Global Consultation on Safe Water and Sanitation for the 1990s

BACKGROUND PAPER

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New Delhi, India
September 10-14, 1990

Eight Lessons from the Decade

1. *Focus on Poverty: serving the unserved*
   A large percentage of the world's population, generally the poor, remains unserved. Reaching the poor with water and sanitation services requires special emphasis on helping them to help themselves.

2. *Building Capacity: the promotional role of government*
   There is a need for governments to concentrate less on direct intervention in providing services and more on enabling public and private institutions to deliver services.

3. *Meeting Demand: understanding what services people want and are willing to pay for*
   Users' perceptions of the benefits from improved sectoral services have not been well understood by sector planners. There is also a lack of understanding of the household itself: its micro-environment, communications, decision-making processes, perceived needs and expectations. This has led to investment in facilities that have been underutilized or that people have been unwilling to pay for, thereby undermining long-term sustainability.

4. *Sharing Costs: appropriate pricing as a means of improving sector performance*
   Costs are rising and so are the numbers of people to be served. Government subsidies are limited, so costs should be shared. The careful pricing of services is a powerful but often poorly used tool for mobilizing financial resources, providing the poor with access to services, and increasing the accountability of service providers to users. It can also inhibit the wasteful use of resources.

5. *Technical Innovation: a range of options to meet demand*
   Technological advances have greatly increased service coverage by lowering costs and permitting the matching of service levels to demand.

6. *Women: sound reasons for emphasis*
   A focus on the role of women, among the poor and unserved, can enhance the sustainability of basic improvements in water supply and sanitation services.

7. *Monitoring: extending coverage with achievable goals*
   At current rates of coverage, the prognosis for extending water and sanitation services to the unserved over the next 20 years is poor; establishing achievable targets and effective monitoring systems are instruments for enhancing efforts.

8. *Coordination: building national and international collaborative networks*
   The primary reason for collaboration is to make better use of existing resources. Collaboration starts at the country level and is supported by regional and global networks.

PREFACE

The Global Consultation on Safe Water and Sanitation for the 1990s in New Delhi, 10-14 September 1990, is hosted by the Government of India and sponsored by United Nations Development Programme (UNDP) with the co-sponsorship of the United Nations Steering Committee for Co-operation on the International Drinking Water Supply and Sanitation Decade 1981-1990 (IDWSSD) and the External Support Agencies (ESA) Collaborative Council. It will build on the accomplishments of the IDWSSD and mark the beginning of a new phase of accelerated development for the many hundreds of millions of unserved low-income people around the world.

The consultation is expected to reach consensus on strategies for services for the 1990s and beyond which could be supported by the international community. The General Assembly, at its 45th session scheduled in the fall of 1990, will consider the report of the Secretary-General of the United Nations on the Assessment of the IDWSSD and the strategies for the 1990s. The outcome of the New Delhi Consultation will be brought to its attention.

This present Background Paper has been prepared by the Secretariat for the Global Consultation as an aide-memoire for the participants. It attempts to highlight the major issues as a base for the discussions during the Global Consultation but is not intended to serve as a comprehensive overview document given the space limitations and the brief time for its preparation. It should be read in conjunction with "Achievements of the International Drinking Water Supply and Sanitation Decade 1981-1990", a Report of the Secretary-General to the United Nations General Assembly (Document A/45/327).

The Background Paper was drafted in collaboration with members of the IDWSSD Steering Committee, the ESA Collaborative Council and individuals from many countries. It does not, however, necessarily reflect the views of UNDP or any of the co-sponsoring agencies.

The conclusions and recommendations from a number of regional and country consultations and other meetings under Decade auspices have been drawn upon in the preparation of this document. Other documentation has also been used, which is listed in a bibliography that will be available separately. In several cases, verbatim quotations have been made from other publications. These quotations have not been marked, but reference will be made to them in the finalized version to be produced after the Global Consultation.

The Secretariat for the Global Consultation expresses its warmest appreciation to the many individuals from all over the world, who contributed to, commented on and in other ways co-operated in the production of the present paper. This applies not least to those from the host country, including the National Organizing Committee of the Government of India. These thanks are due as well to those whose work during the preceding years carried with it the inspiration for a forceful follow-up to the International Drinking Water Supply and Sanitation Decade.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

ACC	Administrative Committee on Coordination, United Nations
AKRSP	Agha Khan Rural Support Program, Pakistan
AMREF	African Medical and Research Foundation, Kenya
ASEAN	Association of South East Asian Nations
AWWA	American Water Works Association
CARE	Cooperative for American Relief Everywhere
CC	Collaborative Council
CEHA	Centre for Environmental Health Activities, Jordan
CEPIS	Centro Panamericano de Engeneria Sanitaria y Ciencias del Ambiente, Peru
CESI	Country External Support Information System, WHO
CIDA	Canadian International Development Agency
CNR	Committee on Natural Resources, United Nations
ECOSOC	United Nations Economic and Social Council
EEC	European Economic Community
EIA	environmental impact assessment
EMENDERA	Europe, Middle East and North Africa Region
ENSIC	Environmental Sanitation Information Centre, Thailand
ESA	external support agency
FAO	Food and Agriculture Organization
GDP	gross domestic product
GTZ	*Gesellschaft für Technische Zusammenarbeit*, German Agency for Technical Assistance
IADB	Inter-American Development Bank
IDRC	International Development Research Centre, Canada
IDWSSD	International Drinking Water Supply and Sanitation Decade
IGW	Intersecretariat Group on Water Resources
ILO	International Labour Organization
INSTRAW	Institute for Studies, Training and Research for the Advancement of Women
IRC	International Water and Sanitation Centre, Holland
IRC/WD	International Water and Sanitation Centre for Waste Disposal, Switzerland
ITN	International Training Network, UNDP/World Bank
IWSA	International Water Supply Association
KWAHO	Kenya Water for Health Organization
l/c/d	litres per person per day
NGO	non-governmental organization
NORAD	Norwegian Agency for International Development

O&M	operation and maintenance
OECD	Organization for Economic Cooperation and Development
OECD-DAC	OECD Development Assistance Committee
PAHO	Pan-American Health Organization
PDA	Population and Community Development Association, Thailand
PEGESUS	Partnership to Evolve and Grow Effective and Sustained Systems
PROWWESS	Promotion of the Role of Women in Water Supply and Environmental Sanitation Services, UNDP
PUE	public utility enterprise
PVO	private voluntary organisation
R&D	research and development
RWSG	Regional Water and Sanitation Support Group (UNDP/World Bank)
RWSS	rural water supply and sanitation
SAAP	sector strategy and action plan
SIDA	Swedish International Development Authority
SIP	Strategic Investment Plan
SKAT	Swiss Centre for Appropriate Technology
TCDC	technical cooperation among developing countries
TOR	terms of reference
UN	United Nations
UN-DTCD	United Nations Department of Technical Cooperation and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNICEF	United Nations Children's Emergency Fund
USAID	United States Agency for International Development
VIP	ventilated improved pit latrine
VITA	Volunteers in Technical Assistance, U.S.A.
WASH	Water and Sanitation for Health Project, U.S.A.
WHO	World Health Organization
WHO-CWS	WHO Community Water Supply and Sanitation Unit

SUMMARY

The launching of the International Drinking Water Supply and Sanitation Decade (IDWSSD) by the UN General Assembly in 1980 represented a major national and international commitment to provide safe and affordable water supplies and sanitation facilities to the less privileged in the developing world.

Ten years later it is appropriate to review what has been achieved. In assessing the Decade one can cite impressive numbers of new people served. One can also underscore the fact that at the end of the Decade results have fallen short of expectations and coverage has not kept up with population growth.

The Decade has accelerated and advanced knowledge of the sector, and much progress has been made in extending the range of options for sector development beyond conventional solutions alone. Much can be gained from the analysis, documentation and sharing of experience, thus strengthening the foundation on which to build in the coming years.

This document attempts to summarize the key lessons learned during the Decade and, more importantly, to focus on the challenges that still lie ahead. The global community attending the Safe Water 2000 Global Consultation in New Delhi is charged with the task of identifying the best approaches for meeting the often overwhelming need for safe water and adequate sanitation in much of the developing world. As a new decade begins it is important that the achievements and failures of the Decade are realistically assessed and that the most is made of what has been learned.

KEY LESSONS FROM THE DECADE

In reviewing the decade, eight key themes recur in different parts of the world and different areas of the sector. These themes represent some of the major lessons learned from the Decade experience.

1. **Focus on Poverty: serving the unserved**

   A large percentage of the world's population, generally the poor, remains unserved. Reaching the poor with water and sanitation services requires special emphasis on helping them to help themselves.

   While everybody needs water and sanitation services, the better off can reduce the impact of poor services through making their own private arrangements for water and sanitation. The poor, who cannot afford this option, thus suffer the most in terms of ill health, time spent collecting water, and in the high costs of often inadequate services. Rapidly growing populations, stagnant economies, and deteriorating infrastructures limit the capacity of many governments to deliver services, thus exacerbating the plight of the poor. Large-scale subsidies are not necessarily the appropriate solution, often trapping communities in a vicious cycle of dependency, more poverty, and yet more subsidies. This drains government resources and contributes little to the sustainability of services.

