equally important, UNEP was also to take the development perspective into account in its environmental activities, in regard to freshwater resources. This mandate has given UNEP a unique, holistic perspective regarding environment and development, with all its ramifications for human existence.

UNEP's overall purpose in the field of natural resources is to assist Governments to fully integrate the environmentally-sound management of natural resources into national plans for social and economic development. The aim is to help governments ensure that protection and conservation of the environment and the natural resources base on the one hand, and desired socio-economic development on the other hand, are fully supportive and compatible goals. This notion is at the core of sustainable development.

This integrative approach to the environment and sustainable development has a substantive rationale. First is the belief that sustainable development should not degrade the natural environment, nor result in decreased productivity in substantive sectoral areas over the long term. Another imperative is that national goals of economic growth, at the same time ensuring sustainable use and utilization of available natural resources. Further, it is also important to recognize the close interrelationships between poverty and environmental degradation and resource depletion.

Finally, there is the reality that natural resources, including freshwater, are finite resources. They also are distributed unevenly, both spatially and temporally, over the globe. One result of this reality is that there always exists the possibility of conflict between nations as a means of attempting to obtain scarce or needed resources because of these and other factors, UNEP's view is that traditional uni-sectoral perspectives regarding natural resources, especially freshwater, must be replaced by a broad, integrated perspective of these resources.

It is noted this integrative approach to the environment and development has a wide base, and offers a range of possibilities for UNEP to especially assist the developing world. Although UNEP's focus, particularly in regard to freshwater resources, is to take a regional perspective, it also recognizes that freshwater is used on a local level, where drinking water, sanitation and waste disposal are of special concern. To this end, UNEP is involved in such activities as provision of capacity building at the national and regional level, training and education of professional personnel, and assistance as appropriate in development of national development plans. A goal always is to assist governments in integrating environmental and development concerns in their national plans in a sustainable manner.

United Nations Centre for Human Settlements (UNCHS)

A rapidly urbanizing world and the lack of integrated policies to promote adequate urban development and to manage the resource base that sustains urban activities is leading most of the world's major cities to face a water crisis as they approach the 21st century.

It is now recognized that current patterns of urban water use and environmental contamination are not sustainable, that the rising costs of developing ever more distant freshwater resources threaten economic growth and that the effects of unchecked disposal of wastes can spread disease and cause social deterioration. Chapter 18 of Agenda 21 addresses the above issues by including a comprehensive set of recommendations on "water and sustainable urban development".

The UNCHS (Hahitat) policy approach to its activities on urban water resources aim at developing strategies and operational mechanisms to implement the recommendations of Agenda 21 in this area. To this end, UNCHS (Habitat) assists countries in the development and application of management practices that integrate urban settlements and water resources concerns, especially in relation to drinking water, sanitation and pollution control.

Agenda 21 also recognizes that a key element in ensuring the sustainable management of water resources and urban development is application of the principle that decisions should be taken at the lowest appropriate level. This postulate is reinforced by a general trend towards devolving competences to urban local authorities and service agencies for management of urban water resources and environmental infrastructure services, such as drinking water, sanitation, drainage and waste disposal. Thus, the need to design strategies to assist these authorities in building their capacity to assume increased responsibilities is at the core of UNCHS (Habitat) policy in this area.

Consistent with UNEP's integrative perspective of environment and development, UNCHS (Habitat) recognizes that urban water uses and disposal cannot be isolated from the overall management of water resources within a watershed. Decisions on competing uses of freshwater resources for agriculture, domestic and industrial demands, and the effects of urban sources of pollution, often go beyond the competences of single local authorities. Thus, the need for the integration of urban management within the watershed perspective has prompted UNEP and UNCHS (Habitat) to initiate the joint development of a strategic approach in this area.

An important component of UNCHS (Habitat) policy refers to the need to satisfy the demand for implementation of support activities more responsive to actual national and local needs. As such, the UNCHS (Habitat) project execution strategy contemplates working in close coordination with local authorities, and establishing consultative mechanisms with the broad participation of urban stakeholders for formulation of action plans to improve management of urban water resources, especially drinking water, sanitation and drainage.

Finally, the recognized need for greater efficiency in the management of urban water resources demands development of innovative management technologies and software suitable for their application in developing countries.
As such, UNCHS (Habitat) is giving increased priority to development of appropriate management tools and instruments for the use and allocation of water resources, and for the provision and management of environmental infrastructure services.

C. FRESHWATER RESOURCES

Strictly speaking, UNEP has no specialized mission regarding environment and development. Its overriding goal remains to assist Governments in regard to integrative consideration of these concerns With its integrative focus, it is able to identify and consider a multitude of factors relevant to the environment and sustainable development. In support of this focus, UNEP has in-house expertise in a wide range of disciplines, including Freshwater Resources, Terrestrial Ecosystems, Desertification, Oceans and Coastal Areas, Biodiversity, Earthwatch, Atmosphere and Climate, Environmental Health, Environmental Law, Industry and Energy, Environmental Economics, Environmental Education and Training, Capacity Building and Public Awareness. UNEP also has ready access to the talents and experiences of its nearly sister agency, UNCHS (Habitat), in regard to issues regarding the environment and urbanization. This interlinkage is of special relevance, given the predictions that the majority of the world's population will be living in urban areas in the future, with its attendant stresses on the environment and natural resources.

Equally important is UNEP's ability to use and reinforce the interlinkages between these diverse disciplines within its environmental programmes. UNEP's policy and activities must have a solid scientific foundation and, accordingly, scientific support in the backbone of UNEP's activities. UNEP brings these disciplines together in a solid programme to address concerns related to environment and development. In cooperation and assistance of the concerned riparian Governments, primary activities of UNEP in regard to sustainable development include (1) bringing the major actors together in appropriate fora; (2) providing the "big picture" perspective to environment and development; (3) helping Governments identify significant problems; (4) helping Governments find solutions to these problems, including consensus- and capacity-building on both the technical and socio-economic level; and (5) helping bring together governments and potential donors and funding agencies for needed actions. UNEP typically with a wide range of UNEP agencies in these activities, including the Regional Economic Commissions and virtually all the specialized UN agencies.

Consistent with its focus, UNEP will continue to increase its efforts to (1) reinforce the interlinkages within its scientific and socio-economic disciplines, (2) develop and apply economic and legislative tools for increasing the effectiveness of sectoral environmental management policies, (3) provide environmental training and human resources development, and (4) assist governments in institutional strengthening and capacity building for reinforcing environmental assessment and management capabilities on the national level.

D. WATER AND SUSTAINABLE URBAN DEVELOPMENT

The main activities of UNCHS (Habitat) in this area focus on urban water resources and related environmental infrastructure services (water supply, sanitation, drainage and waste disposal), as executed under its Settlements Infrastructure and Environment Programme (SIEP). In addition to its regular research programmes, SIEP projects involve field research and capacity building activities in several cities of developing countries.

To respond effectively to demands for improved management of water resources, drinking water, environmental sanitation and urban development, SIEP's field research and capacity building projects are executed at the local level, in partnership with the authorities of the cities in which it operates. The Programme endeavours to coordinate its local activities with national initiatives being executed by other external support agencies and organizations of the UN System. At present, coordination with agencies such as UNDP, WHO and UNICEF is on an ad-hoc basis, and not part of overall agreements for country level cooperation.

SIEP's current research and development activities focus on review and design of management instruments in aspects such as assessment of the effective demand for water resources and infrastructure services; appraisal of investment options on water resources and infrastructure services delivery; new institutional approaches for management of urban water resources; and management of waste and urban sources of pollution.

The "Urban Management Programme" (UMP) and "Sustainable Cities Programme" (SCP) of UNCHS (Habitat), despite their broader coverage of urban issues, also touch upon some aspects of water resources, water supply and sanitation management in urban areas. UMP is executed in collaboration with UNDP and World Bank. The Sustainable Cities Programme implements the environmental component of UMP, and WH0 is a partner in the execution of this component. In addition to these activities, UNCHS (Habitat) has a broad programme of country level technical cooperation projects on shelter and urban development. A significant part of these projects have a water resources and environmental infrastructure component, thus reflecting an increasing demand for support in these areas within an overall policy of integrated urban settlements development.

UNCHS (Habitat) also has started preparatory activities for the Second United Nations Conference on Human Settlements (Habitat II) to take place in 1996, 20 years after the Vancouver conference that was instrumental in the creation of UNCHS (Habitat). The main outcomes of the conference will be a "statement of principles" and an "action plan" for improvement of human settlement conditions in an urbanizing world.

The sustainable management of urban water resources and environmental infrastructure services, such as drinking water and sanitation, is an important component in the formulation of a plan of action.

UNCHS (Habitat), as coordinator of the working groups on urban issues of the United Nations ACC Subcommittee for Natural Resources, and the Water Supply and Sanitation Collaborative Council has carried out an analysis of current activities on external support agencies on urban water resources, drinking water- and environmental sanitation. From this review of activities, it is concluded that the agreement on a set of basic principles regarding implementation of activities on water and sustainable urban development could provide the foundation for more productive collaborative activities among UN organizations and other external support agencies.

E. THE WAY FORWARD: PUTTING AGENDA 21 INTO ACTION

(1) Freshwater resources, drinking water and environmental sanitation were identified as global concerns at UNCED, because of their critical role in human life. It has since become an even more important issue among Governments, and within the United Nations family. Indeed, a major objective of Chapter 18 of Agenda 21 is to plan for the sustainable and rationale utilization of freshwater resources by the year 2000. This fundamental goal is imperative, if the notion of sustainable development is to have real significance.

(2) To this end, implementation of the recommendations of Agenda 21 cannot wait. However, there presently is not a clear strategy for applying these recommendations in national management and decision-making processes. Thus, UNEP and UNCHS (Habitat) activities are giving outmost priority to translating the recommendations of Agenda 21 into operational mechanisms that can assist countries to put policies and strategies for achieving sustainable water resources and urban development into action.

(3) Sustainable management of freshwater resources can only be realistically achieved through integration of freshwater management concerns at the urban and watershed level. Accordingly, UNEP and UNCHS (Habitat) are embarking on an aggressive programme of assistance to local and riparian authorities in the formulation of freshwater management plans through broad consultative processes that incorporate the concerns of communities, and urban and watershed stakeholders.

(4) The joint, integrative capabilities of UNEP and UNCHS (Habitat) in the area of natural resources and urban management reinforces the recommendation in Agenda 21 to maintain UNEP as the central environmental body in the UN system.

(5) With its existing strengths in institutional and legal arrangements, coordination of research, information management, and regional assessments, and in cooperation with Governments, UNEP will continue to emphasize integrated management of freshwater (and mineral) resources as the appropriate approach to their sustainable supply and use, as well as a fundamental requirements for sustainable development

(6) To advance this goal, UNEP and UNCHS (Habitat) are undergoing a fundamental reorganization and restructuring to better integrate their strengths and activities. Both agencies will be in a better position to enhance the interlinkages between their respective comparative advantages in regard to environment and development.

(7) Both UNEP and UNCHS (Habitat) will continue to emphasize in a cooperative, collaborative manner their existing strengths in their respective areas of competence. Both are making substantial use of the expertise and knowledge in their regional offices, particularly their familiarity with specific regional issues and concerns. Finally, UNEP and UNCHS (Habitat) will continue to work to strengthen their cooperation and collaboration with other UN and international organizations doing work in regard to environment and development. Indeed, these are goals toward which UNEP and UNCHS (Habitat), as well as the other UN and international organizations doing substantive work in the field of natural resources, must direct their future interests activities and policies.

WATER POLICIES AND AGRICULTURE

Edited extract from: *The State of Food and Agriculture.* 1993. FAO/ESP. Rome. Italy.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome 1994

This paper is extracted from the Special Chapter on Water Policies and Agriculture, published in *The State of Food and Agriculture*, 1993. It is primarily intended for agricultural policy-makers, water managers, researchers, students, development planners and agricultural project donors. It is meant to help us reflect on the way water resources are managed at present; to contribute to the discussion on sustainable water use; and to stimulate thinking, research and change. Decisions made in this decade regarding how water is used will have a profound effect on our future supplies.

The full text of the Special Chapter consists of four sections. The first section gives an overview of world water resources and briefly discusses the key issues: scarcity, quality and health.

The second section stresses the need to integrate the water sector with the national economy and analyses the physical, economic and social aspects of water. It then provides a conceptual foundation for understanding the circumstances under which water policies either work or fail. Section II also assesses the advantages and disadvantages of broad alternative approaches to public water policy.

Section III examines how policy analysis is applied to water resource planning, including both supply-side (physical and hydrological) and demand-side considerations. It discusses the advantages and disadvantages of various policy options for urgent water policy issues related to surface water and groundwater.

The fourth and final section reviews three specific policy issues in irrigated agriculture: declining growth and investment trends; the difficulties imposed by irrigation-induced environmental degradation; and efforts to reform managerial/administrative systems.

Only extracts from Sections I and II are reproduced in this document.

WATER POLICIES AND AGRICULTURE

I. Water resource issues and agriculture

INTRODUCTION AND OVERVIEW

An interesting observation arising from the preparation of this year's special chapter on water and agriculture is how difficult it is to generalize about water. Almost any statement requires qualification. For example, while we can say that water is one of the most abundant resources on earth, we know that less than 1 percent of the total supply is reliably available for human consumption. Water is a liquid, for the most part, but it can also be a solid and a vapour. Drinking-water is certainly essential for human survival but water-related illnesses are the most common health threat in the developing world. An estimated 25 000 people die every day as a result of water-related sicknesses.[1]

One statement, however, needs no qualification: human existence depends on water. The geosphere, the atmosphere and the biosphere are all linked to water. Water interacts with solar energy to determine climate and it transforms and transports the physical and chemical substances necessary for all life on earth.

In recent years, water issues have been the focus of increasing international concern and debate. From 26 to 31 January 1992, the UN system sponsored the International Conference on Water and the Environment (ICWE) in Dublin, Ireland. The ICWE called for innovative approaches to the assessment, development and management of freshwater resources. In addition, the ICWE provided policy guidance for the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992. UNCED highlighted the need for water sector reforms throughout the world.In 1993, the World Bank issued a comprehensive policy paper defining its new objectives for the water sector. FAO recently established an International Action Programme on Water and Sustainable Agricultural Development (ISA-WASAD). Likewise, the UNDP, WHO, UNICEF, WMO, Unesco and UNEP are all coordinating or participating in special programmes related to water resources.

Other international, national and local organizations are becoming more active in water issues. The 1990 Montreal meeting, "NGOs Working Together", focused attention on drinking-water supply and sanitation. The Canadian International Development Agency, the French Ministry of Cooperation and Development, the German Agency for Technical Cooperation (GTZ), the United Kingdom's Overseas Development Administration and the United States Agency for International Development (USAID) have recently developed water resource strategies for foreign assistance.

The message highlighted by all these efforts is that water is an increasingly scarce and valuable resource. Of principal concern is our failure to recognize and accept that there is a finite supply of water. The consensus is that the growing water scarcity and misuse of freshwater pose serious threats to sustainable development.

[1] UNEP. 1991. *Freshwater pollution*. UNEP/ GEMS Environmental Library. No. 6. Nairobi.

Competition among agriculture, industry and cities for limited water supplies is already constraining development efforts in many countries. As populations expand and economies grow, the competition for limited supplies will intensify and so will conflicts among water users.

Despite water shortages, misuse of water is widespread. Small communities and large cities, farmers and industries, developing countries and industrialized economies are all mismanaging water resources. Surface water quality is deteriorating in key basins from urban and industrial wastes.

Groundwater is polluted from surface sources and irreversibly damaged by the intrusion of salt water. Overexploited aquifers are losing their capacity to hold water and lands are subsiding. Cities are unable to provide adequate drinking-water and sanitation facilities. Waterlogging and salinization are diminishing the productivity of irrigated lands. Decreasing water flows are reducing hydroelectric power generation, pollution assimilation and fish and wildlife habitats.

At first glance, most of these water problems do not appear to be directly related to the agricultural sector. Yet, by far the largest demand for the world's water comes from agriculture. More than two-thirds of the water withdrawn from the earth's rivers, lakes and aquifers is used for irrigation. As competition, conflicts, shortages, waste, overuse and degradation of water resources grow, policy-makers look increasingly to agriculture as the system's safety valve.

Agriculture is not only the world's largest water user in terms of volume, it is also a relatively low-value, low-efficiency and highly subsidized water user. These facts are forcing governments and donors to rethink the economic, social and environmental implications of large publicly funded and operated irrigation projects. In the past, domestic spending for irrigation dominated agricultural budgets in countries throughout the world. For instance, since 1940, 80 percent of Mexico's public expenditures in agriculture have been for irrigation projects. In China, Pakistan and Indonesia, irrigation has absorbed over half of agricultural investment. In India, about 30 percent of all public investment has gone into irrigation.[2]

A significant portion of international development assistance has also been used to establish irrigation systems. Irrigation received nearly 30 percent of World Bank agricultural lending during the 1980s. Spending commitments for irrigation by all aid agencies exceeded $2 billion per year in the past decade.

Once established, irrigation projects become some of the most heavily subsidized economic activities in the world. In the mid-1980s, Repetto[3] estimated that average subsidies to irrigation in six Asian countries covered 90 percent of the total operating and maintenance costs. Case-studies indicate that irrigation fees are, on average, less than 8 percent of the value of benefits derived from irrigation.

Despite these huge investments and subsidies, irrigation performance indicators are falling short of expectations for yield increases, area irrigated and technical efficiency in water use. As much as 60 percent of the water diverted or pumped for irrigation is wasted.[4] Although some losses are inevitable, in too many cases this excess water seeps back into the ground, causing waterlogging and salinity. As much

[2] R. Bhatia and M. Falkenmark. 1992. *Water resource policies and the urban poor: innovative approaches and policy imperatives*. Background paper for the ICWE, Dublin, Ireland.

[3] R. Repetto. 1986. *Skimming the water: rent-seeking and the performance of public irrigation systems*. Research Report No. 4. Washington DC, WRI.

[4] FAO. 1990. *An International Action Programme on Water and Sustainable Agricultural Development*. Rome.

as one-quarter of all irrigated land in developing countries suffers from varying degrees of salinization.[5] Moreover, stagnant water and poor irrigation drainage escalate the incidence of water-related diseases, resulting in human suffering and increased health costs.

Today, agriculture is often unable to compete economically for scarce water. Cities and industries can afford to pay more for water and earn a higher economic rate of return from a unit of water than does agriculture. (For economists, water flows uphill to money.) For the first time in many countries, agriculture is being obliged to give up water for higher-value uses in cities and industries. Irrigators in some areas are now asked to pay for the water they receive, including the full cost of water delivery. In other areas, new regulations require farmers to pay for polluting streams, lakes and aquifers.