Special efforts are needed to solve the problems of the poor and to encourage active participation and growing self-reliance within communities that will enable the people themselves to provide their own services. Such empowerment shows itself not only in more widespread coverage but in improvements in efficiency and lowered costs of services.

2. **Building Capacity: the promotional role of government**

> *There is a need for governments to concentrate less on direct intervention in providing services and more on enabling public and private institutions to deliver services.*

In cities, utilities need managerial and financial autonomy and a clear mandate if urban water supply and sewerage services are to be effectively provided. There is a clear correlation between the performance of utilities and the degree of independence from direct government intervention. There is, however, an essential and important role for government in creating the "enabling environment", in setting standards and in monitoring performance targets, especially to promote service provision in peri-urban areas and rural communities.

In rural areas, the widespread failure of centrally provided and maintained water supply services has demonstrated the problems of government in providing services to poor dispersed settlements. Lack of economies of scale, high costs of provision and low affordability often result in minimal incentives for governments to provide services to rural communities. During the Decade, community management, which incorporates ownership of and responsibility for services, has become the cornerstone of attempts to sustain services in rural areas. Government support is still essential in creating the enabling environment through regulation, extension and the establishment of financial mechanisms.

Community management can often occur in informal, peri-urban settlements where it is costly to construct facilities and collect revenues, costs are high and regulatory systems are unclear. The longer-term solution is likely to be the extension of services by the urban utility, which will only be possible where the utility is efficient and financially sound.

3. **Meeting Demand: understanding what services people want and are willing to pay for**

> *Users' perceptions of the benefits from improved sectoral services have not been well understood by sector planners. There is also a lack of understanding of the household itself: its micro-environment, communications, decision-making processes, perceived needs and expectations. This has led to investment in facilities that have been under-utilized or for which people have been unwilling to pay, thereby undermining long-term sustainability.*

Little is known, and consequently incorporated into project design, about the household itself, in particular water and sanitation practices, health beliefs, perceived needs and expectations, and decision-making processes. All these factors affect demand for services, willingness to pay for them and their use. Simply providing improved water and sanitation services has not been sufficient to ensure that the services are used by the intended beneficiaries or that they are used in a way that is beneficial to people's health and environment. This is particularly true in rural areas, where people have depended for decades on traditional water supplies and sanitation practices and where the population does not always recognize the potential health benefits of improved water and sanitation services. Too often there has been insufficient appreciation on the part of sector planners that, unless new facilities are perceived by the people themselves as representing a significant improvement on existing water sources or sanitation practices, they will not be utilized or

paid for by the intended users. This has resulted in the waste of investment resources during the course of the Decade. Greater efforts on the part of sector planners are required to understand the recipient household and its effective demand, to respond to perceived needs and to ensure people's participation in investment choices. Hygiene education and information programmes can go far in better informing users about the benefits of improved services, thereby heightening demand for them.

4. **Sharing Costs: appropriate pricing as a means of improving sector performance**

> *Costs are rising and so are the numbers of people to be served. Government subsidies are limited, so costs have to be shared. The careful pricing of services is a powerful but often poorly used tool for mobilizing financial resources, for providing the poor with access to services and for increasing the accountability of service providers to users. It can also inhibit the wasteful use of resources.*

In the face of increasingly scarce public resources, user charges are an important means of generating financial resources for the water and sanitation sector. The structure of user charges determines the share of costs to be borne by the users and government respectively and thus the level of subsidy that will be required for the sector. Other aspects of pricing are important. The structure of user charges determines the distribution of costs among users, and as such can be used as an instrument to ensure that the poor have better access to services. In addition, user charges oblige suppliers, whether they are utilities or community associations, to be accountable to users, thus creating an incentive for providing better quality of service. In the particular case of community associations, user payments may strengthen the sense of ownership and responsibility of users. Appropriate pricing policies can also help to put an end to wasted resources and to the allocation of these resources more effectively. This is particularly true of scarce water resources.

5. **Technical Innovation: a range of options to meet demand**

> *Technological advances have greatly increased service coverage by lowering costs and permitting the matching of service levels to demand.*

Technology development during the Decade has extended the range of options available to planners, thus facilitating the provision of the poor with systems they can afford. Similarly, sustainability has been enhanced through improved reliability and local manufacture, both resulting from design adaptation to particular conditions. Technological innovation will remain an essential (though not in itself sufficient) strategy for coping with sector development problems. For example, with further development and lowered costs, solar-powered pumping can be expected to have a substantial impact on the provision of water supplies to rural communities. The management of solid and liquid wastes and the conservation of water resources are other areas in which available technologies (typically developed for use in industrial countries) can be modified and adapted for use in the developing world.

6. **Women: sound reasons for emphasis**

A focus on the role of women, among the poor and unserved, can enhance the sustainability of basic improvements in water supply and sanitation services.

Women in most societies generally have the most to gain from, and have the greatest interest in, improved water and sanitation services, because of their traditional functions of child and home care and the importance of water and sanitation in the home environment. However, unless specific efforts are made, gender-related constraints often limit the participation of women. The issue is not the creation of special programmes for women only, but the recognition of the needs, demands and potential of women, and the necessity for their conscious incorporation into project planning and implementation in managerial, professional, community-based and household roles.

7. **Monitoring: extending coverage with achievable goals**

At current rates of coverage, the prognosis for extending water and sanitation services to the unserved over the next 20 years is poor. Establishing achievable targets and effective monitoring systems are instruments for enhancing efforts.

The Decade has not been successful in setting and monitoring service coverage goals. To set such coverage goals, service levels and target dates must be set and monitoring procedures and benchmarks must be defined. There are, however, significant risks to this approach. Experience has shown that coverage targets can result in an emphasis upon installation, not sustained utilization. If coverage is to be sustained, implementation must be undertaken within an agenda for action that includes the adoption of sound policy and regulatory frameworks; viable domestic resource mobilization efforts, including innovative sector financing strategies and appropriate levels of cost recovery; and affirmative action towards decentralization and strengthening of local public and private bodies. These are essential elements of the enabling environment needed for the provision of sustainable service. Where such an agenda does not already exist, goals may have to be lowered and timeframes made longer.

8. **Coordination: building national and international collaborative networks**

The primary reason for collaboration is to make better use of existing resources. It starts at the country level and is supported by regional and global networks.

Coordination is neither an option nor a luxury. It is essential to keep agencies alert to problems and needs, to encourage exchange of solutions and experiences and to provide mechanisms for joint action. The need for coordination is not only limited to national agencies; it should involve ESAs as well. Thus at regional and global levels governments, bilateral and multilateral agencies should maintain constant dialogue on policies, implementation strategies, funding opportunities and information.

1. BRIDGING THE GAP: Water Supply and Sanitation Coverage

Background

The United Nations Conference on Human Settlements held in Vancouver 1976 called for urgent action "to adopt programmes with realistic standards for quality and quantity to provide water for urban and rural areas by 1990 if possible" and "to adopt and accelerate programmes for the sanitary disposal of excreta and wastewater in urban and rural areas". In 1977 the UN Water Conference in Mar del Plata recommended 1981-90 be designated the International Drinking Water Supply and Sanitation Decade. In November 1980, it was proclaimed as such by the UN General Assembly.

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the Water Conference stressed the need to give priority to the poor

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The Water Conference recognized the serious health consequences of a lack of water supply and sanitation and stressed the need to give priority to the poor and less privileged and to water scarce areas. It called on countries to establish realistic goals for 1990. The Conference recommended that countries should:

- develop national plans and programmes for water supply and sanitation
- initiate immediate engineering and feasibility studies on projects of highest priority
- assess their human resources situation and establish training programmes
- mobilize public opinion and community participation
- establish institutions for planning, implementation and monitoring programmes
- coordinate efforts to ensure provision of technically and socially acceptable sanitary facilities
- develop revolving funds to encourage mobilization of resources and equitable participation of beneficiaries while discouraging wasteful consumption.

The Conference's Plan of Action called on the international community for:

- increases in financial contributions
- extension of cooperation for the implementation of high priority projects and programmes
- greater emphasis on social benefits
- recognition of the need for higher levels of grants, low-interest bearing loans, and increased support for local costs.

The Decade in Context

The situation of the world economy during the course of the Decade was painfully disappointing to many developing countries. Within just a few years of the Decade's outset, countries of less developed regions encountered such adverse external conditions as a sharp fall in the prices of non-oil primary commodities on which they relied for much of their export earning, and a steep rise of real interest rates which immediately resulted in the accumulation of foreign debt. As the Decade advanced the downturn in growth became more obvious. Poorest growth was experienced by least developed countries, particularly those in sub-Saharan Africa, which were also ravaged by drought, famine and other disasters.

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the net transfer of financial resources reversed in 1983

As voluntary financing to highly-indebted countries virtually stopped at the beginning of the Decade, the net transfer of financial resources to developing countries, measured as the total financial flow (official and private) minus the net payment of interest, dividends and other capital-servicing, was reversed in 1983. The developing world which had been traditionally the net recipient of financial resources is now the net supplier of resources to the developed world, and the amount of such transfers grew to more than US$ 30 billion in 1988. Rising costs and increasing difficulties in external financing hit most severely those governments which relied, for the financing

of their public investment, on external sources which had been available at relatively low cost in the 1970s. This put pressure on public investment programmes in water supply and sanitation at the same time as many of these countries went through wrenching fiscal adjustments.

1.1. Present Status, Needs and Lessons

1.1.1. Population Growth

An important factor contributing to deteriorating living standards is the high rate of population growth. By 1987 the world's population grew to over 5 billion which was largely due to the rapid growth of population in developing countries where the growth rate averaged 2.1% per year during the first half of the Decade, as compared to 0.6% per year in more industrialized regions.

A significant aspect of the demographic growth during the Decade was the migration of population from rural to urban areas. As a result, the urban population in developing regions of the world grew at 3.6% a year, more than twice as rapidly as rural populations, which grew at 1.5% (see Figure 1). Above all, an explosive increase of urban population was observed in mega-cities such as Bombay, Cairo, Jakarta, Mexico City, Sao Paulo and Shanghai.

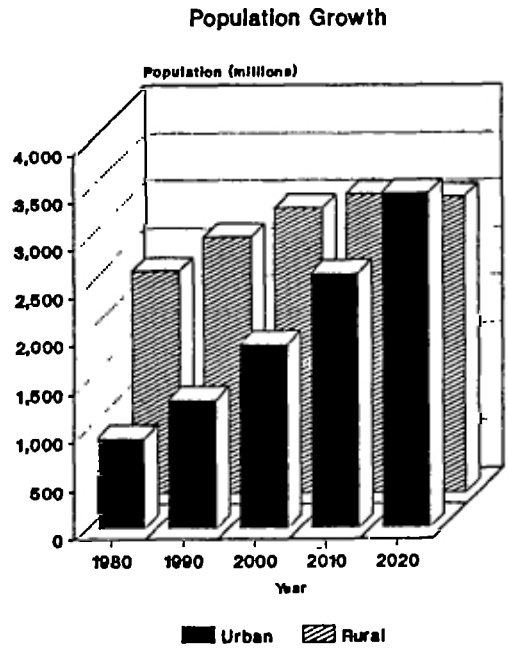

Figure 1 : Population Growth in Developing Countries

The pressure of population has also posed threats to natural resources in developing countries. Improper land and water management has resulted in deforestation of watersheds leading to the silting up of reservoirs and a sharp decrease in water resources. Competing elements for water by agriculture, industry and domestic uses has caused scarcity and pollution of water resources. This has dramatically increased the cost of urban water supplies. Bridging the coverage gap will not only depend on reducing population growth but also implementing conservation measures which protect the environment and in particular, water resources.

1.1.2. Progress in Coverage

In spite of the many difficulties faced by developing countries, their efforts towards fulfilling their intentions as part of the Drinking Water Supply and Sanitation Decade under the Mar del Plata Action Plan were considerable, even though results often fell short of expectations.

The quantitative comparative analysis of service coverage that follows is based on information provided by governments to the WHO in response to the recommendations of the Mar del Plata Action Plan to strengthen sector information in order to facilitate Decade evaluation. Additionally, information on sector investments, particularly those of the external support agencies, has been provided through the Country External Support Information (CESI) system. Qualitative information has also been provided by governments and from projects supplemented by information from the offices of the Resident Representatives of the United Nations Development Programme and from ESAs.

The absence of adequate information on water supply and sanitation at the national level is still often a serious constraint to sector planning and management. It should be noted that coverage figures often refer to minimum levels of adequacy both in terms of the quality of the services provided as well as density and proximity of services. The definition of what constitutes adequate water supply and sanitation services has been left to governments, since this concept is related to local economic social and physical conditions. Hence, the application of differing suitability criteria has a strong bearing on levels of coverage reported (see Box 1) and has resulted in several anomalies in coverage estimates and projections. Nevertheless, the quality of national reporting has steadily improved throughout the course of the Decade. The existing data are therefore, sufficiently reliable and the proportion of the global population represented is adequate to identify overall trends and directions.

Box 1

What is Coverage?

The definition of coverage varies from country to country, region to region – so much so that it is often like comparing "apples to oranges". To some, water coverage means a family handpump supplying reliable safe water within the household compound. To others, it means that water is centrally supplied to standpipes. Unfortunately, central supply to standpipes often means intermittent service and long queues. In terms of sanitation, coverage can mean a pour flush toilet in the back yard, but it can also mean bucket collection and reuse of raw excreta on vegetables.

Take, for example, water supply "coverage" by a rural water agency in Asia, where a village of 1,000 is counted as 100% covered on completion of the tubewell scheme. Only 10% of the village has house connections, and another 50% standpipes. The less influential are expected to get an extension to their area in the years to come. They still use the old sources. Eventually the scheme fails and those who were served join the less influential at the old well. But, back in the capital the records remain unchanged: 100% covered.

Water Supply

According to WHO projections some 1,348 million people received adequate water supply services during the Decade of which 368 million were in the urban and 980 in the rural areas. The most impressive advances were made in Asia and the Pacific where over a billion people were reported receiving coverage.

people left unserved by water supply declined from 1.8 to 1.2 billion

Globally, percentage coverage increased from 44% to 69% of the population (see Figure 2), and the total number of people left unserved declined from an estimated 1.8 to 1.2 billion during the Decade. This was largely due to progress made in the rural areas. On the other hand, the urban unserved grew by some 31 million, reflecting urban population growth in Africa, Asia and the Pacific.

Sanitation

An estimated 748 million people received satisfactory sanitation services during the Decade, 314 million in the urban areas and 434 million in the rural. Largest gains were made in rural sanitation in Asia and the Pacific where 368 million were reported receiving services. In percentage terms, urban sanitation rose from 69% to 72%, and in the rural areas from 37% to 49%. Sanitation coverage, in total, was only just able to keep ahead of population growth. This was due to gains in rural sanitation. In the urban areas those left unserved rose from 292 to 377 million.

South of the Sahara

Particular note should be made of Africa south of the Sahara, where in spite of a doubling in the number of people provided with services, the number of urban dwellers without safe water supply increased by 29%. Similarly, the number of urban residents without adequate sanitation increased by 31% even though the number of dwellers availed of services increased by 119%.

1.2. Outlook and Issues

1.2.1. Safe Water for All in 2000?

Compared to the time of Mar del Plata, it is now easier to say what is possible and what is not. Clearly, a target of clean water and sanitation for all in 2000 is unattainable. Projections indicate that there will continue to be difficulty in keeping up with the population growth.

if present trends continue a target of clean water and adequate sanitation for all in 2000 is unattainable

It is only natural that countries choose those most easily served to be served first. This has been the case in rural areas, where investments have been made in the larger communities and the dispersed populations have been left until later, and in urban areas, where the bulk of the work is still to be done in the more difficult peri-urban areas. There will, therefore, be a lag in progress during the early years of the coming decade as governments adjust to their new target groups by changing methodology and orientation. As the unserved become more difficult to serve, a natural slow-down in progress can be expected. Achieving cost recovery, sustainability and community management, as outlined in later chapters, will tax even the best municipal departments and rural water supply agencies.

Based on 1980, 1985 and 1988 data, WHO has made projections to 2000. While taking into account the problems associated with the data and consequent projections, certain trends are apparent.