The irony is that irrigated agriculture is expected to produce much more in the future while using less water than it uses today. At present, 2.4 billion people depend on irrigated agriculture for jobs, food and income (some 55 percent of all wheat and rice output is irrigated). Over the next 30 years, an estimated 80 percent of the additional food supplies required to feed the world will depend on irrigation.[6]

These developments are placing enormous pressure on agricultural policy-makers and farmers. Throughout the world, governments assume the prime responsibility for ensuring food security and, because food depends increasingly on irrigation, food security is closely linked with water security. Between 30 and 40 percent of the world's food comes from the irrigated 16 percent of the total cultivated land; around one-fifth of the total value of fish production comes from freshwater aquaculture; and current global livestock drinking-water requirements are 60 billion litres per day (forecasts estimate an increase of 0.4 billion litres per year). Food security in the next century will be closely allied to success in irrigation.

Irrigation can help make yield-increasing innovations a more attractive investment proposition but it does not guarantee crop yield increases. The overall performance of many irrigation projects has been disappointing because of poor scheme conception, inadequate construction and implementation or ineffective management. The mediocre performance of the irrigation sector is also contributing to many socio-economic and environmental problems, but these problems are neither inherent in the technology nor inevitable, as is sometimes argued.

Irrigation projects can contribute greatly to increased incomes and agricultural production as compared with rain-fed agriculture. In addition, irrigation is more reliable and allows for a wider and more diversified choice of cropping patterns as well as the production of higher-value crops. Irrigation's contribution to food security in China, Egypt, India, Morocco and Pakistan is widely recognized. For example, in India, 55 percent of agricultural output is from irrigated land. Moreover, average farm incomes have increased from 80 to 100 percent as a result of irrigation, while yields have doubled compared with those achieved under the former rain-fed conditions; incremental labour days used per hectare have increased by 50 to 100 percent. In Mexico, half the value of agriculture production and two-thirds of the value of agricultural exports is from the one-third of arable land that is irrigated.

Irrigation is a key component of the technical package needed to achieve productivity gains. In the future, as high levels of costly inputs are added to crop-

[5] Ibid.

[6] International Irrigation Management Institute. 1992. *Developing environmentally sound and lasting improvements in irrigation management: the role of international research*. Colombo, Sri Lanka, IIMI.

land to sustain yield increases, the security and efficiency of irrigated production will become even more important to world farming. Water will no longer be plentiful and cheap. It will be scarce, expensive to develop and maintain and valuable in use. The prospect of high-cost water may at first seem to be another problem looming for low-income economies. However, the high cost will be an incentive to use water more efficiently. The single most important factor limiting the adoption of proven irrigation and drainage technology is the low cost of water. Moreover, if farmers have opportunities for higher-value uses and can make profits, both governments and farmers will invest in irrigation.

This water dilemma – to produce more in a sustainable way with less water – points to the need for demand management mechanisms to reallocate existing supplies, encourage more efficient use and promote more equitable access. Policy-makers need to establish a structure of incentives, regulations, permits, restrictions and penalties that will help guide, influence and coordinate how people use water while encouraging innovations in water-saving technologies.

In the past, supply-side approaches dominated water resource management practices. Water itself was physically managed through technical and engineering means that captured, stored, delivered and treated water. However, the era of meeting growing demand by developing new supplies is ending. In our present-day water economy, resource management is shifting away from the goal of capturing more water towards that of designing demand- and user-focused approaches that influence behaviour.

WORLD WATER RESOURCES

Every day the hydrological cycle renews the world's freshwater resources through evaporation and precipitation. The average annual rainfall over land is 110 000 km^3, but some 70 000 km^3 evaporate before reaching the sea. The remaining 40 000 km^3 are potentially available for human use. Global freshwater consumption is currently around 4 000 km^3, only 10 percent of the annual renewable supply.

These numbers suggest that plenty of water is available for human use but a closer look reveals a more complicated situation. The 40 000 km^3 of available water are distributed very unevenly and two-thirds of it runs off in floods. That leaves around 14 000 km^3 as a relatively stable supply. A substantial share of this supply should be left to follow its natural course in order to safeguard wetlands, deltas, lakes and rivers.[7] For example, 6 000 km^3 of water is needed to dilute and transport the estimated 450 km^3 of waste water now entering the world's rivers each year.[8] Without substantial investment in waste water treatment and more effective regulation, even more water will have to be diverted to dilute and transport wastes.

Precipitation, withdrawals and availability of water vary widely around the world. Table 1 demonstrates regional changes in per caput water availability since 1950 and shows forecasts for 2000. Per caput availability is highest in Latin America and lowest in North Africa and the Near East while withdrawals are highest in North America and lowest in Africa. Per caput water availability in Europe and North America is not expected to change greatly by 2000 while Asians, Africans and Latin Americans will face less per caput water availability as their populations continue to grow.

At present, Asia accounts for over one-half of the world's water withdrawals. Figure 1 illustrates regional water consumption during the past century. Forecasts to the year 2000 suggest that Asia will consume 60 percent of the world's water, followed

[7] S. Postel. 1992. *Last oasis: facing water scarcity*. New York, Norton.

[8] See footnote 1, p. 1.

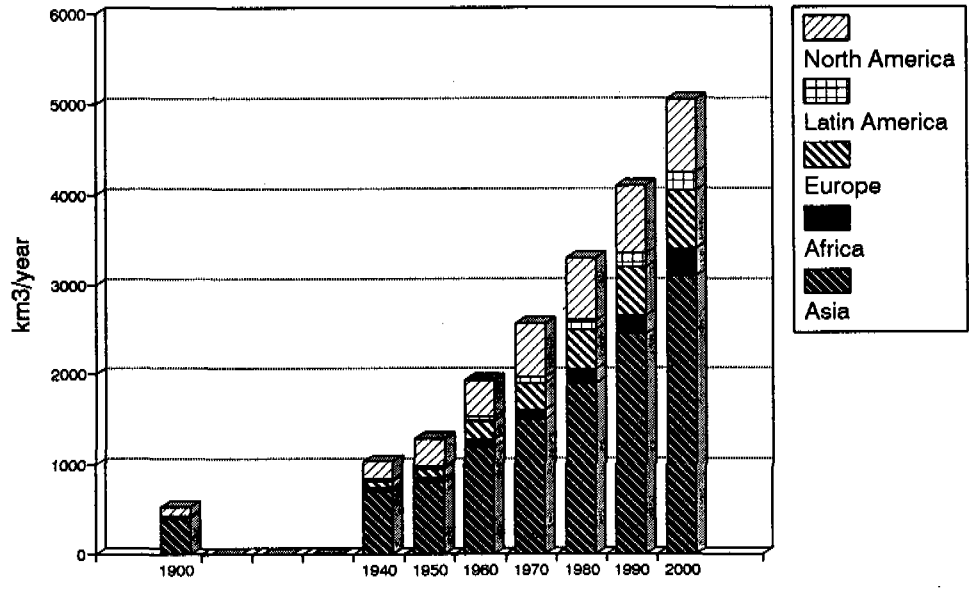
TABLE 1

Per caput water availability by region, 1950-2000

Region	1950	1960	1970	1980	2000
			'000 m^3		
Africa	**20.6**	**16.5**	**12.7**	**9.4**	**5.1**
Asia	**9.6**	**7.9**	**6.1**	**5.1**	**3.3**
Latin America	**105.0**	**80.2**	**61.7**	**48.8**	**28.3**
Europe	**5.9**	**5.4**	**4.9**	**4.4**	**4.1**
North America	**37.2**	**30.2**	**25.2**	**21.3**	**17.5**

Source: N.B. Ayibotolo. 1992. *The world's water: assessing the resource.* Keynote paper at the ICWE, Dublin, Ireland.

FIGURE 1
Water consumption by region, 1900-2000



by 15 percent in North America, 13 percent in Europe and less than 7 percent in Africa. Latin America's share of world water consumption is forecast to be less than 5 percent in 2000, although the region's consumption has nearly quadrupled since 1950.

Water scarcity

Human actions bring about water scarcity in three ways: through population growth, misuse and inequitable access.[9] Population growth contributes to scarcity simply because the available water supply must be divided among more and more people. Every country has a more or less fixed amount of internal water resources, defined as the average annual flow of rivers and aquifers generated from precipitation. Over

[9] T.F. Homer-Dixon, J.H. Boutwell and G.W. Rathjens. 1993. Environmental change and violent conflict. *Sci. Am.* (February).

TABLE 2

Countries predicted to have scarce water resources in 2000

Country[1]	Population in 2000	Water availability	
		Internal renewable water resources	Water resources including river flows from other countries
	(millions)	*(—m³ per caput—)*	
Egypt	**62.4**	**29**	**934**
Saudi Arabia	**21.3**	**103**	**103**
Libyan Arab Jamahiriya	**6.5**	**108**	**108**
United Arab Emirates	**2.0**	**152**	**152**
Jordan	**4.6**	**153**	**240**
Mauritania	**2.6**	**154**	**2 843**
Yemen	**16.2**	**155**	**155**
Israel	**6.4**	**260**	**335**
Tunisia	**9.8**	**384**	**445**
Syrian Arab Republic	**17.7**	**430**	**2 008**
Kenya	**34.0**	**436**	**436**
Burundi	**7.4**	**487**	**487**
Algeria	**33.1**	**570**	**576**
Hungary	**10.1**	**591**	**11 326**
Rwanda	**10.4**	**604**	**604**
Botswana	**1.6**	**622**	**11 187**
Malawi	**11.8**	**760**	**760**
Oman	**2.3**	**880**	**880**
Sudan	**33.1**	**905**	**3 923**
Morocco	**31.8**	**943**	**943**
Somalia	**10.6**	**1 086**	**1 086**

[1] A number of other countries with smaller populations, e.g. Barbados, Cape Verde, Djibouti, Malta, Qatar and Singapore, are also included in the water-scarce category.

Source: FAO calculations based on World Bank/WRI data.

time, this internal renewable supply must be divided among an increasing number of people, eventually resulting in water scarcity.

When annual internal renewable water resources are less than 1 000 m^3 per caput, water availability is considered a severe constraint on socio-economic development and environmental protection. Table 2 lists the countries where per caput internal renewable water availability will fall below 1 000 m^3 by the end of this decade. Most countries facing chronic water scarcity problems are in North Africa, the Near East and sub-Saharan Africa. Countries with less than 2 000 m^3 per caput face a serious marginal water scarcity situation, with major problems occurring in drought years. By the end of the 1990s, water availability is expected to fall below 2 000 m^3 per caput in more than 40 countries.

In many countries, while scarcity is less of a problem at a national level, serious water shortages are causing difficulties in specific regions and watersheds. Notable examples include northern China, western and southern India and parts of Mexico.

People also bring about water scarcity by polluting and overusing existing supplies. Box 1 describes some of the pressing water pollution issues. This type of scarcity can be regarded as the consumption of the resource's "capital". For instance, an aquifer represents resource capital, providing what is generally a renewable source of water ("income") that can be tapped for human consumption. Sustainable use of the aquifer leaves the capital intact so that future generations can continuously use the renewable portion or income. If pumping is greater than recharge, the aquifer is depleted and the capital is consumed.

Overuse of groundwater has become a major problem in China, India, Indonesia, Mexico, the Near East, North Africa, Thailand, the western United States and many island countries where seawater intrusion results. The overpumping of aquifers not only results in a water source that is too depleted to serve as a supply, it may also cause the land above the aquifer to settle or subside, resulting in widespread structural damage in extreme cases. Bangkok and Mexico City are well-known examples.

Finally, a shift in access or distribution patterns may concentrate water resources among one group and subject others to extreme scarcity. In many cities of the developing world, large numbers of people depend on water vendors and may pay 100 times as much as the rate of public utilities (see Table 3). Numerous recent studies document that large numbers of urban poor

TABLE 3

Ratio of prices charged by vendors to prices charged by public utilities in selected countries

Country	City	Ratio
Bangladesh	**Dacca**	**12-25**
Colombia	**Cali**	**10**
Côte d'Ivoire	**Abidjan**	**5**
Ecuador	**Guayaquil**	**20**
Haiti	**Port-au-Prince**	**17-100**
Honduras	**Tegucigalpa**	**16-34**
Indonesia	**Jakarta**	**4-60**
	Surabaja	**20-60**
Kenya	**Nairobi**	**7-11**
Mauritania	**Nouakchott**	**100**
Nigeria	**Lagos**	**4-10**
	Onitsha	**6-38**
Pakistan	**Karachi**	**28-83**
Peru	**Lima**	**17**
Togo	**Lomé**	**7-10**
Turkey	**Istanbul**	**10**
Uganda	**Kampala**	**4-9**

Source: R. Bhatia and M. Falkenmark. 1992. *Water resource policies and the urban poor: innovative approaches and policy imperatives.* Background paper for the ICWE, Dublin, Ireland.

pay much higher prices and a much larger share of their income for water than families with access to a city water system.[10] The poorest families in some large cities spend up to 20 percent of their income on water. When the cost is so high, these families use little water for washing and bathing, which results in serious health problems.

World water use

The early civilizations of Asia, Africa and Latin America organized cooperative efforts to develop river valleys for irrigated agriculture. Through irrigation technology, societies controlled and manipulated natural water supplies to improve crop production. The result was often reliable and ample food supplies which led to the creation of stable agricultural villages, the division of labour and economic surpluses.

Many scholars still argue whether irrigation technology facilitated political control and development of the state or whether political developments led to advancement of the technology. No matter the direction of cause and effect, no one disputes the association of development with control over water use.

[10] See footnote 2, p. 2.

TABLE 4

Sectoral water withdrawals, by income group

Country income group	Annual withdrawals per caput	Withdrawals by sector		
		Agric.	Ind.	Dom.
	(m^3)	(..... % .....)		
Low-income	**386**	**91**	**5**	**4**
Middle-income	**453**	**69**	**18**	**13**
High-income	**1 167**	**39**	**47**	**14**

In today's world, agriculture still accounts for the majority of human water use. Globally, around 70 percent of water withdrawals are for agriculture. Domestic and industrial uses consume the remaining 30 percent.[11] Water uses differ greatly depending on access, quantity, quality and socio-economic conditions. For example, Table 4 illustrates that agricultural water use is higher as a proportion of total water use in the low-income countries (91 percent) than in the high-income group (39 percent). Nevertheless, on a per caput basis, the high-income countries use more water for agricultural purposes than the low-income countries.

The trends in world water use during this century are presented in Figure 2. Overall, global water consumption has increased almost tenfold. Agriculture's share, which was 90 percent in 1900, will have dropped to an estimated 62 percent by 2000. During this same period, industrial consumption will have grown from 6 percent to 25 percent, while consumption by cities will have increased from 2 percent to nearly 9 percent. By the year 2000, around 35 percent of available water supplies will be in use, compared with less than 5 percent at the beginning of the century.

[11] Domestic uses include drinking-water supplies, private homes, commercial establishments, public services and municipal supplies.

BOX 1
WATER AND POLLUTION

The quality of water from different sources varies widely. Precipitation absorbs gases from the atmosphere and removes particles from the air. When the precipitation strikes the ground it becomes surface water runoff or enters the ground. The surface water flows into larger and larger channels, ponds, lakes and rivers until some of it reaches the sea. Along its course, surface water picks up both organic and mineral particles, bacteria and other organisms as well as salts and other soluble substances. The water in lakes and swamps sometimes acquires odours, tastes and colours from algae and other organisms and from decaying vegetation.

Since ancient times, heavy metals from mining and pathogens from cities have caused serious, although localized, contamination. Since the industrial revolution, water pollution problems have become first regional, then continental and now global in nature. Much water is polluted when it is used in industry and agriculture or for domestic purposes. Mining is the major cause of metal contamination, whereas other industries contribute to acidification. The intensification of agricultural activities has led to the contamination of groundwater by fertilizers and other chemicals. Moreover, irrigation projects often cause a rapid rise in the level of groundwater, which leads to waterlogging and soil salinity.

Since 1977, UNEP's and WHO's Global Environmental Monitoring System (GEMS) has been working with Unesco and WMO to develop a global water quality monitoring network. More than 50 water variables are monitored to provide information on the suitability of water for human consumption and for agricultural, commercial and industrial use. Recent assessments have found that the main water pollutants are: sewage, nutrients, toxic metals and industrial as well as agricultural chemicals.

Conclusions drawn from the GEMS assessment include: the nature and level of freshwater pollution strongly depends on socio-economic development; the most common water pollutant is organic material from domestic sewage, municipal waste and agro-industrial effluent; and the high water nitrate levels found in western Europe and the United States are a result of the nitrogen fertilizers and manure used for intensive agriculture. The GEMS assessment also noted a dramatic increase in the use of fertilizers in developing countries, particularly where intensive irrigation allows for double or triple cropping.

Other conditions highlighted in the GEMS report include deforestation, eutrophication, suspended particulate matter (SM) and salinity.

Deforestation, i.e. the clearing of land for agriculture and urban development, often leads to water contamination. When the soil is stripped of its protective vegetative covering, it becomes prone to erosion. This in turn leads to higher water turbidity, because of the increased amounts of suspended matter, to nutrient leaching and to a decreased water-retention capacity of the soil.

There is also concern about the destruction of wetlands, which destroys the habitat of many species and removes natural filter mechanisms, permitting many common pollutants to reach water supplies.

Eutrophication is the enrichment of waters with nutrients, especially phosphorus and nitrogen. It can lead to enhanced plant growth and depleted oxygen levels as this plant material decays. It is not always a human-induced problem, but is often linked to organic waste and agricultural runoff. Today 30 to 40 percent of the world's lakes and reservoirs are eutrophic. Not all intervention has been successful, but eutrophication can be reversible if mid- and long-term strategies are enacted. Laws and measures introduced to reduce tripolyphosphates (used mostly in detergents) and to remove phosphorus from waste water have had positive effects.

SM consists of materials that float in suspension in water. There are three main sources of SM: natural soil erosion, matter formed organically within a water body and material produced as a by-product of human activity. SM settles on the sediment bed and forms deposits in rivers, lakes, deltas and estuaries. Evidence of human-induced SM from Roman and Mayan times has been discovered in lake beds, implying that this was one of the first types of water pollution. River damming affects the amount of SM flowing from rivers to the oceans because reservoirs act as effective sinks for SM. An estimated 10 percent of the global SM discharge to the sea is trapped in reservoirs. Approximately 25 percent of the water currently flowing to the oceans has been previously stored in a reservoir. Damming can also greatly modify water quality; waters flowing out of reservoirs not only have reduced SM quantities, they are also depleted of nutrients and are often more saline, which consequently has detrimental effects on downstream agriculture and fisheries.