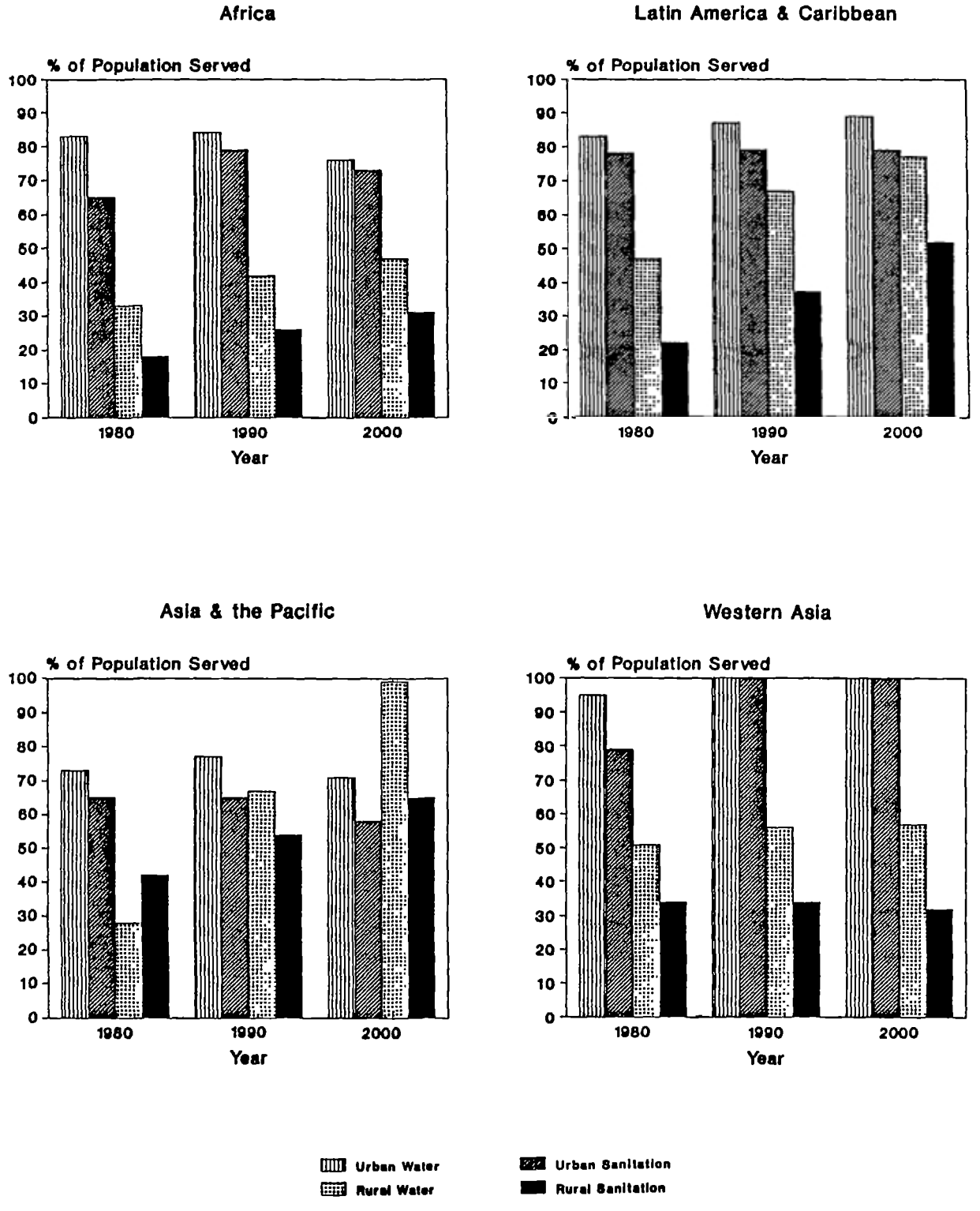

Figure 2: Percentage of Population Served by Region

Momentum in both water and sanitation will likely be kept up in the rural areas. A note of caution is expressed, however, in the case of Asia and the Pacific where coverage is projected to reach nearly 100% by 2000. This projection was heavily influenced by data from China where rural water coverage was reported to have risen from 20% in 1980 to 66% in 1988. Also, in sub-Saharan Africa coverage is projected to fall short of progress anticipated in other regions.

a downward trend is expected in the urban areas

In the urban areas population growth will severely limit municipalities' ability to reduce the numbers unserved. In the year 2000 there will likely be between 200 and 250 million more people without water and sanitation services than there are today, thus nearly doubling the total urban unserved (see Figure 3).

These losses in percentage coverage will be countered to a great extent by advances which are likely in the rural areas. Nonetheless, by the year 2000 there could well be a total of three quarters of a billion people without adequate water supply and more than double that without sanitation, principally in Africa and Asia.

If these projections of coverage rates and population growths are extended to 2010, even worse scenarios can be envisaged whereby the urban unserved may exceed a billion. These will be, for the most part, the peri-urban poor.

The priority areas of concern are urban sanitation and water supply in Asia and the Pacific and both rural and urban sanitation and water supply in Africa as these areas make up by far the bulk of the unserved projected for the years of 2000 and 2010.

costs will rise and coverage rates may slow down

The above projections are optimistic

- data have been reported by countries on the basis of estimates rather than field surveys. There is a natural tendency to estimate higher coverages than actually exist in the field.
- projections (based on UN medium projections) assume that substantial advances in reducing population growth will be made in the coming 30 years.

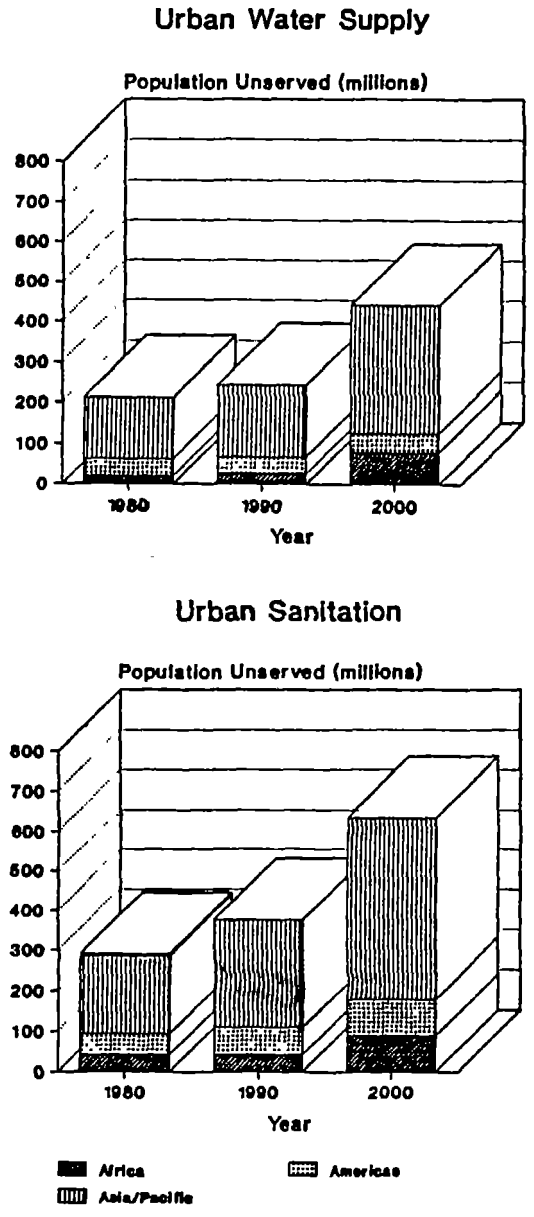

Figure 3: The Unserved Populations

- projections were made on the basis of countries being able to maintain momentum. To achieve this, governments will have to undertake major commitments and efforts. Rates may actually slow down during at least the first half of the coming decade. In real terms, costs of providing service will rise substantially in the coming years. Governments will have to use lower cost technologies, more efficient production capacities and reduction in unaccounted for water. However, cost savings will not counteract rising costs.

1.2.2. Monitoring the Next Decade

Although coverage data have been collected, analyzed and projected, their accuracy and comparability have been limited by definitional problems. One danger is that over the years of reporting a series of optimistic errors have compounded, resulting in significantly higher numbers being reported as covered than is actually the case. Thus, over the coming two or three decades, sector coverage may be reported as being 90% and above but the reality could be substantially lower. This could result in resources being withheld from the remaining unserved, which would inevitably be the lowest income groups.

Monitoring in the next decade must improve. Measurement methodology should improve so that:

- coverage in each country is well defined; while definitions will have to respond to local conditions, they should still permit inter-country comparisons
- coverage reflects the sustainability of services
- coverage takes into account important variables such as use of the services as well as their convenience, accessibility, and impact on the environment.

At the beginning of the Decade, lack of resources caused many countries to base their estimates on preliminary surveys or even rough estimates. Although the quality of data has improved since, there is still a need for baseline surveys incorporating at least representative population samples. These should be undertaken using new measurement methodology meeting the above criteria.

1.2.3. Principal Conclusions and Questions

During the past Decade, global water supply and sanitation coverage has kept up with population growth, but not by a wide margin. The numbers of people remaining to be served was substantially reduced in the rural areas but increased in the cities. This was particularly true in Asia and the Pacific region. The numbers of urban dwellers without water and sanitation facilities will likely continue to increase in the future.

Low-income communities make up by far the largest part of the unserved in both rural and urban areas. Helping the poor help themselves in achieving sustained water and sanitation is a feasible complement to conventional approaches.

How can resources and efforts be best directed towards low income groups during the coming decade?

The experience of declining economies and rising costs during the past Decade is likely to continue into the next. Unless there is a major change in economic trends in developing countries, increased public financing is unlikely. However, there are financial and institutional resources available through the community and private sector. How can these best be drawn upon in the years to come? This is a central question which is addressed in the following chapters.

Constraints to coverage are not only financial, they include, among others, institutional inefficiencies, low productive capacities, poor coordination between agencies and mis-use of water resources and the environment. These highlight the complexity of sector problems and represent major challenges for the decade ahead.

Sector planning will require effective monitoring systems which reflect not only numbers of installations but also sustainability, levels of service and how facilities are used. What are the most appropriate indices for measurement, what mechanisms can be put into place to ensure accurate monitoring, and how are data to be collated and analyzed in the country and global context?