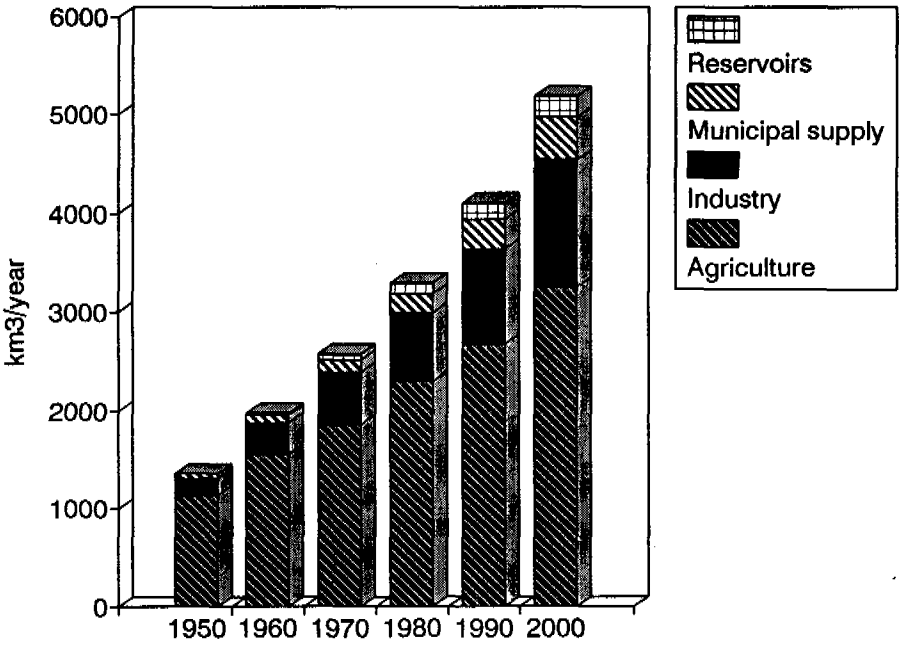
Salinity is a significant and widespread form of freshwater pollution, particularly in arid, semi-arid and some coastal regions. The primary cause of salinization is a combination of poor drainage and high evaporation, rates which concentrate salts on irrigated land. Salinity can adversely affect the productivity of irrigated crops and is also detrimental to industrial and household water users. It is not a new phenomenon; salinization of soil and water in the flood plain of the Tigris and Euphrates Rivers contributed to the decline of the Mesopotamian civilization some 6 000 years ago. The estimated global gross area of irrigated land is 270 million ha. About 20 to 30 million ha are severely affected by salinity while an additional 60 to 80 million ha are affected to some degree. Waterlogged soil, which aggravates the problem of salinity, is usually caused by overwatering and a lack of proper drainage systems. Runoff from agricultural areas fertilized with manure and chemicals pollutes watercourses and groundwater by increasing levels of nutrients.

The present level of water pollution warrants that steps be taken to control further contamination of water resources. More serious action needs to be taken in water resource management, waste water treatment and the provision of safe public water supplies. In developed and developing countries there should be controls and regulations regarding the treatment and recycling of industrial effluents, while efforts must be made to replace harmful products and ban dangerous pesticides.

There is compelling evidence that at least 20 to 30 percent of the water currently used in households and industries can be saved by adopting appropriate regulatory and policy instruments (tariffs, quotas, groundwater extraction charges). The twin benefits of clean water and reduced demand can be obtained if the recycling or reuse of water is encouraged in industries through pollution control legislation and economic incentives (water tariffs based on economic costs, effluent charges and low-interest loans for effluent/sewage treatment plants). Similar savings may be possible in irrigated agriculture by investments in canal lining, by encouraging less water-intensive crops (through relative output prices) and by raising irrigation rates.

Source: UNEP. 1991. *Freshwater Pollution*. UNEP/GEMS Environmental Library. No. 6, Nairobi.

FIGURE 2
World water consumption according to use (Note: Consumption by reservoirs is through evaporation.)



Source: I.A. Shiklomanov. 1990. Global water resources. *Nat. Resour.* 26:34-43.

Water quantity and quality requirements also differ widely depending on the type of use. Net agricultural requirements are especially large in relation to other uses. For instance, around 15 000 m^3 of water are normally sufficient to irrigate 1 ha of rice. This same amount of water can supply: 100 nomads and 450 head of stock for three years; or 100 rural families through house connections for four years; or 100 urban families for two years; or 100 luxury hotel guests for 55 days.[12]

Industry requires large amounts of water, but most of it is recycled back into the water system. The major problem is that much of this water is returned polluted with wastes, chemicals and heavy metals. Over 85 percent of total withdrawals by industry are recycled as waste water.[13]

Domestic water demand is moderate in comparison with agriculture and industry but its quality requirements are high. Domestic and municipal water uses include drinking, washing, food preparation and sanitation.

Water and health

Two of the most troubling domestic water supply issues for policy-makers are access and health. Nearly one billion people in the world are without clean drinking-water.

[12] I. Carruthers and C. Clark. 1983. *The economics of irrigation.* Liverpool, Liverpool University Press.

[13] D.B. Gupta. 1992. The importance of water resources for urban socioeconomic development. In *International Conference on Water and the Environment: Development Issues for the 21st Century.* Keynote Papers. Dublin, Ireland.

Providing easier access to safe drinking-water significantly improves health conditions. Personal hygiene increases when water availability rises above 50 litres per day (which generally means that it must be delivered to the house or yard). An estimated 1.7 billion persons contend with inadequate sanitation facilities. The lack of sewage collection and treatment is a major source of surface and groundwater pollution.

Health officials identify five categories of disease related to water: i) water-borne diseases (typhoid, cholera, dysentery, gastroenteritis and infectious hepatitis); ii) water-washed infections of the skin and eyes (trachoma, scabies, yaws, leprosy, conjunctivitis and ulcers); iii) water-based diseases (schistosomiasis and guinea-worm); iv) diseases from water-related insect vectors such as mosquitoes and blackflies; and v) infections caused by defective sanitation (hookworm).

The World Bank's *World Development Report 1992* estimates that providing access to safe water and adequate sanitation could result in two million fewer deaths from diarrhoea among young children and 200 million fewer episodes of diarrhoeal illnesses each year.

Water as a strategic resource

Water, even when plentiful, is frequently drawn into the realm of politics. Domestic laws and well-established customs can help resolve water-related disputes at national and village levels but international law has not developed fast enough to deal with the growing number of water-related conflicts between many countries and regions. In 1989, Egypt's then Minister of State for Foreign Affairs, Boutros Boutros-Ghali, declared: "The national security of Egypt is in the hands of the eight other African countries in the Nile basin."[14] As Postel notes, Mr Boutros-Ghali's statement highlights the importance of water to Egypt's economy as well as the advantage upstream countries have over downstream neighbours.

The increasing value of water, concern about water quality and quantity, and problems of access and denial have given rise to the concept of resource geopolitics or "hydropolitics". In this context, water joins petroleum and certain minerals as a strategic resource. Its increasing scarcity and value will only intensify the prevalence of water politics and relevant international conflicts.

Several countries depend heavily on river flows from other countries. Botswana, Bulgaria, Cambodia, Congo, Egypt, the Gambia, Hungary, Luxembourg, Mauritania, Netherlands, Romania, the Sudan and the Syrian Arab Republic all receive over 75 percent of their available water supplies from the river flows of upstream neighbours. More than 40 percent of the world's population lives in river basins that are shared by more than one country.

Along with land and energy sources, water has been the focus of disputes and, in extreme cases, even wars. The division of the Indus waters and its tributaries among India and Pakistan provided a salutary warning example. War was only just avoided in the early years of independence by a binding agreement, backed by massive international aid, to build two huge water storage dams and a system of canals. Water could then be channelled to the areas of Pakistan that were deprived of water when some of the Indus tributaries were diverted into Indian territory.

The costs to all parties of this settlement were high but certainly less than the human and financial costs of a conflict. Many other international rivers, including the Nile, Euphrates, Ganges and Mekong, are prospective risk points for disputes. The future of the Jordan waters is already an integral component of regional peace talks and illustrates how complicated hydro-politics can be. The fact that groundwater

[14] See footnote 7, p. 4.

BOX 2
THE INTERNATIONAL CONFERENCE ON WATER AND THE ENVIRONMENT: DEVELOPMENT ISSUES FOR THE 21ST CENTURY

The International Conference on Water and the Environment (ICWE) was held in Dublin, Ireland from 26 to 31 January 1992. The conference provided the major input on freshwater problems for UNCED, convened in Rio de Janeiro, Brazil, June 1992. The ICWE was attended by 500 participants from 114 countries, 38 NGOs, 14 inter-governmental organizations and 28 UN bodies and agencies.

The major work of the ICWE was undertaken by six working groups which addressed:

- **Integrated water resources development and management;**
- **Water resources assessment and impacts of climate change on water resources;**
- **Protection of water resources, water quality and aquatic ecosystems;**
- **Water and sustainable urban development and drinking-water supply and sanitation;**
- **Water for sustainable food production and rural development and drinking-water supply and sanitation;**
- **Mechanisms for implementation and coordination at global, national, regional and local levels.**

The two main outputs of the conference are the Dublin Statement and Report of the Conference, which set out recommendations for action based on four guiding principles. First, the effective management of water resources demands a holistic approach linking social and economic development with the protection of natural ecosystems, including land and water linkages across catchment areas or groundwater aquifers; second, water development and management should be based on a participatory approach that involves users, planners and policy-makers at all levels; third, women play a central part in the provision, management and safeguarding of water; and, finally, water has an economic value in all its competing uses and should be recognized as an economic good.

resources are also involved in the talks adds another dimension of difficulty.

THE WATER SECTOR AND NATURAL RESOURCE POLICY

In January 1992, the ICWE concluded that scarcity and misuse of freshwater pose a serious and growing threat to sustainable development and protection of the environment.[15] The conference emphasized that human health and welfare, food security, economic development and ecosystems are all at risk, unless water and land resources are managed more effectively in the future.

To address water problems at local, national and international levels, the ICWE recommended a range of development strategies and policies based on four principles (see Box 2). While the conference participants readily agreed on the wording of the first three principles, the fourth provoked a long and contentious debate. Principle 4 declares that water has an economic value in all its competing uses and should be recognized as an economic good.

For many, it is difficult to reconcile the concept of water as an economic good with the traditional idea of water as a basic necessity and human right. Older elementary economic textbooks explain this conceptual puzzle - why diamonds, which have so little utility, are expensive while freshwater, which is so essential to life, is cheap. More recent texts leave water out of these vignettes. Like fresh air, water was once considered a classic free good; now that it is growing scarce, while not yet expensive, it is at least acknowledged to be valuable.

[15] *The Dublin Statement and Report of the Conference*. 1992. ICWE, Dublin, Ireland.

Scarcity is one of the most important issues in considering the various socio-economic tradeoffs in allocating water among different users. Allocation policies and decisions determine who will have access to water and under what conditions, and what impact this will have on society and the economy.

The cheapness of water is often more apparent than real. It is a free good not because water provision is without cost obviously this is far from true but because governments have chosen to charge less than full costs for water services for one or more reasons.[16] These subsidies are now coming under scrutiny. The ICWE's final report acknowledges that failure in the past to recognize water's economic value and the real cost of service provision has led to wasteful and environmentally damaging uses. Moreover, the conference report states that managing water as an economic good is an important way of achieving efficient and equitable use, as well as encouraging the conservation and protection of scarce water resources.

It is in this context that the ICWE and UNCED called for a new approach to the assessment, development and management of freshwater resources. The proposed approach involves the management of freshwater as a finite and vulnerable resource and the integration of sectoral water plans and programmes within the framework of national economic and social policy.[17]

[16] Water may be considered a "free" good in the form of rain, but when this free good is captured and delivered to customers by canal, pipe or other means, it becomes a water service. There is generally much less resistance to water service fees than there is to water charges.

[17] UN. 1992. Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources. Chapter 18, Agenda 21, *Report of the United Nations Conference on Environment and Development.*

A more integrated and broader approach to water sector polices and issues is important because of water's special nature as a unitary resource.

Rainwater, rivers, lakes, groundwater and polluted water are all part of the same resource, which means global, national, regional and local actions are highly interdependent.[18] Water use in one part of the system alters the resource base and affects water users in other parts.

Dams built in one country frequently reduce river flows to downstream countries for years afterwards, thereby affecting hydroelectric and irrigation capacity. When a city overpumps a groundwater supply, streamflows may be reduced in surrounding areas; when it contaminates its surface water, it can pollute groundwater supplies as well. Some human actions at local levels may contribute to climate change, with long-term implications for the hydrological system worldwide.

Water policies, laws, projects, regulations and administrative actions often overlook these linkages. Governments generally tend to organize and administer water sector activities separately: one department is in charge of irrigation; another oversees water supply and sanitation; a third manages hydropower activities; a fourth supervises transportation; a fifth controls water quality; a sixth directs environmental policy; and so forth.

These fragmented bureaucracies make uncoordinated decisions, reflecting individual agency responsibilities that are independent of each other. Too often, government planners develop the same water source within an interdependent system for different and competing uses (see Box 3). This project-by-project, department-by-department and region-by-region approach is no longer adequate for addressing water issues.

[18] P. Rogers. 1992. *Comprehensive water resources management: a concept paper.* Policy Research Working Paper Washington DC, World Bank.

BOX 3
FRAGMENTED PLANNING AND WATER RESOURCES IN SOUTHERN INDIA

The World Bank's water resources management policy paper presents several examples from South India to illustrate the kinds of problem caused by fragmented decision-making. The Chittur River's highly variable flows have traditionally been diverted at many points into small reservoirs to irrigate the main rice crop. The diversion channels are large enough to accommodate flood flows following the monsoon rains. Thus, when a storage dam was constructed, the uppermost channel was able to absorb virtually all the regulated flow. The upper tanks now tend to remain full throughout the year, concentrating benefits and adding to evaporation losses. The more extensive lower areas have reverted to uncertain rain-fed cultivation, and total agricultural value added has decreased. Construction of the storage dam without adequate considerations of downstream users or the existing storage capacity of the basin is one example of how individual project development in isolation can cause significant economic losses.

The construction of the Sathanur Dam on the Ponnani River in Tamil Naduto serve a left bank command area deprived productive delta areas of irrigation water. While the rights of downstream irrigators are recognized in the dam operating rules, most of the regulated flow is diverted upstream; water losses have greatly increased in the wide sandy bed and no surface water has reached the sea for twenty or more years. Continued spills in about 50 percent of all years were used to justify the subsequent construction of the right bank command, further aggravating shortages in the delta and leading to continual conflicts between the two Sathanur commands. Meanwhile, additional storage dams on upstream tributaries are adding to evaporation losses in what was already a fully developed basin. Irrigation in the productive delta has declined further and the Sathanur commands in turn are suffering. The high-value crops that were once grown on the main river are being replaced by cultivation on less productive lands, served by tributaries that are more variable than the main river.

The Amaravati River, a tributary of the Cauvery, is the most disputed major river in India. In the absence of a Cauvery agreement, Karnataka (the upstream riparian state) has steadily developed large irrigation schemes, depriving the delta (Tamil Nadu's rice bowl) of its accustomed supplies. Meanwhile, Tamil Nadu has been developing the Amaravati. As at Sathanur, water releases are made from the Amaravati Dam for the traditional areas, but these are far downstream and the substitution of regulated flood flows has encouraged the development of private pumps along the river bank. Even though the new electric connections have now been banned, little can be done to control illegal connections or diesel pumps and, consequently, little water now reaches the lowest commands, let alone the Cauvery. Meanwhile, new storage dams are being constructed on tributaries both in Kerala and Tamil Nadu, further depriving not only the old lands but also the new lands and the pump areas.

Source: World Bank. 1993. *Water resources management: a policy paper.*

To help resolve the growing number of water resource issues, policy-makers are increasingly being called on to review and explain the conditions, problems and progress in the overall water sector. This integrated approach requires water managers to understand not only the water cycle (including rainfall, distribution, ecosystem interactions and natural environment and land-use changes), but also the diverse intersectoral development needs for water resources.

The next section further explores this important concept of linking the water sector with the national economy and provides a conceptual basis for understanding the role of economic policy-making.

II. Water resources: economics and policy

In early civilizations, water played a relatively simple role. It was needed for transportation and drinking and it provided a fishing and hunting source. Over time, sedentary agricultural societies evolved and water use became more important. Families began settling near springs, lakes and rivers to supply livestock and crops with water, gradually developing technologies to divert water for irrigation and domestic purposes. Babylonian, Egyptian, Hittite, Greek, Etruscan, Roman, Chinese, Mayan, Incan and other empires constructed water delivery systems such as long aqueducts to carry water to large cities.[19] In fact, until the middle of the twentieth century, most societies were able to meet their growing water needs by capturing reliable and relatively inexpensive sources.

When water is plentiful relative to demand, water policies, rules and laws tend to be simple and only casually enforced. As populations grow and economies expand, water sectors evolve from an "expansionary" phase to a "mature" phase.[20] At a certain point during the expansionary phase, the financial and environmental costs of developing new water supplies begin to exceed the economic benefits in the least productive (marginal) uses of existing supplies. The reallocation of existing supplies, rather than the capture of unclaimed supplies, then becomes the least costly method to maximize benefits.

A water sector in the "mature" phase is characterized by rising marginal costs of providing water and increasing inter-dependencies among users. In this phase phase, conflicts over scarcities and external costs arise. (External costs result when one user interferes with another's supply, e.g. when an upstream user pollutes a river and raises costs for downstream users.) These conflicts eventually become so complex that elaborate management systems are needed to resolve disputes and allocate water among different users and economic sectors.

Developing effective water sector policies is troublesome for a number of reasons. First, water has unique physical properties, complex economic characteristics and important cultural features that distinguish it from all other resources.[21] Second, water resource management is administratively complicated because it involves legal, environmental, technological, economic and political considerations.[22] In most societies, political considerations dominate decisions on water resource use. Nonetheless, most policy options are framed and discussed in economic terms.

This section attempts to provide a conceptual basis for understanding water policy interventions while examining the circumstances under which water policies work or fail. It comprises three parts: the

[19] V. Yevjevich. 1992. *Water Int.*, 17(4): 163-171.

[20] A. Randall. 1981. Property entitlements and pricing policies for a maturing water economy. *Aust. J. Agric. Econ.*, 25:195-212.

[21] R.A. Young and R.H. Haveman. 1985. Economics of water resources: a survey. *In* A.V. Kneese and J.L. Sweeney, eds. *Handbook of natural resources and energy economics*, Vol. II. Amsterdam, Elsevier Science Publishers.

[22] For example, water resource management depends on the government's ability to establish an appropriate legal, regulatory and administrative framework. In fact, markets are based on a system of enforceable private property rights. Private water markets require secure and transferable property rights, including the right to exclude other users.

BOX 4
ECONOMIC POLICIES AND WATER USE IN THE SYRIAN ARAB REPUBLIC

After struggling throughout the 1980s, the Syrian economy has performed well over the past few years. The end of a two-year drought allowed agriculture and agro-industries to recover in 1991. During the drought, the government was forced to import large quantities of wheat and barley, thereby draining foreign currency reserves. In addition, the lower water levels meant a reduction in hydropower generation, increasing the need for thermal power and, in turn, lowering crude oil exports.

Two of the Syrian Arab Republic's major national development objectives are: achieving food self-sufficiency to reduce dependency on imports; and expanding agricultural exports to earn more foreign exchange. To support these objectives, the government has invested 60 to 70 percent of the entire agricultural budget in irrigation over the past ten years.

Several factors explain this special attention for irrigation development. The irrigated area comprises only 15 percent of the cultivated land yet produces over 50 percent of the total value of agricultural production. A large part of wheat production as well as all major industrial crops, including cotton tobacco and sugarbeet, are produced on irrigated farms. Production on the remaining rain-fed area, representing 85 percent of the total area, varies greatly from year to year.

At present, agriculture accounts for around 85 percent of the country's water consumption, but competition is increasing. During the 1980s, industrial water demand increased by nearly 900 percent. Current projections suggest that water requirements will be two to three times greater by 2010.

The government's effort to promote food self-sufficiency has produced a second generation of water-related problems. To encourage growth in agricultural production and enhance rural incomes, interest rates, seeds, fertilizers, pesticides, transport and energy prices are subsidized. The government also establishes purchase prices and buys industrial crops, major cereals and feedgrains. For example, the 1992 domestic wheat price was almost twice the international price.

These policies are contributing to the proliferation of wells in the Syrian Arab Republic. Digging wells to pump groundwater accounts for 80 percent of the newly irrigated land since 1987. With irrigation, farmers obtain higher yields, more stable production and greater profit. Since water is free, the only investment expense required is the well and the pumping gear – a one-time fixed cost. Farmers obtain subsidized credit to purchase subsidized fuel for operating imported pumps purchased with overvalued currency (an implicit subsidy). With these economic opportunities, most farmers want to dig wells or pump surface water.

Other current economic pressures are also influencing farmers' decisions to dig wells and expand irrigation. For example, as incomes in urban areas increase, consumers are demanding more fruit and vegetables. At the same time, recent changes in trade and exchange rate policies are making Syrian agricultural products more competitive in regional markets. Farmers who inititally planned only on supplementary irrigation for winter wheat are finding summer vegetables and irrigated fruit production increasingly profitable.

first examines the relationship between the water sector and the overall economy; the second explains the social, physical and economic nature of water; the third assesses the advantages and disadvantages of broad alternative approaches to public water policy and also reviews policy issues related to the economic organization of water resource management.

LINKING THE WATER SECTOR WITH THE NATIONAL ECONOMY

Economic policy-makers tend to confront policy issues one at a time, stating policy objectives in single dimensional terms. This approach presents difficulties because a policy aimed at achieving a single objective usually has unintended and unrecognized consequences. Water managers and policy-makers need to assess the entire range of government interventions to understand fully the economic, social and environmental impacts on a given sector, region or group of people.

Improving water resource management requires recognizing how the overall water sector is linked to the national economy. Equally important is understanding how alternative economic policy instruments influence water use across different economic sectors as well as between local, regional and national levels and among households, farms and firms. For too long, many water managers have failed to recognize the connection between macro-economic policies and their impact on, for example, technical areas such as irrigation.

Macroeconomic policies and sectoral policies that are not aimed specifically at the water sector can have a strategic impact on resource allocation and aggregate demand in the economy. A country's overall development strategy and use of macroeconomic policies - including fiscal, monetary and trade policies - directly and indirectly affect demand and investment in water-related activities. The most obvious example is government expenditures (fiscal policy) on irrigation, flood control or dams.

A less apparent example is trade and exchange rate policy aimed at promoting exports and earning more foreign exchange. For example, as a result of currency depreciation, exports of high-value, water-consuming crops may increase. If additional policy changes reduce export taxes, farmers are provided with an even greater incentive to invest in export crops as well as in the necessary irrigation (see Box 4).

National development strategies can directly influence water allocation and use in other ways. In the case of a food self-sufficiency strategy, the government may subsidize water-intensive inputs to encourage farmers to produce more rice. By providing financial incentives for rice producers, the government is influencing the demand for water and private irrigation investment through price policies.

Apart from the direct effects on water use resulting from such price policies, the increased demand for irrigation water also has intersectoral, intrasectoral, distributional and environmental implications. The agricultural sector is provided with an economic advantage in access to water *vis-à-vis* the industrial sector (intersectoral); water used for rice gains an economic advantage over water used for other crops (intrasectoral); rice producers with more land and access to water gain over those with less land and water (distributional); and increased pesticide and fertilizer use are likely to affect water quality (environmental).

Sectoral policies affect water use and allocation in non-agricultural sectors in a variety of ways. For example, in the western United States, 70 to 80 percent of the region's water yield results from snowmelt from the high-elevation forests, many of which are under public jurisdiction. Water yields are significantly affected by timber harvest policies on these lands. Rangeland management policies on lower elevations also alter vegetation conditions and thus affect the rate of evapotranspiration, in turn affecting

streamflow and groundwater recharge.[23] In such cases, it is important for downstream city water managers to recognize, understand and become involved in the decisions of other sectors such as livestock and forestry.

With the continuing importance of structural adjustment and stabilization programmes, many developing countries are implementing fundamental changes in macroeconomic and sectoral polices. Typical adjustment programmes call for a greater reliance on markets, more open trade, fiscal austerity and a phasing out of producer and consumer subsidies (input and product markets). Budget-reducing measures imply increased competition between and within sectors for funding new water projects. In these situations, the overall economic, social and environmental implications of choices must be carefully addressed. For example, when governments must choose between financing either irrigation projects or hydroelectric power projects, there is an additional social opportunity cost of the irrigation water in countries that are dependent on imported energy sources. At the same time, when water scarcity keeps some farmers on uneconomical lands such as steep watersheds, the country suffers twice: once in terms of reduced production compared with what would be possible with irrigation; and again in terms of erosion and resource depletion, with erosion possibly shortening the life of existing waterworks.[24]

In most countries, pressure has increased not only to modify investment allocations but also to recognize and accommodate new demands for water. The direct implications for water managers include fewer capital investments in new water projects, the elimination of irrigation subsidies, increased efforts to recover its cost and more emphasis on demand management to improve the efficiency of existing supplies.

THE SOCIAL, PHYSICAL AND ECONOMIC NATURE OF WATER

Policy-makers throughout the world treat water as more than a simple economic commodity. Because water is essential to life, they often reject competitive market allocation mechanisms. Many societies believe that water has special cultural, religious and social values. Boulding observed that "the sacredness of water as a symbol of ritual purity exempts it somewhat from the dirty rationality of the market".[25] In many cultures, goals other than economic efficiency play an unusually large role in selecting water management institutions. Some religions, such as Islam, even prohibit water allocation by market forces.

The international community recognizes that access to water is a basic human right. The ICWE asserted that "...it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price".

The connection between water and human life is most dramatic in arid regions, where crop irrigation is essential to food production. In Egypt, little food can be grown without the help of the Nile for irrigation. However, the focus on water's special status tends to obscure the fact that, in most societies, only a tiny fraction of

[23] B. Saliba, D. Bush, W. Martin and T. Brown. 1987. Do water market prices appropriately measure water values? *Nat. Resour. J.*, 27 (summer).

[24] D.W. Bromley, D.C. Taylor and D.E. Parker. 1980. Water reform and economic development: institutional aspects of water management in the developing countries. *Econ. Dev. Cult. Change*, 28(2).

[25] K.E. Boulding. 1980. The implications of improved water allocation policy. *In* M. Duncan, ed. *Western water resources: coming problems and policy alternatives*. Boulder, Colorado, Westview.

water consumption is actually for drinking and preserving life. In fact, a large portion of urban water is used for convenience and comfort. In the arid western United States, per caput water withdrawal by households frequently exceeds 400 litres per day, about half of which is used to irrigate lawns and gardens. Most of the remainder is for flushing toilets, bathing and washing cars. Another important influence on water resource policy is societies' partiality for technical solutions. In most countries, water management is typically relegated to the engineering domain. Indeed, most water managers are engineers, who are trained to solve technical problems. As inadequate public policies are increasingly blamed for water-related problems, a strong case is emerging for emphasizing human behaviour as an additional component of water systems.

Physical attributes of water

Water has two additional features that further complicate management efforts: bulkiness and mobility. The value per unit of weight tends to be relatively low (placing water among the commodities that are termed "bulky"). Unlike petroleum, the costs of transporting and storing water are generally high relative to its economic value at the point of use. In crop irrigation, the water applied may yield additional economic values of less than $0.04 per tonne of water. Water is also difficult to identify and measure because it flows, evaporates, seeps and transpires. This evasive nature means that exclusive property rights, which are the basis of a market economy, are hard to establish and enforce.

Many water management problems are site-specific and so elude uniform policy treatment. While water consumption and quality require-ments are tied to local populations and development levels, local water availability usually changes with climatic variations throughout the year and over longer cyclical swings. These supplies may be highly variable and unpredictable in time, space and quality. In regions throughout India, for instance, most rainfall is concentrated during a three-month period and there are large year-to-year variations. In addition, forecasts of significant global climate change – attributable to both natural and human causes – raise concerns about longer-term supply trends (See Box 5).

Water projects that attempt to compensate for extreme seasonal variations such as floods and droughts frequently require enormous investments. The economies of size are so large in these cases that unit costs continue to exceed the range of existing demands. This is a classical "natural monopoly" situation in which a single supplying entity is the most economically efficient organizational arrangement.

On the other hand, most economies of size for pumping groundwater are achieved at relatively small outputs and multiple suppliers can therefore operate efficiently. However, aquifers are usually hydraulically linked with rivers or streams – part of a river's volume may come from underground flows and rivers may replenish groundwater stocks. This hydraulic linkage is affected when an aquifer is heavily pumped. A lowered groundwater table may draw water from a connected stream, reducing its flow to surface water users. Box 6 describes the special policy concerns related to aquifers.

Aquifer management is often complicated by the aggregate impact of the actions of many individuals. Even though each individual may have a negligible impact when taken alone, the sum total can be of major importance. One example is the rapid spread of tube well irrigation in South Asia. One tube well has little effect on the total water supply, but thousands of tube wells can quickly deplete an aquifer. Establishing effective policies to regulate these many small, scattered decision-makers is exceedingly difficult.

Economic attributes of water use

Water provides four types of important economic benefits: commodity benefits;

BOX 5
CLIMATE CHANGE, WATER RESOURCES AND AGRICULTURE

To date, research is not able to provide clear conclusions about the prospective impacts of climate change and global warning. Among the potential impacts of climate change is its effect on the hydrological cycle and water management systems. For instance, increases in floods and droughts causes increased frequency and severity of disasters. Relatively small changes can cause severe water resource problems, especially in semi-arid regions and humid areas where demand or pollution has led to water scarcity.

The statement adopted by the Second World Climate Conference, held in Geneva in 1990, concluded that the design of many costly structures to store and convey water, from large dams to small drainage facilities, is based on analyses of past records of climatic and hydrological parameters. Some of these structures are designed to last from 50 to 100 years or even longer. Records of past climate and hydrological conditions may no longer be a reliable guide for the future. The possible effects of climate change should be considered in the design and management of water resource systems.

Data systems and research must be strengthened to predict water resource impacts, detect hydrological changes and improve hydrological parameterization in global climate models.

Agricultural impacts could be significant but researchers are uncertain whether global agricultural potential will increase or decrease. Increases in drought risk are potentially the most serious effect of climate change on agriculture. Disease and pest patterns, raised sea levels and storm surges are additional problems. It does appear that many areas will have increased precipitation, soil moisture and water storage, thus altering patterns of agricultural ecosystems and other water uses.

Source: WMO/UNEP/FAO/ Unesco/ ICSU. 1990. Second World Climate Conference. Geneva; and UNEP. 1992. *The state of the environment.*

waste assimilation benefits; aesthetic and recreational benefits; and fish and wildlife habitats. Individuals derive commodity benefits from water by using it for drinking, cooking and sanitation. Farms, businesses and industries obtain commodity benefits by using water in productive activities. These commodity benefits represent private good uses of water which are rivals in consumption (e.g. one person's or industry's water use precludes or prevents its use by others). Government policies and regulations that concentrate on improving market access and competition are important means for improving the productive and allocative efficiency of the commodity uses of water.

The second and increasingly important economic benefit of water is waste disposal. Water bodies have a significant, but ultimately limited, assimilative capacity, meaning that they can process, dilute and carry away wastes.

Recreation and aesthetic benefits and fish and wildlife habitats were once regarded as luxury goods outside the concern of governments. Today, these two types of benefit are gaining increased attention. In developed countries, more and more people are focusing their recreational activities around lakes, rivers and seas. In developing nations, as incomes and leisure time grow, water-based recreation is becoming increasingly popular and an adequate supply of good-quality water helps provide a basis for attracting the tourist trade. Examples are cruises on the Nile in Egypt and visits to the Iguazú Waterfalls on the Brazil-Argentina border. Likewise, information and knowledge about how humans have an impact on ecosystems have raised concern about the fish and wildlife

BOX 6
AQUIFER OVERDRAFT

An aquifer is a geological formation, actually or potentially containing water in its pores and voids. Aquifers consist of the porous rock or soil media (sand, gravel or rock materials) within which water is collected and through which it flows. Moisture from rain or snow that escapes evaporation collects in streams as surface water or seeps into the ground. Soil water not taken up by plants seeps downwards until it reaches the water-saturated zone. Water in aquifers is called groundwater. Groundwater deposits are economical to use for human purposes if they are close to the surface (and thereby inexpensive to pump) and are of good quality.

Aquifers vary greatly in their nature and extent. The quantity, quality and ease of extraction can be determined accurately only after extensive exploration. Underground geology varies widely and is expensive to map. Aquifers may be very thin or hundreds of meters thick; some are local in character, while others extend for hundreds of kilometres. The Ogallala-High Plains Aquifer in the central-western United States underlies more than 10 million ha over six states.

Relative to surface water, groundwater moves very slowly – in some cases only a few metres per year. While aquifers may have accumulated over thousands of years, modern pumping devices can easily exhaust them more rapidly than the natural recharge rate. It is also possible to divert surface water to artificially recharge an existing aquifer and make it available for future use.

Aquifer status reports from many parts of the world suggest that all is not well with our groundwater resources. Symptoms of management problems begin with pumping rates that exceed the natural recharge. Primary symptoms are: an exceedingly rapid exhaustion of groundwater stocks and the consequent increase in pumping costs; the intrusion of poorer-quality water into the deposit being exploited; salt water intrusion from rapid pumping near seacoasts; and mineralized deposits interspersed with better-quality water.

Subsidence of overlying lands is another adverse impact of aquifer overexploitation. As water is withdrawn, the soil and rock particles comprising the aquifer are compressed into a smaller volume and, consequently, crack the earth's surface. This results in damages to buildings, roads, railroads, etc. Another consequence of overpumping may be the interruption of flows in neighbouring wetlands and streams; deprived of their water source, they are reduced in size or may dry up altogether. Other adverse effects from overpumping result when residential or farmers' wells dry up because of the presence of larger and deeper wells.

From a broad perspective, aquifer exploitation can bring about either or both of two types of social dilemma. First, overdraft is an example of a class of resource problems, usually called "common pool" problems.[1] A common pool resource can be defined by two characteristics. The first is subtractibility (meaning that a unit of resource withdrawn by one individual is not available to another individual user). The second is high cost of excluding potential beneficiaries from exploiting the resource. Fugitive or mobile resources, such as water, petroleum or migratory fish and wildlife, are typical examples of resources with high-exclusion costs.

Common pool problems or dilemmas arise when individually rational resource use leads to a non-optimal result from the perspective of the users as a group. Three conditions are necessary to produce a common pool resource dilemma: first, large numbers of users withdraw the resource; second, the actions and characteristics of the individual users and the extraction technology bring about suboptimal outcomes from the group's viewpoint; third, there must be an institutionally feasible strategy for collective resource management that is more efficient than the current situation.[2]

The roots of the problems associated with common pools are found in the inadequate economic and institutional framework within which the resource is exploited.[3] Common pool resources have been typically utilized in an "open access" framework, within which resources are used according to a rule of capture. When no one owns the resource, users have no incentive to conserve for the future and the self-interest of individual users leads them to overexploitation. The characteristics of the economic institutions governing their use is the fundamental issue in managing common pool resources.

The second type of social dilemma associated with groundwater exploitation is the imposition of external costs or externalities. In the presence of significant externalities, the calculation of costs and benefits by exploiters do not yield a collectively optimal rate of exploitation.

[1] R. Gardner, E. Ostrom and J.M. Walker. 1990. The nature of common pool resources. *Rationality and Society*, 2:335-358.

[2] Ibid; and E. Ostrom. 1990. *Governing the commons: evolution of institutions for collective action*. Cambridge, UK, Cambridge University Press.

[3] R.A. Young. 1993. Aquifer overexploitation: economics and policies. *Proc. 23rd Conference of the International Association of Hydrogeologists*, Santa Cruz, Spain.

benefits provided by water. Fish and wildlife habitats are related to both commodity and recreational uses.

Waste assimilation and recreational and aesthetic values are closer to being public goods than private goods. Public goods are non-rivals in consumption - one person's use does not preclude use by others. For example, enjoyment of an attractive water body does not deny similar enjoyment to others. Non-rival goods require large amounts of resources to exclude unentitled consumers from using the good. Exclusion costs are frequently very high for water services such as flood control projects and navigation systems. Goods and services that are non-rivals in consumption are normally better suited to public sector interventions, including ownership, provision and regulation.

ECONOMIC ORGANIZATION OF THE WATER SECTOR: MARKETS OR GOVERNMENTS?

Most countries rely on a mix of market policies and direct government interventions to manage water resources. Each system has its own advantages and disadvantages.

A competitive market has the potential to efficiently allocate resources (water supplies) among competing demands. Producers and consumers acting in their own self-interest arrive at the price at which available supplies are allocated. Private producers, guided by prospective profit, seek to buy inputs as cheaply as possible, combine them in the most efficient form and create products that have the highest value relative to cost.