2. CREATING A SAFE ENVIRONMENT FOR BETTER HEALTH: Water Resources, Sanitation and the Environment

2.1. Present Status, Needs and Lessons Learned

This is an era of growing environmental concern. Since the mid 1940s, population has more than doubled and world economic activity has increased five times. Leading the population growth and supplying a large part of the raw materials to feed the economic growth, the developing countries have been hit especially hard. Accelerating urbanization, exhaustion of water resources and rampant disease now characterize many developing countries and the situation is deteriorating.

There are doubts as to the world's ability to achieve economic growth in the short to medium term without environmental repercussions that could undermine long term economic growth. Overstepping the limits of natural resources is already altering natural eco-systems, including water resources.

As a result, there is a major focus on the environment including those aspects that have a direct impact on most developing countries, such as soil conservation, aridity and deforestation. These are important, but within the household environment, day in, day out, more people suffer and die from disease transmission caused by poor water supply and sanitation than almost any other cause. It is for this reason that this section focuses on water supply and sanitation firstly, on the household environment; secondly, the community environment; and lastly, in terms of water resources as a whole.

2.1.1. The Household

It is at the household level, within the family, that water supply and sanitation have their greatest impact on the environment and in particular, health (see Box 2). Yet, surprisingly little is known about the family and the environment in which it lives. The answers to basic questions, such as "what are the precise transmission routes of the various diarrhoeal agents within the home?" or "what are the real driving forces behind the family's decision to improve its environment?", remain largely unknown. Too often the overall needs of communities are considered, rather than individuals or families, without an understanding of what motivates the family to upgrade these services. Projects are invariably designed without a basic knowledge of people's preferences, the reasons why people may want improvements or what they are willing to contribute for them.

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little is known about the family and the environment in which it lives

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At the level of the micro-environment, of the family and the household, it is the women who make important decisions. This fact is obscured in almost all cultures, but it is crucial because macro-level impacts are the accumulated result of what happens at the micro-level. For instance, women collecting small amounts of firewood eventually denude hillsides; garbage disposal is one of a woman's tasks; domestic activities create the demand for water; women decide which products, domestic cleaners and fuels they will purchase and use; the way in which mothers raise their children determines hygiene behaviour which in turn determines the health impact of water supply and sanitation services. Recycling efforts must begin at the household level, where garbage and human waste can be made into a resource, and wastewater can be reduced or recycled. The decision to start a backyard garden and grow vegetables for the family or market, or to change to less toxic chemicals and fuels for domestic use is also made by individual households. All of these activities are directly within the purview of the women of the household.

Yet, there is a strong tendency to ignore the role of women. In the design of a water supply project, whether the women of the household will use the new water source or will continue with the old one out of preference for its taste or the enjoyment of meeting friends beside the old well is, surprisingly, often not considered. Usually very little is known about the daily lives of

Box 2

Major Benefits of Water Supply and Sanitation in Development

The benefits of improvements in water supply and environmental sanitation to health and social and economic development are a result of many different interacting factors. Health benefits are both direct and indirect. Thus well-designed projects combining water supply, excreta disposal and hygiene education can be expected to reduce diarrheal morbidity by 30-50 percent, and reduce mortality by an even greater extent, except in cases where other interventions, such as oral rehydration programmes, have already substantially reduced diarrheal morbidity.

Apart from relieving the human suffering and misery, the prevention of diarrhoeal diseases, other infections and parasite infestations improve the nutritional status, especially of infants and children, the most vulnerable members of society. Another contribution to improved nutrition is the use of surplus and waste water in small-scale irrigation for local food production, including family garden plots.

Opportunities for women and children are created by reducing the back-breaking drudgery and decreasing the energy and time spent hauling water over long distances. This reduces ill effects on their health and improves the quality of their lives, enabling them to pursue other activities such as education, income generation, and family care.

Water supply and sanitation improvements have an impact on productivity, as adequate safe water and proper sanitary facilities stimulate the development of productive activities providing employment and increased income for the community. Among the contributing factors are fewer working days lost to ill health.

In terms of environmental protection, adequately designed, maintained and used water supply and sanitation installations and practices contribute to improved water resource and urban environments.

women, how they make choices, and what influences them. Typically information is sought from the male head of the household, whose perceptions and needs are quite different from those of the women of the household. Yet the success or failure of water projects, as measured in both health and productivity, is ultimately in the hands of the women, and this means that there is a crucial need for better understanding of the women's point of view. It is essential that projects include women in the early stages of planning.

The very fact that so little is known about the household and how it is managed means that efforts at integration of water supply improvements, sanitation and hygiene education have often been unsuccessful. Hygiene education is not known for its quick success and only recently have delivery mechanisms been identified that are replicable and sustainable. Yet there are examples of longer term success: school-based programmes particularly have had a significant impact. Primary school children are the largest, most impressionable and attentive audience in the world. Curricula in many schools invariably include health subjects, but teacher training requires upgrading with improved teaching materials and methods focusing on hygiene and the environment.

Projects which provide water supply, sanitation and hygiene education as simultaneous and balanced interventions may not necessarily be required. However, although very successful single purpose projects have been implemented, integration in some manner is essential (and has been shown to be possible) if the full economic benefits of investment are to be obtained. To achieve this objective, project planners will have to be flexible and innovative in the methods they devise and in the institutional arrangements they adopt.

2.1.2. The Community

Traditional rural societies evolve over centuries, and the social structures within rural communities have resulted in the environment within the community being in balance. The environmental situation in cities, where most residents are migrants, is very different. There, the social structure is fragmented and communities are seldom able to prevent severe deterioration of their environment. Even when water and sanitation improvements are introduced, the impact is reduced because, due to a lack of community spirit, the communities seldom respond by implementing follow up actions. Piped water is supplied into homes but drainage is not provided to take away the wastewater; and even when drainage is provided, solid waste collection improvements are not implemented to stop drains being clogged by garbage. Box 4 highlights the conditions in some of the cities of Africa, Asia and Latin America.

improvements in water and sanitation are a proven way of improving the living conditions of the poor

The environmental situation in most urban areas of developing countries is grim, and is deteriorating. Commonplace sights in many urban areas are unpaved

Box 3

Towards a Healthier Urban Environment

Cities currently account for two-thirds of the population growth in the developing world. By the year 2000, close to two billion people will live in urban areas. While such cities play a central role in generating economic growth, uncontrolled urban expansion and industrial growth is increasingly threatening both public health and the natural environment in developing countries.

Most cities in the developing world are unable to cope with the vast amounts of urban waste produced by their people, cars and factories. In many countries less than half the population is served by sewage and solid waste collection services. Low-income groups living in non-formal settlements on the urban fringe - who make up 30 to 60 percent of the urban population - constitute the majority of the unserved portion. They are burdened with more than their fair share of debilitating and deadly illnesses.

Rising health care expenditures and losses in productivity due to sickness from gastroenteric and respiratory diseases are among the economic costs levied on the urban poor by a poor environment. But these indicators do not adequately measure the costs in terms of human suffering and lowered quality of life. Moreover, evidence suggests they are also highly prone to chronic illnesses previously associated with developed countries, such as cardiovascular diseases and cancer.

Developing countries are already facing situations where more advanced pollution problems appear before control over traditional pollution sources is achieved. They are making the transition from traditional to modern pollution in a fraction of the time it took the industrialized countries.

City governments are severely constrained by a lack of financial and managerial resources to cope with the consequences of rapid urban growth and widespread poverty. Despite the substantial contributions they receive from central governments and the allocation of one-third to one-half of their budget to waste management services, municipalities are falling further behind in adequately controlling both human and domestic wastes and industrial pollution.

In the developing world, more than 95 percent of urban sewage is discharged untreated into the nearest water course or field without heed to environmentally acceptable disposal methods. Municipal refuse and increasingly, toxic wastes, are disposed of in municipal sewers and open dumps. Uncollected wastes, which could be handled by safe landfills, end up in nearby drains or streets, where they cause flooding and provide breeding sites for disease-carrying insects and rodents.

Rapid expansion of water and sanitation services and increased support for pollution control must become urban environmental priorities. National governments must take a strong role in establishing meaningful environmental standards, and provide the technical assistance, training, and financing of their burgeoning cities. Achieving a better urban environment will largely depend on stronger local service institutions, better urban land management and municipal finance, and increased resources for municipal waste treatment and disposal operations.

roads and dirt tracks flooded by wastewater, large wastewater ponds at low points, piles of refuse acting as breeding sites for vermin, open canals filled with black anaerobic water and sludge, and barefooted children playing on the roads amidst the muck, traffic and refuse. In such a scenario, improvements to water and sanitation are a feasible, practical, proven way of improving the living environment of the poor.