Consumers' incomes, tastes and preferences influence expenditure patterns, which encourage firms to produce the commodities people are willing and able to buy. Prices are forced upwards for the commodities most desired, and producers allocate resources in the direction of the greatest potential profits. The firms producing desired goods most efficiently are rewarded by profit while the unsuccessful are eliminated, so production occurs at the least cost. However, the needs of potential consumers with limited income may not be met at all or only partially.

While the private market has the potential to produce the maximum private-valued bundle of goods and services, the public sector also plays an important role. Public actions incorporate a broader range of social goals than the private sector. The public sector can ameliorate income inequalities, promote development in disadvantaged regions, regulate private activities that harm the environment and control other undesirable effects of a private, profit-oriented monopoly.

Market failures

If water as a commodity, or the economic system in which water is used, meets the preconditions for a market system, government interventions can be minimized. In competitive markets, government's primary role is to emphasize "incentive structures" and to establish "rules". Some of the most important rules are the laws governing the establishment of property rights and the enforcement of contracts.

Market economies experience shortcomings called market failures.[26] Market failures occur when incentives offered to individuals or firms encourage behaviour that does not meet efficiency criteria (or more generally, because efficiency or economic criteria fails to satisfy national social welfare criteria). In these cases, the public sector may intervene to influence water provision and allocation. Market failures affecting water resources include externalities, public goods and natural

[26] C. Wolf. 1988. *Markets or governments; choosing between imperfect alternatives*. Cambridge, MA, Massachusetts Institute of Technology Press.

monopolies. In other cases, even efficient markets may not meet societies' equity criteria so public intervention is necessary to compensate for distributional inequity.

Externalities are inherent in water sector activities. An example is the detrimental effect of saline return water flows (caused by irrigation) on downstream water users. Another example is the waterlogging of downslope lands through inefficient irrigation practices. Most irrigators do not normally consider the external costs they impose on others, so governments attempt to protect affected individuals through regulations, taxes, subsidies, fees or technical standards. For instance, irrigation practices can be regulated by setting and enforcing standards to control salinity and waterlogging.

In recent years, the "polluter pays" principle has attracted increased attention in industrialized countries (and to a lesser extent in developing countries). This principle requires producers to pay the "full" cost of their production process, including externalities such as polluting water.

Water storage projects and flood control programmes represent examples of *public goods*. The market does not adequately supply public goods because private entrepreneurs cannot easily exclude non-paying beneficiaries and capture a return on investment. For example, it is not possible to exclude people living along a river from the benefits of a flood protection plan on that river.

A firm that experiences decreasing costs throughout its range of production is easily able to dominate the entire market and become a *natural monopoly* (a common situation in the water sector). Decreasing costs imply increasing returns; thus, the first firm to begin production can always underprice new entrants. Urban water supply systems, hydropower plants and canal irrigation projects are subject to this type of market failure. Unregulated monopolies can restrain production and charge excessive prices; they also have little incentive to innovate. A water supplier acting as a natural monopoly has the power to impose exorbitant costs - even economic ruin - on its customers.

Public regulation or public ownership can mitigate the undesirable effects of a private, profit-oriented monopoly. When increasing returns exist, the lowest-cost production is that of a single producer. Society is likely to benefit by regulating or owning the monopoly rather than by encouraging competitive suppliers. More than one competitive supplier would present much higher distribution costs.

While free competition is viewed as the most efficient system for allocating resources, potential market imperfections can accentuate income disparities. Societies' public welfare goals often incorporate a broad range of social objectives. Primary among these is ameliorating income inequalities between members of the society and sometimes among political subdivisions or regions. In these situations, the government may direct investment and subsidies towards specific regions or groups. Water projects provide important investment strategies both for human welfare (drinking-water and food supplies) and for infrastructure to support economic development.

Government failure

Even in the event of market failures, public sector interventions or non-market approaches may not lead to the socially optimum solution. In many cases, non-market responses to market failures lead to less than optimal outcomes. In particular, some government agency performance incentives result in a divergence from socially preferable outcomes (both in terms of allocative efficiency and distributional equity criteria). The problem areas relevant to water sector services are:

- *"Products" are hard to define.* The outputs of non-market activities are difficult to define in practice and to

measure independently of the inputs that produced them. Flood control or amenity benefits of water storage reservoirs are examples of water system outputs that are hard to measure.

- *Private goals of public agents.* The internal goals, or "internalities", of a public water agency as well as the agency's public aims provide the motivations, rewards and penalties for individual performance. Examples of counterproductive internal goals include budget maximization, expensive and inappropriate "technical-fix" solutions and the outright non-performance of duties. In addition, agencies may adopt high-tech solutions, or "technical quality", as goals in themselves. For example, they may recommend sprinkler or drip irrigation systems when other less expensive but reliable methods are more economical. Finally, irrigation agency personnel may be persuaded, by gifts or other inducements, to violate operating rules for a favoured few.[27]

- *Spillovers from public action.* Public sector projects can also be a major source of externalities. Salinity and waterlogging of downslope lands can occur just as easily from inappropriately managed public irrigation projects as from private irrigators.

- *Inequitable distribution of power.* Public sector responsibilities, however noble their intent, may not be scrupulously or competently exercised. Yet the monopoly control of water supplies by public agencies provides certain groups or individuals with so much power over the economic welfare of water users that procedures to protect those of limited influence should be of prime importance.

[27] R. Wade. 1982. The system of administrative and political corruption: land irrigation in south India. *J. Dev. Stud.*, 18:287-299.

Economic structure and irrigation

For many years, the economic systems in a number of developing countries discriminated against agriculture through policies such as high levels of protection for domestic manufacturing sectors, overvalued exchange rates and taxes on agricultural exports. Most developing countries today are at some stage of structural reform, attempting to adjust and transform their economies towards a more liberal economic trade regime - modifying government involvement and increasing market influence.

The developing world's recent record in consolidating macroeconomic stability with solid economic growth is very mixed. Where success is evident, most of the economic transformation has taken place at the macro level and much remains to be done to effect the consequent adjustments at the micro level, i.e. at the level of water users.

Even with widespread acceptance of the need for macroeconomic price policy reforms for all other sectors since the early 1980s, the dominant supporting actions for agriculture have been non-price policies. For non-agricultural sectors, the new policy mix includes minimizing state involvement in the pricing and marketing of inputs and outputs, privatization and limiting government borrowing.

Despite the irrigation sector's often being sheltered or even benefiting from the effects of these economic policy reforms, government subsidy cuts are inevitably affecting the scope and efficiency of agricultural support services. In most countries, there is a pressing need to discuss how various policy options, including both public interventions and market-oriented, private sector activities, may assist the irrigation sector in the process of economic reform.

Contribution of the European Commission to the Ministerial Conference on Drinking Water and Environmental Sanitation,
Netherlands 22-23 March 1994.

Water is one of the elementary sources of life. It is also an indicator of the general quality of the natural environment. Without water, the harmonious and sustainable maintenance and development of socio-economic activities would not be possible. But good quality water is limited at any given time and place.

According to a recent Eurostat/OECD statistic, average annual per-capita water consumption of the EC-12 has risen from 590 m3 in 1970 to 790 m3 in 1985 - an overall increase of 35% in 15 years.

Since the dawn of our industrial revolution, pollution of water has increased in many parts of the Community. Broad and concerted action in more recent times has begun to make some impact on the problem. But progress in the last 20 years has been, not so much a noticeable improvement in water quality, rather a halt in the decline in water quality in most areas of the Community. From this point attention must be focused on action to improve standards thus ensuring proper water quality for the population and the environment.

The Community cannot dissociate itself from local nor international water problems. Since 1972, Community action in this area has comprised:

* establishing quality requirements of limit values;

* prohibiting or limiting discharges of certain dangerous substances into the aquatic environment;

* supporting investment for the purpose of improving water quality, both within the EU and in developing countries;

* promoting international cooperation for the sustainable management of transboundary water courses and for their protection through, for instance, international agreements for the protection of the seas, coastal water and international rivers.

1. Community action within the Union

To improve the quality of life, and as a condition for achieving sustainable development, it is essential that sufficient water of adequate quality be available throughout the Community without upsetting the natural equilibrium of the environment. Water is a natural asset common to all Europeans, but increasingly it is becoming a rarer resource, also giving rise to economical problems.

The recent EC Programme of Policy and Action in relation to the Environment and Sustainable Development sets out the overall objectives to be achieved on water quantity and quality in the long-term, targets to be reached by the year 2000 and actions needed in the short-term (see annex).

The importance of drinking water for life itself and for our way of life is self-evident. The subject deserves careful consideration not least because of the important financial consequences of any change, and the balancing of conflicting interests.

Many people think of Community legislation as something remote and not concerning them directly. This is far from the truth. Community legislation affects us all, and it is vitally important that legislation should be for the benefit of the whole of the Community and all its citizens. This argument applies with particular emphasis to legislation concerning drinking water quality which is of immediate and direct concern to every citizen. It is impossible to overstate the importance of having the correct rules in force.

Council Directive 80/778/EEC of 15th July 1980 relates to the quality of water intended for human consumption. It aims to protect public health and to avoid unfair differences in the conditions of competition. This directive should contribute to the improvement of living conditions and the harmonious development of economic conditions throughout the Community.

But after more than a decade, even a successful legal instrument like this might need revision. Reconciling a relaxation of current quality standards with the objective of raising standards of ling would not be easy. But relaxation of the standards is not an option. Any revision should make only those adjustments which would allow the same objectives to be pursued even more efficiently. Room remains to simplify and clarify the existing text, to abandon unnecessary parameters, and to ascertain that parametric values given stand up to scientific scrutiny.

The Commission has been invited by the Council to consolidate its water protection legislation. This gives us an opportunity to review the legislation Directive by Directive against current water policy objectives.. For Drinking Water, a fundamental review of the current Directive is required. We need to identify its strength and weaknesses in relation to current requirements, and take advantage of experience gained in its implementation. Critical examination of the technical annexes is also necessary as part of the wider task of identifying rules needed at Community level to ensure an adequate and sustainable supply of good drinking water, well into the next century. This is why the Commission

held a conference in September 1993 concerning the possible revision of the Drinking Water Directive.

The purpose of this conference was to give all interested parties a chance to voice their opinions on possible revision of the Directive, and for those opinions to be debated. Many useful comments were received by the Commission and relevant services are currently analysing these contributions and the scientific evidence accompanying them.

In addition, the Commission has received some 10,000 letters from members of the public in Germany calling for no reduction in standards of the current Directive (in particular with regard to pesticides).

The Commission indicated in its 1994 Work Programme that it would present a proposal for a revised Drinking Water Directive. This should be ready in the second half of 1994. The main issues to be examined include:

- a) Health-related parameters

The Directive's objective being to ensure that drinking water is safe to drink, the Commission would find it difficult to justify and reduction in the present level of protection.

- b) Scientific evidence

The Commission has been vigilant to keep informed of the latest available scientific evidence, and in particular, has followed World Health Organisation (WHO) revisions to guidelines on drinking water quality. The Commission shares with WHO the view that water quality should be maintained at a high level.

Maximum Admissible Concentrations (MAC) set for the various parameters in the Directive should not be regarded as quality levels to which water can be left to deteriorate.

- c) Compliance rules

The present Directive is very strict, requiring 100% compliance at any time. This legal rigidity has created difficulties for Member States attempting to redress failures without continuing to be in breach of the Directive for a long period. For example, eliminating sources of pollution is usually a more time-consuming but better long-term solution to the problem than installing short-term but more immediate solutions such as 'end of pipe' treatment facilities. The Commission therefore sees the need for a legal framework allowing for remedial measures to be taken.

- d) Subsidiarity

Subsidiarity is an established part of Community policy. The Commission shares the view that action should be taken at the appropriate level. In the case of drinking water however, the basic standards should be identical throughout Europe to ensure equal health protection for all citizens, free circulation of goods and to prevent distortion of competition. Member States are free to set more stringent or additional standards as they wish.

-e) Lead

New WHO guideline values for lead suggest a standard of 10 ./l in place of the current 50 ./l. This should be considered together with compelling evidence for a revised lead parameter. Removing all lead from public and private pipe systems in order to meet such standards will be an enormous task. Thus if the parametric value is to be changed, adequate time will have to be allowed for the necessary work to be carried out.

- f) Pesticides

Present MAC values are set on the basis that pesticides have no place in drinking water. This view commands considerable support, not least from Member States. However, in carrying out any review of the Directive, it will be necessary to examine carefully scientific evidence purporting to demonstrate that no health risk exists form some pesticides at concentrations above 0.1 .g/l, and also, whether any change in approach would be compatible with the precautionary approach required under the Union Treaty.

2. Community action outside the Union

- a) General framework:

The European Community has concluded co-operation agreements with 107 developing countries.

The Lomé Convention with 69 African, Caribbean, and Pacific countries (ACP) is at the centre of the Community co-operation policy. Besides the Lomé Convention, EC co-operation policy appears through:

- co-operation agreements with Mediterranean countries,
- co-operation agreements with countries in Asia and Latin America,
- food aid,
- "horizontal actions" (i.e. fight against AIDS, protection of tropical forests).

Community action in ACP countries derives from the Lomé Conventions which have put finance from the European Development Fund at the disposal of beneficiary countries since 1958. The current Lomé IV Convention provides aid of 12 billion ECU during a period of 5 years.

Before implementing EC/ACP co-operation, extensive discussions take place between the EC and national authorities. Financial resources to be allocated to a beneficiary country over a period of 5 years is negotiated, and an extensive exchange of views on the development of the country in all its aspects - political, financial, economic and social - takes place at the same time. Decisions concerning distribution of the funds among the various economic and social sectors are taken together. It is at this time, that national authorities indicate their priorities and that the importance given by them to the water sector in rural and urban areas becomes evident.

The Commission contributes to the various sectors as the beneficiary country moves from political declarations of principle to actual financial decisions concerning the water sector.

Globally speaking, support to the water sector has been about 100 million ECU under Lomé I (1975-1980), and about 200 million ECU under Lomé II (1981-1985). This support covered studies, technical assistance, investment, training programmes and institution building.

With Lomé III (1986-1990), a large part of EC aid was allocated to rural development with the objectives\ of increasing agricultural production. A sub-programme - water, sanitation, health - was generally included in the integrated rural development programmes. Other projects in sectors such as urbanism and habitat, social structures, energy production (hydroelectric), etc., often comprise action in the areas of water supply and sanitation. Action financed through Non-Governmental Organisations, and projects with local communities must also be mentioned in this context.
It is difficult to identify precisely the amount of resources allocated to the sector, but estimates suggest that support remained the same as previously under Lomé IV and Lomé III.

- b) Basic principles

Some basic principles are applied to projects financed in this sector:

- planning:
water supply must be planned in accordance with other aspects and policies of economic and social development, particularly with the other sectors to which water supply is linked (e.g. agriculture, breeding, industry, energy, .. etc.);

- national policy:
as a guarantee for the above, the beneficiary countries must define a national water policy fixing general objectives for rural and urban areas. Priorities (particularly with regard to underprivileged sections of the population) must be stated, and long-term planning of the investment taking into account institutional and financial problems linked to their operation and maintenance be set out;

- participation:
water participation must also aim to make the public more aware of their responsibility as regards water supply, making the best use of local facilities. Local people must be encouraged to participate in the preparation, implementation, and maintenance of water supply systems. Participation is enhanced by community-based organisation of the people involved. This objective requires a systematic programme of information and training of the local population;

- capacity evaluation:
the capacity of the facilities must be adequate, with a precise evaluation of needs and expected demand;

- appropriate level of supply:
the level of service must be adapted to the economic and social situation of the users, taking into account in particular their capacity to pay for water at its real price, and of the national and local capacities to manage and maintain facilities. Viability of the system depends on financing of recurring costs, and therefore on the application of an appropriate tariff based on various categories of user;

- appropriate design:
the technical design must be simple and must as much as possible use local material and equipment using work of national enterprises, without, however, by-passing technological progress;

- pollution control:
the preservation of a good water quality must be secured by an appropriate system of pollution control, and particular attention must be payed to the question of drainage and treatment of waste waters.

These basic principles have fashioned the approach taken in the design of water supply projects, under the framework of Lomé II and III since the 1980s.

-c) Current situation of the Sector

The viability and proper management of installations remain critical issues. Particular attention must continue to be payed to this as well as maximising local

participation. Certain projects, especially in rural areas have shown that such management systems can function efficiently.

Conclusion:

It was clearly stated on the occasion of the International Conference on Water and Environment in Dublin in January 1992 that water must be considered a limited resource which should be managed on the basis of economic criteria and in accordance with a policy of realistic pricing.

The Dublin Report also underlines the importance of:

- the programmes of capacity-building;
- the campaigns raising awareness of the populations concerned;
- the role of women;
- technological development promoting water saving methods, in particular in the sectors of agriculture and industry which are the major consumers;
- the control of water pollution as well as the treatment of waste waters.

In June 1992, the Rio Conference on Environment and Development took up these points in Agenda 21. The Rio reports, and in particular Chapter 18 of Agenda 21 on water resources, stresses the close link between the water sector and the sectors of agriculture, industry and urbanisation.

Integrated management of water resources from source to consumption is vital for their optimum utilisation. It must be accompanied by an integrated approach to pollution control and conservation of ecosystems.

Follow-up at EC level of the recommendations of these two conferences was begun in April 1993 at a meeting between experts of the Commission and of the Member States.

Extensive exchange of information and opinions are taking place from which coordination of policies and programmes in the area of water resources can be expected.