Most cities in developing countries suffer far more from overcrowding and water pollution than cities in industrialized countries. Cities have grown so quickly that

cities face unprecedented problems of growth and acute shortage of resources

there has been little time for adequate planning and development to accommodate the vast influx of rural poor drawn to the city. Urban municipalities are unable to cope with the demands for infrastructure improvement in a planned way in the face of an explosive growth in

their populations. They face unprecedented problems in the scale of growth and the acute shortage of resources. Essentially "crisis management" has had to be adopted and sustainability, operation and maintenance, and social and environmental objectives have been largely ignored.

Urban communities in developing countries face many environmental issues but water pollution is particularly crucial. Over 90% of discharges into rivers in and around the cities of the developing world are raw sewage and industrial effluents. Industrial wastes are often more toxic than those from domestic sources as they contain high concentrations of metals, chemicals and complex organic pollutants. Removal of toxic elements of any industrial effluent by the industry concerned is essential to safeguard water supply sources and municipal wastewater treatment plants.

The same communities must also address the issue of the management of solid wastes which are often piled up in the streets. The composition of the solid wastes are different from those of the industrialized countries. Usually there is little salvageable material but they are largely organic and therefore suitable for composting. There is a particular need to control the solid waste from industry because this is the major source of toxic materials. Leakage of hazardous wastes from industry in uncontrolled landfills is of particular concern in Asia where groundwater is the principal water source for many major urban centres.

There is an urgent need to enact legislation and establish enforcement mechanisms for pollution control. Apart from the lack of financial and human resources to effectively carry out this task, agencies in developing countries have an additional disadvantage in that, without central sewerage or a solid waste collection system, sources of pollution are dispersed, often arising from thousands of industrial and domestic effluent discharges and indiscriminately dumped solid waste.

Conventional sewerage is often too expensive for significant parts of many urban centres to afford. Collection from each household and disposal of solid waste by an outside agency is similarly unaffordable for low-income communities within urban areas. For both liquid and solid wastes, there is a need to adopt low-cost technologies such as improved pit latrines. Approaches that are affordable that involve the community have a particular advantage. For example the depositing of garbage by households at a central point for pick-up by the municipality is far cheaper than house-to-house collection.

Experience over the past decade has amply demonstrated the inadequacy of uni-sectoral approaches to water, wastewater and solid waste management planning and development. For example, provision of water supply without commensurate development of drainage and sewerage systems to remove the consequent wastewater has worsened the living environment, particularly of the urban poor.

full health benefits are not achieved by water supply alone

It is now widely recognized that full health benefits are not achieved by water supply alone. Sanitation (a mix of drainage, sewerage and solid wastes management) and hygiene education are needed as complementary elements. Yet sanitation does not often get the same attention as water supply.

Financial constraints often dictate that the majority of the funds are spent on water supply. Yet the community environment must be considered and planned for as an integrated whole. Despite their many and varied interactions and complexities, roads, drainage, sewerage, water supply, land use development patterns, government department mandates, community social organization, political structure, economy, and infrastructure sustainability must be taken into account. Coordinated inter-sectoral development is essential, but the means to accomplish it are lacking.

2.1.3. Water Resources

Water Scarcity

Water is intimately linked to all elements of local and global ecology. In spite of the predicted large increases in demand for water, the total use worldwide by the year 2000 is still likely to be less than half of the stable global renewable supply. The problem is not so much water quantity as much as its unequal distribution across the continents. Some 80 countries, supporting 40% of the world's population, already suffer from serious water shortage. Of particular concern is North Africa and the Middle East, where by the year 2000, meeting the demand for water could consume virtually all the usable fresh water supplies of these regions. Less extreme, but nonetheless of serious concern, are southern and eastern Europe and central and southern Asia where the demand approaches the limits of supplies that can be safely tapped.

Most regions of the world have examples of water scarcity (see Box 4).

Box 4

Water Scarcity in Selected Countries and Regions

East and North Africa - Ten countries are likely to experience severe water stress by the year 2000; in several countries the only feasible way of meeting year 2000 municipal demand will be by the diversion of irrigation water.

China - Fifty cities face acute shortages; water tables beneath Beijing are dropping 1-2 meters per year; farmers in Beijing region could lose 30 to 40% of their supplies to domestic and industrial uses.

India and Pakistan - Tens of thousands of villages now face shortages; many cities and most townships have water only a few hours a day.

Mexico - Groundwater pumping in parts of the valley containing Mexico City exceed recharge by 40%, causing land to subside; the option to import more fresh water is extremely expensive.

water scarcity is accelerating

Water scarcity is accelerating. In 1975 the situation was serious; 19 developing countries were classified as having less than 500 cubic meters of renewable water per person per year. After accounting for losses, this translates into an availability of 200 cubic meters. This level is not sufficient to meet domestic and irrigation water supply demand, even if water is used at a high level of efficiency. By the year 2000 an additional 10 countries will be added to this list, which by 2025 will contain 37 countries. Most are located around the Sahara.

the question is not how much water we need, but how best to benefit from what water is available

The question is not how much water is needed, but rather how much water is there and how best to benefit from it. The challenge is to manage water demand while augmenting and drawing on existing supplies in a way that does not undermine future use of the resource. Requirements can be reduced if agriculture, industry and urban areas use water efficiently. Water balance projections reaching at least ten years into the future, and water allocation and use plans which are based on the principle of bringing demand in line with supply are essential parts of any strategy for the efficient use of water resources.

About 70% of the world's water goes to irrigation for agriculture, 23% to industry and 7% to domestic demands. Much of the 70% for irrigation never benefits a crop, as irrigation's average efficiency is about 30%. Improvements in efficiency by more than 30% are achievable. Setting of norms and marginal cost pricing for irrigation, municipal and industrial water not only encourage water conservation and hence more water to become available but also assist in the rational allocation of water resources between competitive uses. Wherever water scarcity exists, the water demand of cities take precedence over agriculture and in most cases this is justified in economic terms. In China, for example, it is estimated that water use in industry generates an economic value more than 60 times that of agriculture.

Very significant savings are possible by reducing leakage and unaccounted-for water in urban areas which sometimes amounts to 60% of abstracted water. Often just 20% of the leaks account for 80% of leakage. Industrial water use can, and should be, reduced by recycling within industry. A large proportion of water initially drawn for industry can be recycled several times. Some recycling technologies are able to reduce water demand by 90%. Many areas are experiencing water scarcities and competition between cities and farms for water resources. Efficiency in the water used for agriculture, like the drinking water and industrial sectors, is hindered by inappropriate pricing policies. Heavily subsidized irrigation schemes with little or no cost recovery through water tariffs contribute to gross inefficiency of water use and wasteful over-investment in new construction. Realistic pricing policies would help improve this situation.

In much of the irrigated area supplied by tubewells, groundwater withdrawals exceed the rate of replenishment. As water tables decline, over-pumping can make irrigation too costly to continue. Worse, water supplied for towns and communities in the area are also affected by dropping water tables and are faced with the mounting costs of water shortages, well deepening and pumping or development of other distant, new supply sources.

groundwater is the largest, least contaminated water resource

Groundwater is the largest and least contaminated accessible water resource in most countries. A major issue is how governments can protect groundwater against pollution and over-use. The control of groundwater is a

complex issue. It is better to have limited protection measures targeted on high priority issues than over-ambitious un-implementable programmes. Specifically:

- legislation and regulatory instruments, while aimed at the sustainable use of groundwater and the preservation of its quality, need to include the phasing-in of protection measures such as monitoring, development of aquifer vulnerability maps, regulations for industry and waste disposal sites, geological assessment of the impact of industrial developments and agriculture on groundwaters, and zoning of groundwater protection areas. Abstraction and recharging should be licensed and controlled by competent authorities through a permit system flexible enough to adapt to site specific situations.

- monitoring programmes for groundwater protection need to be established. But, with limited budget resources, choices have to be made with respect to the inventories of aquifers and their quantitative and qualitative characteristics.

water is still wrongly considered as a resource that has no value

In most countries water is still considered a resource that has no value. But even in these countries its collection, abstraction, transport, storage treatment and distribution are increasingly costly. For almost all countries, reducing demand, conserving water and improving efficiency of use would ease the financial burden of water resource development by not only delaying the development of new supply sources, but also enabling the scaling down of the capacities of new plant and distribution systems and the cutting of pumping costs.

Global warming promises more uncertainties for the future. It is predicted that temperatures may rise almost everywhere, and that warming of the lower atmosphere may cause the hydrological cycle to speed up. Modelling these changes indicates that historic rainfall patterns will change: rainfall will increase in some areas and decrease in others. Even where the total amount of rainfall is predicted to remain nearly constant, its time distribution pattern would change, implying that substantial alterations in reservoir capacities could be required. For instance additional rainfall is predicted for India, but in the form of intensified monsoons which could be more of a curse than a blessing.