TABLE II: WATER QUANTITY AND WATER QUALITY

	OBJECTIVES	EC TARGETS UP TO 2000	ACTIONS	TIME-FRAME	ACTORS
Quantitative Aspects Ground water & Surface fresh water	- Sustainable use of fresh water resources : demand for water should be in balance with its availability	- Prevent permanent overdraft - Integration of resources conservation and sustainable use criteria into other policies, including, in particular, agriculture and land use planning, but also industry (development, location and production procedures) - Market reduction of pollution of both groundwater and fresh surface water	- Collection and updating of data on groundwater - Monitoring and control measures on groundwater - Integrated water management and protection, including legislation - Measures to protect and rehabilitate aquifers - Measures to promote more effective water use - Economic and fiscal measures	1992/3 by 1995 mid 1993 id id ongoing	MS + LAs id EC+MS+ LAs MS MS+EC+ sectors+LAs MS+LAs+ EC
Qualitative Aspects Groundwater	- To maintain the quality of uncontaminated ground water - To prevent further contamination of contaminated ground water - To restore contaminated groundwater to a quality required for drinking water production purposes	- Groundwater: to prevent all pollution from point sources and to reduce pollution from diffuse sources according to best environmental practices and best available technology	- Groundwater and surface fresh water.- strict implementation of the existing directives on urban water and nitrate pollution to reduce the input of nutrients to the soil, water and sediments.With regard to fresh water: examination of the need for a directive on phosphate reduction. - Elaboration of further specific emission standards encouraging the development of production processes and performance standards for products to prevent foreseeable negative effects on water (use of best available technology combined with target standards to be achieved later) - Influence standardization bodies by participation of water industry whose concerned - Proposals for progressive replacement of harmful pesticides and progressive use limitations - Economic and fiscal measures	continuous 1995 1992 -> id 1993 ongoing	MS+LAs EC EC+MS+Industry+ standardization bodies (e.g. CEN) id EC+MS MS+LAs+ EC
Surface water - Fresh water	To maintain a high standard of ecological quality with a biodiversity corresponding as much as possible to the unperturbed state of a given water	- Surface water: quality improvement towards a better ecological quality and safeguard of high quality where it exists	- Marine water: further to the measures to achieve a high ecological quality and to reduce surface water pollution: * Proposals on maritime transport preventing environmental damage from shipping activities (oils spills, loss of a\cargo, reduction of operational pollution) to be developed * Surveillance of geographic zones with appropriate monitoring techniques * Proposal for a directive on the reduction of operational and accidental pollution from small tonnage boats * Economic and fiscal measures	1992 1997 1993 -> ongoing 1993 -> ongoing	EC+MS MS EC+MS MS EC+MS MS+EC
- Marine water	Reduction of discharges of all substances, which due to their toxic persistence or accumulating impact could negatively affect the environment, to levels which are not harmful to a high standard of ecological quality of all surface waters	- Marine water: objectives and action similar to the North Sea conference to other sensitive sea areas of the EC			

The Water Supply and Sanitation

Collaborative Council

All you need to know about the Council

March '94

The Secretariat, Water Supply and Sanitation Collaborative Council

(Prepared at the request of the Secretariat for the Ministerial Conference on Drinking Water and Environmental Sanitation, hosted by the Government of The Netherlands)

Preamble

Collaboration and partnership among key players in the water supply and sanitation sector remains one of the less emphasised inputs to sector development, when compared, for example, with financing, technology and institutional development. Given the magnitude of the sector's unfinished tasks, and the limited prospects of increased resources being made available, collaboration has become essential as a means of achieving a concerted and coordinated approach to sector development.

Collaboration can be good politics; it can promote the process of social mobilisation and decentralisation, avoid duplication of efforts and waste of resources; it facilitates the integration of activities such as water resources management; and it leads to more efficient use of available resources. It is largely through extensive global collaboration that the water and sanitation sector is able to speak with authority and confidence about the approaches needed to achieve accelerated and sustainable progress in future years.

There are good examples of collaboration taking place at all levels (country level, regional level), but the widespread use of collaborative mechanisms is not yet well established. The Water Supply and Sanitation Collaborative Council has been taking a leading role in developing guidelines for countrylevel collaboration, which is being seen as an especially useful way of improving the effectiveness of sector development at national level. Common concepts for future water and sanitation development, innovative solutions to technological problems, replication of successful approaches and avoidance of the repetition of unsuccessful ones, all can be attributed to the collaborative process.

What is the Collaborative Council?

The Council is a group of professionals from developing countries, external support agencies (ESAs), and non--governmental, professional, information and research organisations all working in the water, sanitation, and waste management sector, to carry forward the momentum of the International Drinking Water Supply and Sanitation Decade (1981-1990) and provide members with the means to develop and promote new and progressive concepts.

Why was the Council formed?

The Decade brought improved water supply and sanitation to more than a billion people. However, the combined efforts barely kept pace with the rise in population. It is urgent now to continue the great efforts put forward during the Water Decade and to build its achievements. During the Decade the sector came to understand more profoundly the complexity of the issues surrounding the goal of "Water for all". It developed and gained worldwide acceptance of appropriate technologies, and it brought focus to demand-driven and community management approaches considering gender roles and the needs of children to ensure the provision of real needs and sustainability. Perhaps most important, the Water Decade attracted global attention to the need for delivering water and sanitation services to the poor as a priority.

The sector has now a better knowledge base on which to plan for the future, and lessons learned during the Decade need to be applied.
A framework for global cooperation within which sector agencies of both developed and developing countries could work together in partnership was clearly necessary. The Council came into being to provide such a framework and a forum for sector professionals from South and North to deliberate on issues of common concern and reach consensus on their resolution.

What is its mission?

The mission of the Council is to enhance collaboration among developing countries and external support agencies, so as to accelerate the achievement of sustainable water supplies, sanitation and waste management services for all people, with emphasis on the poor.

What are the functions of the Council?

The Council offers a global forum for the exchange of information and promotion of the sector and for the discussion of key issues. It also alerts members to opportunities for more efficient use of resources, increases awareness of the need to expand water, sanitation and waste management coverage, promotes collaboration at the country level, and stimulates the adoption of harmonious policies and programmes.

One of the main priorities of the Council is to promote collaboration among sector professionals associated with both ESAs and developing country sector agencies; to foster exchange of technical information among sector professionals; to assist in the creation of greater public awareness of sector needs; to encourage applied research; to support investigation of specific sector issues; and to provide appropriate fora for discussion of sector

When does the Council meet?

Council meetings take place every two years. The first meeting was held in Oslo, Norway, in September 1991 under the theme "sustainability". It was hosted by the

Norwegian Agency for Development Cooperation (NORAD) in association with the Nordic countries Denmark, Finland, Norway and Sweden.

The second meeting was held in Rabat, Morocco, in September 1993. Hosted by the Kingdom of Morocco, this meeting had as its theme "Making the Most of Resources".

The next meeting is scheduled for late October/early November 1995. It will be held in the Americas region and, in particular, in the Caribbean to respect the concerns of the small island nations.

Who can join the Council?

Membership is open to professionals working in or associated with national agencies and ESAs active in the sector. In this context, the term ESA is taken to include multilateral and bilateral agencies, development banks, NGOs, professional associations, research and training organisations, information and documentation centres, and academic institutions. Members may speak on behalf of their institutions or themselves.

Are there any membership dues?

There are no membership fees. The Council expects voluntary contributions of experience and knowledge by its members (personal or institutional), to help carry out its functions and achieve its mission.

How can organisations get involved?

Any inquiries about the Council (membership, organisation, work programme), offers of assistance (funds or services), or suggestions for Council consideration should be directed to the Council's Secretariat. (See back cover)

While general membership of the Council is open to all qualified sector professionals, the number of invitees to specific meetings will be determined by prevailing factors.

How is the Council organised?

The Council is an innovative mechanism that evolved to involve and engage all existing agencies concerned : North and South, governmental and non governmental, multi and bilateral, research, information and professional, public and private sector to carry forward and enhance the momentum of the Decade and provide members with the means to develop and promote new and progressive concepts.

The Council derives its mandate from a UN Resolution in 1990 (though it is not a UN body). It is neutral and devoid of bureaucracy. It provides sector professionals the means to volunteer their knowledge and experience to work collectively to overcome barriers to sector progress. The collective wisdom of the Council is made available to countries agencies for their consideration and adoption.

The Council as constituted defies classification due to its uniqueness. Its effectiveness is derived from its conscious neutrality from big and strong agencies and regional or political loci and its recognition by and informal association with, countries and agencies. It is an attractive mechanism because it is consultative and participatory and depends on and makes the most of existing institutions.

The Council is headed by a Chairperson who serves on a part-time basis for four years. The current Chairperson is Margaret Catley-Carlson, from Canada. She is the President of the Population Council, New York, USA. The day-to-day activities of the Council are carried out by a full-time Secretariat, hosted by the World Health Organisation, which has made offices available at its headquarters in Geneva, Switzerland. The Secretariat is headed by an Executive Secretary appointed by the host agency in consultation with the Chairperson to serve for a two-year period. The current Executive Secretary is Ranjith Wirasinha from Sri Lanka. The Asian Development Bank for whom he works has released him for full-time service to the Secretariat.

The Executive Secretary reports directly to the Council and its Chairperson. The staff of the Secretariat at present comprises the Executive Secretary and his Deputy (Mr. Bryan Locke on loan from UNDP) and two secretaries. Strengthening of the Secretariat would be made only on need, based on its workload and responsibilities.

The Secretariat has operational autonomy from WHO, related to its activities and will be answerable to the Council through its Chairperson. The Chairperson, if needed, would establish a task force from its membership (which includes WHO) to review and report on the Secretariat or attend to resolution of administrative issues.

The financial operations of the Secretariat will be in accordance with guidelines of the host agency and will be controlled through its accounting and auditing arrangements. The staff of the Secretariat in the performance of their work would conform to the host agency's administrative procedures.

Who funds the Secretariat of the Council?

For the first two years, the Governments of Switzerland, United Kingdom, Canada, Germany, Italy, Netherlands, and WHO, UNDP, and UNICEF have been the main contributors to the Secretariat. Other ESAs have expressed interest in providing similar support. Assistance in kind have been provided by the Kingdom of Morocco, the Asian Development Bank, Norway and the Nordic countries, and USAID. Contributions were received for financing participants to the recent Rabat Forum from Australia, Austria, Germany, Norway, Sweden, the USA, WaterAid, UNICEF, UNEP, UNDP and the UNDP/World Bank Water and Sanitation Programme.

How does the Council carry out its work?

The Council decides on its main programme and activities at its biennial meetings. The activities relate to the critical issues identified by the Council for consideration.

Detailed study and research on issues identified by the Council for removing barriers to progress are carried out by voluntary Working Groups. Each Working Group will have a voluntary coordinator and will choose its own chairperson. The coordinator is normally expected to provide the financial and other resources to accomplish the tasks of the Working Group. The groups would report on their findings at the next Council Meeting. The Council discusses the findings at the Council Meeting and makes available the collective wisdom of the Council to countries/agencies for their information and adoption, as would suit their situation.

What has the Council identified as major sectoral issues and what are the messages?

The principal concerns of and messages for the sector resulting from stock taking at the end of the Water Decade at the "Safewater 2000" global forum in New Delhi in 1990 and subsequent fora and Council meetings have been that:

(i) Water is a finite resource with competing demands from people, agriculture, industry and the environment. It needs to be shared equitably and efficiently managed if it is not to become the limit to sustenance and growth. Future planning would need a shift to demand management and conservation. The economic and social value of water needs to be fully realised.

(ii) By the end of the century, many countries will have only about half as much water available as they had in 1975, yet they will have to meet much greater demands from industry and agriculture as well as domestic demands. Rapid urbanisation and industrialisation will further reduce the amount available through pollution unless major preventive initiatives are undertaken.

(iii) Access to safe sanitation has lagged far behind the growth of population. Sanitation can no longer be considered as an add-on to water supplies, but on its own importance. It needs to have a much higher profile.
Promotion of sanitation requires major efforts and innovative approaches and needs to be supported not only because of its importance to health, but also on economic and environmental grounds.

(iv) Development funds will be limited, and so the most has to be made of available resources.

(v) Most water supply and sanitation services developed in the past have operated at low efficiencies. The second and third generation of water supply systems have been found to be many times more costly. Improvement in efficiency of existing systems would not only be necessary but would be the most economical approach to obtaining additional capacity to serve more.

(vi) Sustainability of water supply and sanitation services have been a major issue. Involvement of all stakeholders and, particularly, women at all stages of planning and development of services will be fundamental to overcoming this issue.

(vii) Grants and subsidies provided by Governments in the past to the development of water supply and sanitation services and their operation and maintenance have benefitted those who can afford rather than those who cannot. Strategies need to be considered to change this situation and subsidies, when provided, should be targeted for the poor.

(viii) The poor urban informal populations need to be recognised for the provision of services, if their economic potential is to be realised. No providing such services would result in heavy social cost.

(ix) Governments cannot and should not bear the sole responsibility for providing services. The potential of communities, the private sector and non-governmental organisations to relieve the burden requires to be availed of and an enabling environment established to realise this.

(x) Collaboration at all levels and particularly at the country level is central to resolving the above issues and development of national sector strategies will constitute a strong tool to facilitate such

collaboration. Many proven mechanisms are available for improved collaboration.

What has the Council included in its biennial programme?

* Promotion of the important messages for the sector through advocacy at all levels and the use of "tools" (guidelines, manuals, and strategies) developed by the seven Working Groups of the Council.

* Completion of the unfinished agendas of previous Council group work on Country Level Collaboration, Services for the Urban Poor, Operation and Maintenance, Applied Research, Communication and Information, and Gender Issues.

* Formulation of Institutional and Management Options for the Water Supply and Sanitation Sector, including for Water Demand Management and Conservation. Development of strategies for Water Pollution Control and for Promotion of Sanitation.

* Support for other initiatives of the Council:

  - Development of human resources and management of information in the five Portuguese-speaking countries of Africa;
  - Dissemination of guidelines on Managing Water Resources to Meet Megacity needs in Asia;
  - Implementation of the project in the Pacific Island Countries on Small Island Nations and their Specific Needs in the Water Supply and Sanitation Sector; and
  - Involvement of the Newly Independent States (NIS) of Central and Eastern Europe in the activities of the Council.

What has the Council achieved?

The Council has developed arrangements to provide a forum for all stakeholders to meet on equal terms under neutral considerations, deliberate on issues of common concern objectively and reach collective agreement on how to overcome barriers to progress. It is effectively providing means for more broad based ownership for new and progressive concepts making national acceptance of such concepts easier and politically more palatable. It is becoming the focal point in the water supply and sanitation sector for information and assistance where ownership of such information and expertise is not obvious.

It has prioritised issues for resolution and has had these researched and studied by international, unbiased voluntary working groups towards overcoming the barriers. At its first meeting in Oslo, Norway, in September 91, it established Working Groups to deal with the following key areas:

(i) Country Level Collaboration - to find ways to improve co-ordination and cooperation at the country level.

(ii) Urbanisation - to deal with demands arising out of rapid urbanisation, with emphasis on the needs of the urban poor.

(iii) Operation and Maintenance - towards more efficient utilisation of available assets.

(iv) Information Management - to have information in the form, time and level it is needed, towards more realistic planning in order to save time and costs.

(v) Applied Research - to remove constraints encountered in having research carried out and also in utilising results of research and to formulate a mechanism/s for identifying priority research topics.

(vi) Information, Education and Communication - to deal with advocacy and communication in all aspects important to the sector and at all levels.

(vii) Gender issues - to ensure that gender considerations are embodied in the outputs of all of the above activities.

Additionally it worked on three other initiatives through the assistance of members of the Council who had the interest and capacity to do so. There were:

(i) Small Island Nations - to address the issues and needs peculiar to such nations and which are not adequately addressed at larger fora (through UNDP).

(ii) African Lusophone Countries - to deal with shortcomings in literature and information and education and training support in the portuguese language (through the Government of Portugal and the International Centre for Water and Sanitation in The Netherlands).

(iii) Managing Water Resources to Meet Megacity Needs (in Asia) - to deal with related issues in the 12 megacities (10 million + population) expected to emerge by year 2000 (through the Asian Development Bank).

All above Working Groups were expected to produce tools (strategies, guidelines, manuals, guiding principles, etc.) which countries and agencies could work with to overcome the barriers. A list of tools is provided as Annex

The Council provided assistance to the Ministerial Conference on Drinking Water and Environmental Sanitation from the outset to identify resource persons, to provide information, review papers and provide advice as a member of the International Steering Committee.

Further information on Council activities and achievements are presented in the Rabat Meeting Report, copies of which will also be available for distribution through the Conference Secretariat.

What immediate assistance could you provide the Council?

The Council would like to have the tools which have been produced by its Working Groups adopted/tested at the country level. Most of them could be used/tested on on-going or planned programmes. What are needed are funds to translate, print and distribute the tools (i.e. the documents), and in the case of some tools, a country meeting may have to be organised to carry out the preliminary work or agree a work-plan to adopt the tools in the field. For either of these substantial funds are not needed. It is hoped that some ESAs would provide the required funds. We would also like some developing countries to volunteer to be candidate countries for using/testing the tools. Developing countries and ESAs who may be interested are requested to contact the Executive Secretary of the Council during the Ministerial Conference or thereafter.

Mrs. Margaret Cartley-Carlson, Chairperson
WSS Collaborative Council
One Dag Hammarskjold Plaza
New York, NY 10017
USA
Tel: 1-212- 339 05 00
Fax: 1-212- 755 60 52

Mr. Ranjith Wirasinha, Executive Secretary
WSS Collaborative Council
c/o World Health Organisation
Avenue Appia 20
CH-1211 Geneva 27, Switzerland
Tel. 41-22 791 36 85
Fax. 41-22 788 00 54

Inquiries, suggestions and interest in participating in Council activities may be directed to the Executive Secretary.

THE POTENTIAL OF PROFESSIONAL ASSOCIATIONS IN WATER SUPPLY AND SANITATION IN DEVELOPING COUNTRIES

Prepared for the Ministerial Conference on Drinking Water and Environmental Sanitation - March 1994

Prepared by the International Association for Water Quality and the International Water Supply Association

Preamble

Professional associations (PAs) can make a powerful contribution to the development process in many newly democratised and developing countries. They provide three crucial elements - an effective network for information sharing; a unifying and empowering influence for problem solving and collective action; and a structure for standards setting and licensing.

They are member organisations of people in the same business or profession. As the democratic organisation of a profession, they should and can function as open structures that channel the energies of their members. Operating as volunteer, not-for-profit, NGO type bodies, their members give their time and expertise to carry out most of the work, generally supported by a permanent, full time Secretariat. Durability is a keynote of PAs. In advanced countries many associations are well over 100 years old and still thriving. This compares very favourably with the average life of a company, which is about 50 years.

Professional associations are one of the most effective and potent forces in advanced countries today. Yet they are also among the least visible. Since they represent a huge collective presence, they impart social and economic benefits that reach almost everyone every day. But the work of associations is often done quietly, behind the scenes. Thus, the work they do is frequently not obvious, nor apparent to the wider public.

In tending to their members' collective self interest, professional associations can benefit the public at large. Examples include: - the education of members in technical and scientific matters, business practices and legal issues, thereby improving the quality of publicly delivered goods and services; setting professional, performance and safety standards, plus ethical guidelines, all of which reduce market place risks faced by consumers; collecting and disseminating valuable statistics; through community service, calling forth high levels of volunteer labour, which associations then mobilise and train. to the ultimate good of society generally.

Were it not for professional associations, then other institutions would face added burdens in the area of product performance and safety standards, continuing education, public information, professional standards and ethics, research and statistics, political education and community service.