Water Pollution

The danger to the water environment comes not only from over-use in terms of quantity, but also in terms of quality: agriculture is threatening water quality through "non-point source" emissions in the form of excessive use of fertilizers and pesticides. Drainage and runoff from fertilized crops contain heavy organic loads, sediments and high concentrations of the major nutrients required for plant growth, nitrogen and phosphorous. These sources of pollution are less amenable to control through normal regulatory mechanisms. Other major sources of pollution are: industrial effluents that contain organic chemicals and/or heavy metals; and municipal effluents that, even when treated in conventional wastewater treatment plants, contain significant quantities of nitrogen and phosphorous.

Box 5

Industrial Water Pollution

In developing countries, the industries that traditionally have caused widespread water pollution are those that process primary products such as wood pulp, sugar, oil seeds, minerals, coffee, hides and palm oil. However, with the rapid conversion of many countries to "modern" industries, the pollution scenario is becoming more complex, with organic compounds now being a serious water pollution hazard in many countries. The classic example is India, where 70% of the total surface waters are thought to be polluted. In China, 54 of 78 rivers monitored are reported to be seriously polluted by untreated sewage and industrial waste. Numerous Malaysian rivers are becoming ecological disasters; more than 40 of them are so polluted that they are devoid of fish and aquatic animals. Widespread and severe contamination of water resources is not limited to these counties alone but is characteristic of most developing countries in the process of industrialization.

An essential prerequisite to any assessment of water pollution is the management of water resources based on a data bank.

Unfortunately, the level of activity in data gathering and the assessment of water resources in developing countries is on the decline, partly due to shortages of funding and staff.

The challenge is to conserve and protect water resources while matching current and future demand to them. The lesson from the eighties is that this challenge is not being met, as most developing countries are in the process of rapid expansion of urban areas and/or industry, and water pollution is increasing rapidly. Effluent standards,

the challenge is to protect our water resources while matching current and future demand on them

marketable effluent permits, non-compliance charges linked to effluent standards and assignment of legal liability for pollution damages are among the policy instruments that can discourage pollution and support rational river basin management. Providing economic options is more effective in promoting appropriate technological innovation than "command-and-control" regulations and lead to more efficient environmental management.

Most industrial countries are currently elaborating new strategies and policies to cope with the increasingly complex issues emanating from multi-purpose use of resources and pollutant discharge, and are overhauling their basic water legislation and installing regulatory systems. For those developing countries that have to industrialize to meet development objectives, the following experiences of industrialized countries are relevant:

- pollution control is essential to water resource management but such control can no longer rely entirely on effluent regulation but must incorporate far more sophisticated incentives, with "polluter pay" as a possible underlying principle.

- marginal cost pricing, which incorporates full supply and environmental costs, is the strongest instrument available to encourage efficient water use, better allocation and distribution, conservation of water and pollution control. There would be a need for policies and implement regulatory programmes incorporating such economic incentives.

a combination of regulations and pricing mechanisms is needed to both conserve the environment and allow development

- experience has amply demonstrated that cleaning up water pollution is extremely expensive. Governments cannot afford to subsidize it. The onus should be on the polluter. There appear to be conflicting goals: the recovery of full costs for water but the desire to ensure that low-income groups can afford an adequate supply; and the rush to go ahead with industrial development to provide employment as compared to the need to conserve the environment. The challenge is to find a reasonable combination of regulations and pricing mechanisms that is conducive to the achievement of all these goals.

For example, regulatory policies should not ignore the political reality of pollution control shutting down industry and putting people out of jobs. Realistic pollution prevention policies must create incentives for flexible, efficient and effective responses and innovative approaches to pollution prevention while taking costs and political realities into account.

At present, accounting systems and economic analyses still place little or no value on environmental resources. Activities that degrade or deplete natural resources are represented as generating income rather than reducing wealth. A country could pollute its aquifers and the actual economic loss would not be represented in the national accounts. Failing to allow for depreciation of water resources when depleted or polluted overstates capital formation and income, and it thereby justifies policies that waste water resources in the name of economic growth. One major need is to revise economic accounting systems to treat water resources as a tangible asset, and to treat their depletion and pollution as capital consumption; also pollution control expenditures should be treated not as final expenditures but as "intermediate costs".

Many governments are trying to grapple with these inter-related and complex problems through the creation of environmental protection agencies. But even if appropriate regulatory instruments exist, integrated water management also makes heavy demands on multi-disciplinary data collection and investigation, requiring facilities and human resources which, in most countries, are simply not available.

2.2. Outlook and Issues

The previous section draws attention to the growing deterioration of the environment during the past Decade and signals warnings in the form of issues for the next. The environment in its broadest context will be a central concern in the 1990s, especially in developing countries on the road to industrialization. Rapid urbanization and environmental degradation in low income areas of urban centres will tax municipal authorities. Peri-urban settlements will continue to be the home of hundreds of millions of the poverty stricken. The enormity and complexity of the task of providing water and sanitation services call for new and innovative low-cost solutions. These are at hand in some countries but are not readily available for immediate transfer and use in others.

While much is being said about the global and even community environment, surprisingly little attention is

given to the micro-environment of the household family. It is here that water and sanitation have their impact, it is here that women have the greatest say in how water and sanitation are used to improve health and productivity, yet little is known about the household environment. Hygiene, sanitation and even water supply components of projects suffer as a consequence.

Water resources management is another key issue for the coming Decade. Efforts at planning, inter-agency coordination, optimal use of resources and enforcement of regulations have been few, weak and largely ineffective. Developing countries abound with examples of falling groundwater tables, deforestation, blatant pollution and wastage of water. Water resource protection, conservation and management in the face of the demands of urban population explosion and industrial growth is complicated with far reaching implications for the future of countries and touching all facets of society from socio-economic to technical, and legal to political.

The inter-related and complex nature of environmental concerns at the household, community and broader water resource levels gave rise to a series of issues and questions during the past Decade which must be faced in the next.

1. Statistics on overall coverage hide the disparities in services between the wealthier and poorer urban areas. Typically, wealthier residential areas are 100% serviced with piped water into the home, while those in the squatter settlements are forced to buy water from vendors, draw from contaminated open wells or wait in long queues at communal standpipes. There residents, particularly children, are in daily contact with human waste and garbage. How can this imbalance be addressed in the 1990s? Financial mechanisms such as cross-subsidies and revolving funds have been suggested, but the problem goes well beyond financial to political and social concerns. In fact, there is a tendency not to acknowledge the problem; the effect of which will likely be felt in the 1990s.

2. Based to a large extent on NGO-driven projects, the major parameters that need to be in place to enable low-income communities to improve their own environment are now becoming known and are leading to a higher percentage of successful community based projects. However methodologies tend to be site specific. How are experiences and methodologies best adapted and transferred to other situations in a way that they can be scaled up in rapidly expanded programmes?

3. At the heart of improving the micro-environment of the home are improvements in health knowledge and hygiene behaviour and practices. These relate to such personal and intra-family concerns as defecation practices, handwashing, latrine maintenance, breast feeding, hygienic food preparation and refuse management in the home. What are appropriate roles for agencies outside the household in making such improvements? What mechanisms, messages and media have proven most effective in improving the micro-environment? How are these best replicated in other programmes?

4. The peri-urban problems of the 1990s have strong financial, social, political and organizational ramifications. Municipal governments have thus far tended to deal with them by "crisis management". How are solutions to be found? How can agencies achieve better medium and long term planning, organization and management in the future?

5. To conserve and protect water resources for future generations, long term planning, rational policies, broad based multi disciplinary institutional capacity and regulatory mechanisms will have to be put into place. But how, with what support and through which institutions? These questions face nearly all water scarce regions today and will become dramatically more urgent in the decade to come.

6. An essential prerequisite to the management of water resources is a data bank. Unfortunately, the level of activity in the assessment of water resources in developing countries is actually on the decline due to shortages of funding and staff. The situation varies from region to region, but in many countries disastrous long- term effects are likely. There is an urgent need to review the situation globally and establish functional long-term water resource monitoring networks. This pertains particularly to North Africa and other water-scarce areas. How can such networks be put into place and effectively sustained in the long term?

7. The industrialized states have pollution control methodology through trial and error, at great cost. Most are currently elaborating new strategies and policies to cope with the increasingly complex issues emanating from multi-purpose use of resources and pollutant discharges. Their governments are overhauling their basic water legislation and installing regulatory systems. How can their experiences be transferred to the developing countries?

8. Emission standards, marketable emission permits, non-compliance charges linked to emissions standards and assignment of legal liability for pollution damages are among the policy instruments that can discourage pollution and support rational river basin management. They have the desirable effect of allowing the polluter, who knows his own options best, to make choices about environmental protection, rather than leaving these decisions in the

hands of central government. Which are the most appropriate mechanisms for developing country situations? How can they be put into effect during the 1990s?

9. Water supply, sanitation and drainage projects have suffered from a lack of understanding of interactions between these, the environment and hygiene within the household. They will continue to do so unless much greater knowledge on the following is acquired:

    - the disease transmission routes in and around the home and the effect of water, drainage, sanitation and hygiene on local social, ethnic and health-related conditions and practices;
    - the water route: how water is transported, protected and used from the tap to mouth or disposal, and how changes in the practices along the water route can break disease transmission;
    - how women manage the household environment and how they can best be assisted in improving it; and
    - perceived and real environmental needs at the household level and ways of identifying and prioritizing them.