The low level or absence of professional association activity in newly democratised and developing countries handicaps the development of market economies and the private sector. Outside the official information, dissemination and regulatory framework of the Government, professionals in these countries live in a knowledge vacuum, frequently in conditions of professional isolation.

Governments are still the main employers in the utility part of the water industry in the developing world. In some developing countries, Governments have provided services typical of PAs. However their efforts are often insufficient, bureaucratic and slow. Standards, once set by Governments, are hard to change. Few governments have standing committees which continuously adapt those standards, to accommodate new developments and technology.

Today the professional side of the water supply, sanitation and water pollution control sector is maturing fast. A whole new world of private (including professional) activities is growing outside the government's sphere of direct involvement and control. The result is a large body of knowledge and power, which currently lacks leadership. This has to be channelled and provided with checks, balances and a structured system, for only thus can efficient use be made of human and economic resources. PAs are ideal for this role.

Well run PAs have a culture of service to their members, and to their profession, providing value-for-money benefits delivered reliably, and of good quality. They engender an atmosphere in which members will volunteer:-

- to organize conferences, seminars, trade exhibitions and other technical meetings;
- to write technical papers and make technical presentations and/or serve as paper reviewer, session chairman, rapporteur;

- to serve on Committees: -producing standards; writing manuals of practice; seeking solutions to specific problems; liaising with governments on matters of laws, policy, regulations, standards of competence and operating schemes of training and certification etc.

They draw their members from different parts of the water sector - utilities, consultants, academia, government departments, manufacturers etc. - and thus provide a unique meeting place for sector professionals. They provide vital channels of communication and expertise through their journals, magazines and manuals. Their training courses and certification programmes provide an environment of continuing education and training, keeping their members up to date. This fosters improvements in work performance, enhancing the effective use of economic and human resources and improving organisational effectiveness, to the ultimate benefit of consumers.

The research needs which PAs identify and often promote, bring needed improvements, to materials, processes and practices. The information and statistics collected by them are of value not only to members but governments, consumers and suppliers who want to enter a mew market. Because of their volunteer nature, PAs help promote a culture of service. In countries where a PA culture is well established their work is woven into the fabric of society and the public has come to depend on the social and economic benefits which associations provide.

Members dues form the basic revenues of PAs, from individual members and from associate or corporate members - companies, consultancies, etc. However, PAs generally need more than dues income to provide an efficient and comprehensive service to members. Hence sales of periodicals and books, surpluses from conferences and seminars and training course fees all help augment the basic revenues. Trade exhibitions provide a good income, from both rental and admission fees. Generally, PAs need some commercial acumen and business skills to maximise these non-dues revenues and operate the associations in a generally businesslike way.

Every one of the modern industrialised countries has at least one PA dedicated to the water sector. Many countries have two PAs - one for drinking water supply, the other for sanitation.water pollution control. Nearly all of these PAs are many decades old and still thriving. They are an essential component of their country's water supply.sanitation sector, providing the full range of services described earlier in this paper. In the developing world, PAs are not quite so numerous but the situation is changing and many new ones have come into being in the past 10 years or so.

Professional associations need the following types of assistance to help them reach their potential:

- Training for PA staff and volunteer leaders in association management - publications, committee structures, standards, development, certification, information and statistics, conferences and trade exhibitions, good business practice etc.
- Modern equipment for administration communication and publications;
- Some seed money to help develop the benefits structures and association activities etc.

The contribution which PAs make in advanced countries has been demonstrated clearly over many years, including their effectiveness in the water supply and sanitation sector. The potential of PAs in developing countries is great and the challenge is to assist them to realise that potential.

The type of assistance above can be provided by multi-lateral and bilateral agencies as well as other external support agencies. This could be in the form of an add-on to a large facilities construction project, a major study or other activity.

The International Association on Water Quality (IAWQ) and the International Water supply Association (IWSA) have experience of assisting in the setting up and development of national and regional PAs and will continue to do this, to the extend that their resources permit. They are prepared to continue to assist directly and also to make their experience available to others who may wish to help.

The essential point is to recognise that professional associations are highly effective as local, moderate-cost solutions to communicating, training and standards setting within the sector; and to give every assistance possible to enable them to fulfil their potential.

AM(IAWQ)/LRB(IWSA) - 24.1.94

EARTH SUMMIT WATCH

A PROJECT OF THE NATURAL RESOURCES DEFENSE COUNCIL, CAPE 2000 AND NGOs WORLDWIDE

FOUR IN '94: CONCRETE NATIONAL ACTIONS TO IMPLEMENT AGENDA 21

In 1993, NRDC's Earth Summit Watch, in collaboration with NGO's from all over the globe, produced a survey on what 90 countries had done to begin to implement the Earth Summit commitments, called One Year After Rio. This year, CAPE 2000 and Earth Summit Watch invite you to join us in our "Four in '94" initiative. The objective of the initiative is to persuade governments to send ministerial representatives to the May CSD meeting to announce four concrete actions they have taken within the 1994 Agenda 21 clusters.

It is critical that nations begin to demonstrate a willingness to go beyond mere promises and undertake policies and projects to make real progress towards sustainable development. By the May 1994 CSD meeting, each national government should be able to point to four actions within the clusters to be discussed at the next CSD meeting: Health, human settlements and freshwater; and Toxic chemicals and hazardous wastes.

What countries actually do will undoubtedly vary, but what is important is that they take action. Cape 2000 and NRDC have identified four possible actions which are widely recognized as urgent and the subject already of significant international concern. Draft explanations are available on the four following areas:

1: BAN LEADED GASOLINE AND LIMIT LEAD EXPOSURES
2: CLEANUP FRESHWATERS
3: RATIFY AND IMPLEMENT THE BASEL CONVENTION ON HAZARDOUS WASTES
4: PROTECT NATURAL RIVERS

Earth Summit Watch's national "Four in '94' implementation survey will be presented to the May CSD meeting. We will also be seeking information on what each nation is doing to prepare its national Agenda 21 or sustainable development strategy.

If you would like to participate in the "Four in '94" survey/campaign, please contact us as soon as possible, at: Earth Summit Watch, c/o Natural Resources Defense Council, 1350 New York Ave. NW, Washington, DC 20005, USA; tel: (202) 783 7800; fax: 783 5917; email: nrdcdc@igc.org

EARTH SUMMIT WATCH
1994 SURVEY OF NATIONAL AGENDA 21 ACTION

A. Creating and Implementing a National Agenda 21

PLEASE DESCRIBE THE PROGRESS YOUR GOVERNMENT HAS MADE IN APPLYING AGENDA 21 AT THE NATIONAL LEVEL ?

Agenda 21 recognizes the central role of governments in its implementation at the national level (Agenda 21: Ch. 1, 8, 37, 38). One Year After Rio found that over 70 governments had created new bodies or designated existing ones to review and implement this blueprint for sustainable development. A number of countries had begun work on national agendas or strategies. Please provide details as to institutions and procedures for Agenda 21 implementation and the results so far.

B. Four in '94

Please identify and describe four concrete initiatives that your government has undertaken in the substantive clusters to be reviewed at the May 1994 CSD meeting: Health, human settlement and freshwater; and Toxic chemicals and hazardous waste. Indicate what your government has done on the following specific issues within these clusters which are widely recognized as urgent and already the subject of significant international concern:

1: WHAT STEPS HAS YOUR COUNTRY TAKEN TO LIMIT LEAD EXPOSURES, INCLUDING PHASING OUT LEADED GASOLINE?

Millions of people in countries on every continent suffer from the "silent epidemic" of lead poisoning. It is well recognized that lead can cause serious damage to the brain, kidneys, nervous system, and red blood cells and is a particular threat to children's health and development. A number of countries have developed programs for phasing out leaded gasoline and for reducing or eliminating other sources of exposures including lead in food-can solder, plumbing, and paints. (Agenda 21: Ch. 6, 18, 19, 20)

2: WHAT INITIATIVES HAVE YOUR NATION UNDERTAKEN TO CLEANUP MAJOR FRESHWATER SOURCES?

Agenda 21 seeks to provide adequate supplies of good quality freshwater for the entire population of this planet. (Ch. 18) Today, critical rivers, lakes, and aquifers have been badly contaminated. Please describe action undertaken by your government to restore important polluted freshwater sources.

3: WHAT MEASURES HAS YOUR STATE TAKEN TO RATIFY AND IMPLEMENT THE BASEL CONVENTION ON HAZARDOUS WASTES?

During the five year period ending 199', over five million tonnes of toxic and hazardous waste were exported around the world. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal has been ratified by 56 nations. It provides a global framework upon which progress can be made to reduce the production and trade of these wastes. To be effective, more nations must ratify and fully implement the Convention, including banning exports to countries that have refused them. (Agenda 21: Ch. 19, 20, 21, 22)

4: WHAT STEPS HAS YOUR GOVERNMENT TAKEN TO INVENTORY AND PROTECT THE REMAINING NATURAL RIVERS IN YOUR COUNTRY?

Many of the world's rivers have been dammed and otherwise degraded; relatively few rivers still run unimpeded and unpolluted. These remaining natural rivers provide drinking water, commercial fisheries, recreational opportunities and other economic benefits, and support wildlife and critical ecosystems. Sustainable development requires that natural rivers should be identified and protected for - future generations. (Agenda 21, Ch. 18)

FOUR IN '94
LEAD BACKGROUND PAPER

Lead has been used for thousands of years in commerce and industry. Today lead is still used throughout the world in consumer products such as gasoline, paint, batteries, solder for cans, cookware, and electrical and plumbing supplies. The harmful effects of lead on human health and the environment have been long recognized and understood. Lead poisoning can result in impaired growth, mental retardation, and at high doses even death. The majority of lead poisoning cases arise from the ingestion of lead dust by children.

For the most part, awareness of the critical nature and extent of lead poisoning hazards is very low. Many populations being poisoned are not being identified or treated and few steps have been taken to control sources of exposures. At the same time, low technology alternatives to lead, relatively simple source control techniques, and other measures to reduce human exposures exist. Because lead is an element that does not decay or detoxify over time, today's patterns of lead use will determine lead exposures for decades to come.

Currently, very few governments have taken action to reduce and where possible eliminate lead from consumer products, control existing sources, document lead poisoning contamination rates and inform the public of the dangers of lead poisoning. On the international level, no agreement has been reached that provides for concerted and effective prevention. Lead provides a test case of the world's ability to move the post-Rio agenda forward by solving a basic environmental and health problem.

Lead enters the body through many different sources and pathways. A principal source of lead exposure is leaded gasoline. Countries that have begun to phase-out leaded gasoline have seen direct reductions in environmental exposures and significant public health benefits. National governments should phase out leaded gasoline for domestic use and export. In the interim, governments should institute taxes or other mechanisms to ensure pricing incentives that discourage the use of leaded gasoline.

While the hazards associated with lead-based paints have been recognized since the turn of the century, lead-based paint is still found in millions of homes around the world. Since substitutes are readily available, continued production of these pigments should be immediately banned, especially their use in residential structures and buildings used by children, such as schools.

Another source of lead exposure is food contained in lead-soldered tins, and food cooked, stored and served in lead-glazed ceramic ware. In light of the availability of lead-free solder and low-lead glazes, governments should take immediate action to prevent this unnecessary poisoning. Lead can also be absorbed into the blood through drinking water that has travelled through plumbing fixtures, pipes or solder that contain lead. To combat this problem, national governments should require the use of non-leaded materials for water mains, and require that all water-contact surfaces in plumbing be lead-free, as water systems are installed, expanded, and upgraded.

These practicable measures should be undertaken by all nations to help eradicate this ancient disease. If sustainable development means anything, it must mean the protection of the world's children from the debilitating effects of lead poisoning.

The Alliance to End Childhood Lead Poisoning will be hosting the first major conference on the "Global Dimensions of Lead Poisoning" from 19-20 May, 1994. The focus of this conference will be to develop and implement a prevention-based strategy to reduce lead exposures worldwide. For more information contact: K.W. James Rochow, Alliance To End Childhood Lead Poisoning - 227 Massachusetts Avenue NE, #200, Washington, DC 20002- Tel: 202-543-1147 / Fax: 202-543-4466

FOUR IN '94
FRESHWATER BACKGROUND PAPER

Freshwater is a fundamental resource, needed in an aspects of life - integral to an environmental and societal processes. Although freshwater is a renewable resource, supplies are finite. This lifeline to humans, flora and fauna constitutes only 3% of the world's water, and most of this is locked away in the polar ice caps. Because of the great demand on the world's freshwater resources, a lack of services, and pollution more than 1.3 billion people lack access to adequate and safe water, while 1.7 billion (almost one-third of the world's population) lack adequate sanitation services. Today, two thirds of the freshwater used worldwide goes to agriculture, and more will be required in the future to meet the growing food needs of the Earth's increasing population.

The interconnected parts of the global freshwater ecosystems consisting of rivers, lakes, streams, aquifers and wetlands have been polluted, drained, and poorly managed. In many developing nations untreated sewage contaminates water supplies causing approximately 80% of an diseases in these nations. Worldwide more than 250 million cases of water-related diseases, such as diarrhoea, malaria, cholera and schistosomiasis, are reported annually - resulting in about 10 million deaths a year. These waterborne diseases which have their roots in bacteria, viruses, or insects, can be controlled and in many cases eradicated by improving water quality and sanitation services.

The lack of clean water globally has been considered so acute that the United Nations declared the 1980s the "Drinking Water and Sanitation Decade." Some progress was made under this action plan: the number of rural residents with access to clean water in developing countries has increased dramatically with improved technology and a new focus on training local villagers to monitor and maintain pumps, wells and other water sources. However, those gains have been far outpaced by the unrestrained growth in urban areas where overtaxed infrastructures are collapsing; by the failure to improve sanitary conditions; and by the tendency of nations to divert water resource money to large-scale irrigation and hydro power projects. These problems were compounded by the fact that both domestic and multilateral development bank investment in water supply and sanitation were extremely inadequate throughout the 1980s; public investment was about 0.5% of developing countries' GDP for the decade.

The economic and environmental price of not taking action to clean up the world's freshwater supplies has been enormous. In developing countries, for instance, the cost of boiling water is now between 11% and 29% of family income; while the demand on wood fuel to boil water is now causing soil erosion, which further contaminates freshwater supplies.

Chapter 18 of Agenda 21 provides a framework for an integrated and holistic approach to managing freshwater resources. This plan calls on nations to identify and inventory national freshwater sources and develop management plans for these resources in coordination with local and affected communities.

Simple, low-cost technologies can make an enormous difference in treating waste and waste water. These technologies, which can also be used for water conservation, should be given priority by national governments. Water conservation, particularly in urban areas, has the dual benefit of reducing wasted water, decreasing energy needs to produce hot water, and minimizing the volume of wastewater needing treatment. To ensure that water is not lost through wasteful agricultural practices, flood irrigation should be replaced by drip technologies, the use of furrows and other water conserving measures.

A secure water future requires us to recognize the natural limits to water availability and the need to bring human use into line with them. After decades of action plans and agendas in this area, governments must start to take action to ensure adequate access to safe and sustainably managed freshwater supplies.

For more information, contact either Steve Parcells at National Audubon Society, 666 Pennsylvania Avenue, S.E., Washington, D.C. 20003 Tel: 202-547 9009- Fax: 202-547-9022 or Deborah Moore at the Environmental Defense Fund, 5655 College Avenue, Oakland CA 94618 Tel: 510-658-8008; Fax: 510-6580630

FOUR IN '94 INTERNATIONAL WASTE TRADE - BASEL CONVENTION BACKGROUND PAPER

In response to increasingly stringent environmental regulations, costly health and safety regulations, and public opposition, many countries have taken to shipping their waste abroad. In fact, in the five years ending 1992, over five million tonnes of hazardous wastes were exported around the world. In many cases importing countries were unable to dispose of this waste in an environmentally sound fashion. The effects of these poisons on both humans and the environment has been devastating.

Recognizing the need to address this problem, 115 nations signed the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal in March 1989. The Basel Convention, which governs the disposal of household and hazardous wastes, establishes an international regime to ensure that nations manage transboundary movements of such waste in an environmentally sound manner. Basel also promotes actions to reduce the generation of hazardous wastes.

The Convention imposes strict obligations on those nations who have ratified it. These measures consist of a ban on hazardous waste shipments to countries that have not ratified the treaty, and a prohibition of shipments to countries that have established import bans or whose national facilities to dispose of the waste in an environmentally sound manner are inadequate. At the first Conference of the Parties to the Basel Convention, it was also decided that shipments of hazardous wastes intended for disposal, as opposed to recycling, in developing countries should be prohibited.

Under the Convention, before an exporting country can start a transportation of waste, it must have the importing country's consent in writing. In addition to the prior informed consent rule, Basel requires that when an importing nation proves unable to dispose of legally imported waste in an environmentally sound manner, the exporting nations must either take it back or find an alternative method of disposing of it in an environmentally sound way.

This international framework represents the most effective mechanism to control and reduce the movement and production of hazardous wastes. At present 57 nations have ratified Basel and more than 100 countries have moved to ban Basel listed hazardous wastes, including recyclable waste. This position is explicitly advocated in Chapter 20 of Agenda 21, which lists the ratification of Basel and the elaboration of related protocols, such as the protocol on liability and compensation mechanisms, and guidelines to facilitate the implementation of the Convention, as a top priority (Chapter 20, sections 7(b) and 20.34(e)). Nations are currently debating whether the Second Conference of the Parties (March 21-25, 1994) should widen the ban on hazardous waste shipments to developing countries to include recyclable waste. What now needs to be done is to ensure that more countries ratify, fully implement and support the call to amend the Basel Convention to prohibit all waste shipments to developing countries.

For more information please contact Nick Morgan at Greenpeace: 1436 U Street NW, Washington, DC 20009 - Tel: 202-319-2452 Fax: 202-462-4507

FOUR IN '94
NATURAL RIVERS BACKGROUND PAPER

Rivers have shaped the Earth's surface and human life on the planet. Today many of the world's rivers have been dammed and otherwise degraded; relatively few rivers still run unimpeded and unpolluted. These remaining natural rivers provide drinking water, commercial fisheries, recreational opportunities and other economic benefits, and support wildlife and critical ecosystems.

Hundreds of the world's natural rivers have been dammed to provide hydro-electric power and to create reservoirs for irrigation. In many cases these projects have caused the forced resettlement of populations, the flooding of fertile land, disease, the physical disruption of breeding and feeding patterns for many species, and habitat destruction. Despite these harmful effects, dams continue to be built at great expense; in 1993 seventy-four major dams were under construction. (Peter Gleick, Water in Crisis, 1993).

Even where rivers have not been blocked by dams, many of the world's natural rivers have been polluted by sewage, chemicals, industrial wastes, agricultural run-off, and sedimentation caused by logging. Since aquatic species are susceptible to water quality conditions such as pH, temperature, clarity, and the presence of toxic chemicals, they are being driven towards extinction or have already been made extinct. In addition, many types of wildlife that rely on river channel vegetation for food and shelter have been put in danger of extinction.

The degradation of the planet's rivers has had a enormously damaging impact on human health and economic activities. Many communities that have traditionally relied on rivers for water and food have been decimated by decease and forced to move to urban centres. In country after country, river pollution and irrigation have brought sustainable commercial fisheries to a close and have converted these once spiritual and beautiful waterways into deathtraps.

The remaining natural rivers of the world must be protected for present and future generations. Every country should establish a program to protect its most significant, beautiful and, as yet unpolluted rivers. Governments should establish strict standards, monitoring procedures and penalties to prevent the dumping of wastes in these rivers and prohibit by law the damming or diverting of any part of these national treasures.

For more information contact: Brent Blackwelder at Friends of the Earth, 1025 Vermont Avenue, N.W., 3rd Floor, Washington, D.C. 20005 - Tel: 202-783-7400 - Fax: 202-783-0444

FEDERAL MINISTRY OF WATER RESOURCES AND RURAL DEVELOPMENT

THE NIGERIAN COUNTRY STATEMENT TO THE MINISTERIAL CONFERENCE ON DRINKING WATER SUPPLY, AND ENVIRONMENTAL SANITATION HOLDING IN NOORDWIJK, THE NETHERLANDS ON 22ND AND 23RD MARCH 1994

FEDERAL MINISTRY OF WATER RESOURCES AND RURAL DEVELOPMENT

HON. MINISTER
Isa Mohammed

OFFICE
Area 1, P.M.B. 159
Garki - Abuja
NIGERIA

OFFICE OF THE HONOURABLE MINISTER

TEL: 09-2342376
FAX: 09-2342370

Ref No:

DATE 17th March, 1994

THE NIGERIAN COUNTRY STATEMENT TO THE MINISTERIAL CONFERENCE ON DRINKING WATER SUPPLY AND ENVIRONMENTAL SANITATION HOLDING IN NOORDWIJK, THE NETHERLANDS ON 22ND AND 23RD MARCH 1994

1. INTRODUCTION:

1.1 BACKGROUND

1.1.1 Nigeria is located in West Africa with a land area of 925,000 square kilometres and a population of 88.5 million people, half of which live in rural areas of population less than 5000 per settlement. The country is a Federation of 30 States plus the Federal Capital Territory, Abuja. Each state has a number of Local Government Areas, the total for the Federation being 589.

1.1.2 The climate of the country is tropical with two main seasons, viz: the rainy season, which occurs between April and October; and the dry season between November and March. Rainfall ranges between 500mm in the far north and 3000mm in the extreme south. The Niger and Benue Rivers and their tributaries constitute the major drainage systems for the entire country which is underlain by about 50% of basement complex and about 50% of sedimentary rocks deposits. Water supply is therefore based on ground water or surface water sources, depending on the hydrology and hydrogeology of the area involved. Vegetation

CONTINUATION

ranges from swampy rain forest in the extreme south to guinea savannah semi-arid forest in the extreme north. Nigeria has abundant water resources, but good drinking water which is a basic necessity for human existence, is not readily available in many parts of the country, particularly in the rural areas owing to poor planning, inadequate funding, improper institutional arrangement and poor management of resources. However some awareness has been recorded since the adoption of the United Nation's International Drinking Water Supply and SanitationDecade **(IDWSSD)** objectives in 1980. For instance, before actual implementation of the IDWSSD programme, less than 30% of the population had access to potable water while less than 10% had access to good sanitation in Nigeria; but today up to about 40% of the country is being provided with potable water supply at 60 litres per capita per day (Lpcd) for urban population and 25 Lpcd for rural dwellers. Sanitation level remains poor because of poor public response to orientation efforts by the relevant agencies.

1.2 WATER SUPPLY SECTOR DEVELOPMENT

1.2.1 Until in the recent past, water supply activities in the country were uncoordinated with many agencies both local and external support agencies (ESA) involved in water supply, leading to duplication of efforts. The only state that had an independent State Water Agency was Western Nigeria with the creation of the Western Nigeria Water Corporation in 1967 as a result of the conditions imposed by an external lending agency, the United State Agency for International Development (USAID).

CONTINUATION

1.2.2 Arising from the recommendations in the Water Supply and Sanitation Sector Memorandum also prepared by the World Bank WB in 1984, and the Rural Water Supply and Sanitation Sector Memorandum prepared by the (WB) in 1984, and Rural Water Supply and Sanitation Sector Memorandum by the Federal Ministry of Agriculture Water Resources and Rural Development (FMAWRRD) with assistance of the WB in 1986, and their subsequent adoption by the National Technical Committee on Water Resources (NTCWR) for approval of the National Council on Water Resources (NCWR), the state governments were advised to set up appropriate State Water Agencies (fairly autonomous and commercially viable) to handle urban and semiurban water supply while rural water supply should be gradually transferred to the Local Government Authorities (LGAs) to manage.

1.2.3 In the mean time the following agencies are participating in WSS in Nigeria.

1.2.3 1 **Federal Level.**

The Federal Government got involved in Water Resources Development in the early 70s during the prolonged drought which necessitated the establishment of Chad and Sokoto Rima River Basin Development Authorities (RBDA's) Ten other RBDAs had been created between 1972 and 1994, bringing the total to twelve. The Federal Ministry of Water Resources (FMWR) was also created in 1975 to monitor and coordinate the activities of the RBDAs.

(i) **Federal Department of Water Supply and Quality Control (FDWSQC)**

The Federal Government coordinates Water Supply management through the Federal Department of Water Supply and Quality Control which is one of the eight departments in the Federal Ministry of Water Resources and Rural Development (FMWRRD). Her responsibilities include policy advice/formulation, data collection, monitoring and coordination of water supply development for the Federal Government.

The Federal Ministry of Water Resources was created as a full-fledged Ministry in 1975 and remained so until 1984 when it was merged with the Federal Ministry of Agriculture as a Department. It was again recreated as an independent Ministry in 1989 with eight departments but only to be re-merged with the Federal Ministry of Agriculture in 1992. Finally in August 1993, it re-emerged as the present Federal Ministry of Water Resources and Rural Development (FMWRRD).

(ii) **National Council on Water Resources (NCWR)**

The Federal Government in 1981 inaugurated the National Council on Water Resources (NCWR) comprising all State Commissioners in charge of water resources matter, with the Minister, Water Resources, as Chairman. The Council is served by a technical advisory body called the National Technical Committee on Water Resources (NTCWR) which has as its members the Chief Executives of the States Water Agencies (SWA's), representatives of some Universities teaching

water resources and state chief irrigation engineers. The Technical Committee is chaired by the Director General of the Federal Ministry of Water Resources and Rural Development.
The NTCWR has five Sub-Committees of whcih the SubCommittee on Water Supply and Sanitation is one. The NCWR is the highest policy making body on water resources.

(iii) **National Water Resources Institute**
The Institute was created under the FMWR in 1977 to carry out manpower training and research activities in the field of water resources.

(iv) **Directorate of Food, Roads and Rural Infrastructure (DFRRI)**
The DFRRI was established in 1986 under the office of the President to accelerate rural development through the provision of infrastructure, one of which is water supply development. The provision of water supply was planned in stages with the ultimate aim of reaching every rural community. The first stage involved provision of water to 5000 rural communities nationwide using simple technology that could be managed by such communities. Ground water from wells and shallow boreholes are the main sources of water supply which is abstracted mainly with handpumps. In a few cases, small earth dams and piped extensions from urban water supply were considered. The programme which is now in its fourth phase has provided over 19,000 communities with potable water as at November, 1992. DFRRI was in 1993 merged with the Federal Ministry of Water Resources and Rural Development, and is presently being re-organised.

(v) **The Federal Ministry of Health and Human Services (FMHHS)**

The FMHHS is responsible for disease control and treatment including surveillance and prevention programmes. Included in the programme is the Nigerian Guinea Worm Eradication Programme (NIGEP). Sanitation efforts are geared towards demonstration of the construction and use of the twin-pit ventilated improved pit (VIP) latrines. Success of this effort is limited by the high cost of construction of the VIP latrines.

The FMHHS is also responsible for the National Primary Health Care (PHC) Programme which was launched through pilot projects in two LGAs per state all over the Federation in 1986. It involves training of village based workers in Health and Hygiene Education, appropriate treatment of common diseases and prevention and control of endemic diseases. Funds for the PHC programme is disbursed to LGAs after approval of the programme by the State Ministries of Health (SMH'S).

1.2.3.2 **State Water Agencies (SWA's)**

The State governments are responsible for water supply to the communities in the urban and semi-urban areas. Each of the state governments and the Federal Capital Territory (FCT) carry out this responsibility through semi-autonomous SWA'S. Some of these SWA's are still involved in the provision of rural water supply based mainly on motorised deep well pumps and full chemical treatment. They are however gradually transferring these schemes to the LGA's.

CONTINUATION

Each State Government commits as much as it can afford every year for the provision of water supply. However the trend has not been very encouraging since only about 20-30% of what is budgeted for water supply is released by the State Governments. This therefore, hampers the supply of adequate potable water to satisfy potential demands.

1.2.3.3 **Local Government Authorities (LGAs)**

These are responsible for rural water supplies, based mainly on hand dug wells, shallow boreholes fitted with hand pumps and extension from urban water supplies. Recently fund allocation to the LGAs from the Federation Account was increased substantially. The SWA's have since been transferring the motorised and other sophisticated Rural Water Supply (RWS) schemes to the LGA's for operation and maintenance.

1.2.3.4 **External Support Agencies (ESA's)**

Many ESA's have intervened in the sector and some have been fully involved in the planning and actual execution of both rural, semi-urban water supply as well as sanitation projects. Suck organisations include the World Bank, the African Development Bank, UNICEF, UNDP, JICA, EEC, and CIDA/(CUSO), ODA.

2. WATER SUPPLY AND SANITATION SITUATION

2.1 Following a rapid assessment study of water supply and sanitation in the country in 1979, it became apparent that something must be done to quantify the situation of water supply and sanitation in the country and prepare plans and programmes for achieving total sectoral coverage as soon as possible. This led to the World Bank Water Supply

and Sanitation Sector Memorandum and Rural Water Supply and Sanitation Sector Memorandum, both of 1984.

2.2 URBAN WATER SUPPLY:

2.2.1 Out of the World Bank Water Supply and Sanitation Sector Memorandum came a National Water Supply Rehabilitation Programme in which the World Bank provided the Federal Government with US$ 256m, for on-lending of US$ 220m of it to State Governments for the rehabilitation of selected urban and semi-urban water supply schemes in all states of the Federation. The project is in its fourth year of implementation and on completion in about 2 years, should restore the rehabilitated schemes to their designed capacities, and strengthen the SWA's to operate as autonomous commercially viable bodies. Presently the tariffs of the SWA's are so low that they hardly meet their operational and maintenance cost.

2.3. RURAL WATER SUPPLY AND SANITATION:

2.3.1 The Federal Ministry of Water Resources and Rural Development, in conjunction with the UNDP/World Bank, UNICEF, DFRRI, FMHHS and other Government agencies from 1986, developed a National Rural Water Supply and Sanitation Sector Strategy and Action Plan to harmonise rural water supply and sanitation development in the country. This document was discussed and finalised at a national workshop in 1992 for approval by the Federal Executive Council for use as the national policy on Rural Water Supply and Sanitation. The concept in the Strategy and Action Plan is for community participation from inception to completion of the projects, and the eventual operation and maintenance of the schemes. For the smooth

operation of this system, State Governments are to create WSS Units in their relevant Ministries to help the Local Government set up their RWSS units, train the Local Government Staff, assist them initially in project planning, contract procedures, project supervision etc until the Local Governments have acquired expertise in their areas. The Local Governments are charged with the responsibility of planning with the full involvement of benefitting communities, the type of water supply and sanitation systems they can afford to operate and maintain. The Local Government would also assist the communities in setting up their water committees, train local craftsmen to maintain the systems and offer assitance where problems exceed the capability of the local craftsmen. The thrust is for the communities to see the facilities as their own and hence ensure sustainability.

2.4 OTHER WATER SUPPLY AND SANITATION PROGRAMMES

2.4.1 **National Plan of Action on WSS:** as a follow up on the UN Summit for Children in 1990, the country prepared its National Plan of Action on Water Supply and Sanitation to achieve the goals of the Summit. Funding is required to actualise the Plan of Action in full. However, whatever funds is available to the sector is spent towards meeting some of the targets.

2.4.2 **NATIONAL WSS MONITORING PROGRAMME:** The situation of actual water supply and sanitation has mainly been gestimates. This made it difficult to plan objectively. In order to change this situation, the Federal Ministry of Water Resources and Rural Development did in 1991, with the assistance of UNICEF, initiated a National WSS Monitoring Programme, to collect, collate and store in easily retrievable form data on water supply and

CONTINUATION

sanitation nationwide. In 1993, four zonal monitoring centres were set up and manned. Baseline studies in states in the zones have commenced and it is envisaged that by the end of this year, the baseline studies in all the states in each zone would have been completed. This programme is one of the successful GovernmentESA collaboration.

2.4.3 **Reference and Regional Water Quality Laboratories:** In order to monitor the water quality both at source and in the water supply systems, the Ministry is setting up 6 water quality laboratories at strategic positions in the country with funding from the African Development Bank (ADB). These laboratories are made up of 2 Reference or Research Laboratories and 4 Regional Laboratories. International assistance would be required in setting up the water quality network monitoring points, for staff development, and for institutional strengthening of the laboratories.

2.4.4 **Local Manufacture of Water Supply Treatment Chemicals and Devices:** In realisation of the tremendous amount of foreign exchange necessary to import water supply chemicals and devices, the Ministry decided to embark on local manufacture of some of these items. So far Indian Mark III and Afridev type handpumps are being manufactured by local firms under technical assistance from the Ministry. Studies are being concluded in the production of lime for water supply purposes and in the local production of sand filter media.

CONTINUATION

3. **INVOLVEMENT IN INTERNATIONAL EFFORTS IN WATER SUPPLY AND SANITATION:**

Nigeria has been involved in a number of international efforts in the development of water supply and sanitation. The country was fully involved in the International Drinking Water Supply and Sanitation Dacade (IDWSSD) activities in which 1000 borehole related mini-schemes were constructed in the then 19 states of the Federal and the FCT. The country participated in the World Summit for Children in 1990, the UNCED in Rio de Jamairo in 1992, and now the Ministerial Conference on Drinking Water Supply and Environmental Sanitation.

3.2 Initial involvement in these international efforts required very little funds of the responsible agencies. Now with the SAP and the dwindling oil revenue of the country, they represent substential parts of the capital funds of the agencies. We appreciate the tremendous amount of knowledge the country has acquired in these processes. However, the bottomline is how many more people became served as a result of these attendances and contributions to these meetings.

The dilemma is therefore the choice between expenditure to acquire relevance to present day water supply and sanitation state of the art or putting all the expenditure into provision of the infrastructure even though with not so modern methods. We may soon opt for the latter because of our economic situation.

4. **THE NEED FOR INTERNATIONAL ASSISTANCE**

THE PLACE OF THE MINISTERIAL CONFERENCE IN THIS.

We are happy to be a part of this Conference that has concerned itself with seeking a true way forward in the implementation of Agenda 21. We are happy to note the new grounds broken in emphasizing efficient use of available resources to extend

coverage; the advocacy for reorganising the funding structure to give more attention to low-cost, affordable, easily maintainable and hence sustainable systems, in order to reach the more of the unserved; the need to intensify advocacy to bring more awareness to the Water Supply and Sanitation Sector; the need to pull resources together through well structured country-level collaboration and international collaboration; the need to acquire more relevance in country level funding percentages to water supply and sanitation; and the encouragement for international cooperation in the soft ware aspect of drinking water supply and sanitation. These are very vital tools for moving ahead, however, it is our humble view that to achieve the aims of Agenda 21, Chapter 18, on Drinking Water Supply and Environmental Sanitation especially in the developing countries, more funds need to be mobilised and made available or else only marginal success, that would easily be wiped out by population growth, would be achieved with existing founding arrangements.

4.2 The Ministerial Conference on Drinking Water Supply and Environmental Sanitation having done such a tremendous and commendable amount of work towards advancing the implementation of Chapter 18 of Agenda 21, has to break that final and near impossible ground of mobilising the necessary funds to assist developing countries move out of their present low level coverage in water supply and sanitation, to achieve the goal of at least some water for all by the year 2000, and full supply to all soon after that year.

CONTINUATION

5. **NIGERIA: THE NEW THRUST.**

5.1 As can be seen, the country has done a lot to actualise most of the recommendations in the back ground papers for this Conference. We are still far away from the goal, hence we are taking more critical look at our situation and seeking to formulate new methods for advancing the goal for water supply and sanitation for all. In this wise therefore and having identified water supply as one of the most fundamental and urgent need of all parts of the country, starting from this year, the Ministry is pulling together all relevant votes on water supply related matters to tackle the implementation of water supply schemes nationwide. The initial assessment shows that the funds available is small, about 40% of the estimated Federal Government annual requirement. However, we believe that this start would represent seriousness on the part of the sectoral ministry to have a coordinated approach to Water Supply. While it would provide succour to the few that will benefit this year, it will give hope to others that it would soon be their turn. But more important than this, we envisage that it would of its own generate enough interest and support in the political realm to engender greater financial support for the programme.

5.2 Ladies and Gentlemen, you would agree with us that 40% is low while advocacy would beef up this percentage, financial reinforcement is required from external sources. This is where we would count on both bilateral and multilateral external support. We think that this Conference should lay the foundation to bring this about. We would like to believe that this is possible and look up to all of us to make it possible for the people of the world and for posterity.

CONTINUATION

6. CONCLUSION

6.1 Finally, we once more wish to commend the Government of The Netherlands for convening this Ministerial Conference on Drinking Water Supply and Environmental Sanitation, on an issue that is so vital to human survival. We commend and express our gratitude to the Government for the tremendous efforts in terms of time, energy, finance and other things put into preparing for the Conference and making Nigeria a part of that process. Our representatives have informed us of your hospitality, financial support in terms of travelling expenses and accommodation, and the excellent atmosphere in which they had to work. We express the countries profound gratitude.

6.2 We will therefore come to the Conference with great hope of working together with you to achieve viable options for providing safe drinking water and sanitary means of disposal of human waste to our people.

6.3 Thank You.

Isa Mohammed
Hon. Minister of Water Resources
and Rural Development.