These are programme specific requirements. How can they best be met using local resources but perhaps supported externally? How can information networks be established so that such knowledge is shared between countries and programmes and projects?

3. BUILDING NATIONAL CAPACITIES: People and Institutions

Building capacity for the sustained delivery of water supply and sanitation services requires building strong institutions; to do that, favourable policy environments and incentive structures, sound management systems, and educated and motivated human resources are fundamental requirements. The term "institution" covers the full range of organizations, agencies and firms involved in the sector: municipal departments or public utilities responsible for urban water and sewerage; water, health or public works departments; local government; non-governmental organizations (NGOs); the formal and the informal private sector; community associations; and even the household itself. The need for capacity building and the shape that initiatives may take will depend greatly on the prevailing political and economic climate of a country, and will vary from region to region and from country to country.

3.1. Present Status, Needs and Lessons

3.1.1. The Institutional Framework

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community management of services -- a viable solution for the problem of serving the poor

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Perhaps the major issue of the Decade has been an institutional one -- determining the roles of the public sector, the private sector and the community itself in the provision of water supply and sanitation services, under the different circumstances of urban and rural, poorer- and higher-income settlement. Much has been learned about the range of institutional options for service delivery. At one end of the spectrum, there is self-provision or household provision, a common traditional arrangement as well as a valid option for higher levels of service for very dispersed rural settlements. The next step in the range is community management of services, an important option that has emerged during the Decade as the most viable solution for the problem of serving poor rural settlements and even poor peri-urban settlements, where the incentives do not exist for public or formal private enterprise to provide affordable and sustained services. In urban settlements, where economies of scale and thus incentive exist, the formal water supply or sewerage agency is the long-established solution. However, even for this agency, there are alternatives. They range from public sector to private sector or even cooperative society; from single-purpose utility to a department in a municipal authority; from a decentralized municipal agency to a regional or national authority.

The potential of the private sector in the delivery of goods and services has been another important issue of the Decade. Privatization of water supply and sewerage services through lease contract is an option that has been adopted in Guinea. Even wholesale privatization of assets is an option. In countries where the private sector is competing in a relatively undistorted market, there are many impacts on the sector; in particular, costs are kept down. A good example of this is that of the well-drilling industry. At the other end of the scale, a real but unrecognized strength of the private sector is located in its artisans: plumbers, mechanics, well-diggers, masons and electricians who permeate both the rural and urban areas, rich and poor. They are characterized by their relative efficiency and low-cost service.

NGOs have, in many parts of the world, demonstrated their importance within the institutional framework, particularly in pioneering service provision for the rural and peri-urban poor and in social mobilization and training, thus building capacity at the local level for community management. Although NGO programmes are only rarely on a very large scale, they can demonstrate the way forward for widespread service coverage to be achieved.

3.1.2. Rural Institutions

the poor cannot afford to pay for centrally planned and managed services; nor can governments

Water supplies in rural areas are traditionally either household-owned or community-managed. This reflects the availability of water, with difficult access often necessitating group action and easy access often left to individual household responsibility, as in the case of the family handpump. Perceptions that water supply and sanitation services are public services (as they generally are in a city), coupled with the recognition of the basic needs of the poor in rural areas, have led to the widespread provision of centrally planned and managed services. However, such services have proved to be extremely expensive to provide to dispersed and remote communities; neither poor people nor governments can afford to pay for them, so the service is unreliable or non-existent.

A general lesson of the Decade is that centrally managed water supply services for low-income rural settlements are not sustainable. Nevertheless, there have been some successes with the expansion of the mandate of urban-based utilities to cover the medium and larger rural communities (e.g. in Morocco and Tunisia). Difficulties are, however, encountered with the smaller and dispersed populations. In many countries the smaller villages constitute over 50% of the rural population. Much attention has been drawn to successes in the larger rural communities, but the needs of dispersed groups are yet to be adequately addressed.

the Decade has seen a shift in the role of government from directly providing services to promoting service provision by others

A perceptible shift in sector thinking occurred early in the Decade with the widespread acceptance of the need for community participation in scheme planning, construction and operation and maintenance (O & M). Many of the lessons from the Decade parallel a more generalized trend in rural development, with an increased focus on decentralization to local bodies, and the resulting need to strengthen community organizations, the private sector and the outreach role of NGOs. This general development trend is characterized by a shift in the role of the central government, from that of directly providing services to one of creating a supportive environment that will promote service provision by others. With this shift, it is expected that markets will become more competitive and responsive to demand, the "enabling environment" will be strengthened and sustainability of development will be enhanced. In the rural water supply and sanitation sector, this transition from provision to promotion could be categorized by three typical approaches:

- In the **provision approach**, government provides schemes and their continued operation and maintenance free of cost to the beneficiary. The community is the passive recipient and remains on the periphery, uninvolved in the process of planning, technology choice, construction or operations and maintenance.

- In the **transition or community participation approach**, there is a range from the community making such contributions as labour during construction and cash payments to the agency to cover the costs of O & M, to the community having some control of implementation, O & M, repairs and management of funds -- a much more significant role.

- Finally, government plays a strong supportive role in the **promotion or community management approach**, while disengaging itself from the provision of services. It continues to plan the overall programme, mobilize resources and arrange financing and credit facilities, and offers technical advice, regulatory assistance and education. The community takes on the management role and has the option of going to the private sector for engineering design, construction and O & M. It is also responsible for raising and managing funds for O & M, as well as expanding the scheme later.

Community participation and management of rural water supply and sanitation services have emerged as key lessons of the Decade; they are discussed in detail in Chapter 4.

The household is an institution in its own right, and is the focus of efforts to promote improved sanitation. Where affordability and water resources allow, individual household solutions to improved water supplies, such as the rainwater tank or the family handpump become valid options. Only recently has there been widespread recognition of the informal private sector's valuable contribution to the sector through the provision of many millions of family handpumps in Asia (see Box 6).

NGOs have actively developed methodology for community-managed projects and there is much to learn from their experience. Their inherent decentralization

Box 6

The Private Sector Serves Millions

In the transition to higher service level, the family handpump is a viable alternative to conventional community water supply. It has the potential to satisfy a significant portion of the total demand for improved rural water supplies without a heavy drain on government resources. Family handpumps are nothing new. There are several million in use in China, millions in Bangladesh and Pakistan and hundreds of thousands in other Asian countries. They are cheaply produced by local manufacturers and available in the village market, durable enough for family use and easily maintained by their users (especially the women of the household). When compared with the community handpump, the family handpump offers several advantages: proximity, privacy, convenience, savings in time and energy, more health benefits, prestige and reliability. It is seen as a distinct benefit to women -- the main procurers and users of water. The disadvantages are minimal and relate mostly to a potential for becoming contaminated and creating drainage problems if not properly installed.

allows them to work in close proximity with rural people, which is essential to build the trust between agency and community that is an important feature of successful programmes. They also exhibit flexibility and responsiveness in operations. For example, large-scale NGO programmes are underway in Honduras (CARE), Indonesia (Dian Desa), Kenya (KWAHO), Pakistan (AKRSP) and Thailand (PDA) -- to name only a few.

NGOs have actively developed several large-scale community-managed projects

3.1.3. Urban Institutions

The most dominant feature of the urban centres of developing countries over the past decade has been the rapid growth of urban population and the equally rapid deterioration of the environment in towns and cities, especially in lower-income areas. Between 1950 and 1986, this urban population quadrupled from about 300 to 1,200 million. Over the coming 25 years, 90% of urban population growth will take place in the Third World; the average annual urban growth rate is 3.5%.

There have been some improvements in the overall situation with respect to water and sanitation coverage in

invariably, low-income high-density areas are the last to receive water and sanitation

urban areas during the Decade. But, invariably, low-income, high-density areas, where the use of "conventional" water and sanitation systems is often perceived as financially unviable, are the last to receive water and sanitation services. Hence, most peri-urban areas are very poorly served. Also, coverage figures hide the fact that water and sanitation services are unreliable in most urban areas in developing countries. Affluent people can look after themselves through installation of storage tanks and the purchase of water delivered by tankers, and through the construction of septic tanks, but these are expensive and not affordable by the poor. Hence, it is the poor, usually living in overcrowded conditions, who are mainly affected by the poor service.

Many urban water and sewerage utilities in developing countries are financially unviable. Often, internally generated funds are unable to meet even O & M costs, and most utilities have had to rely on government funds for any expansion. Unable to afford proper maintenance, and therefore providing a poor and erratic service, the utilities are invariably trapped in a vicious cycle of falling revenues caused by dissatisfied consumers, leading to a further deterioration in service. Although it is often impossible to improve service significantly without an injection of funds, the inadequate service is commonly used as a justification for not providing the additional funds required nor increasing tariffs. Dependent upon government handouts, the utilities are a drain on the government budget. Paradoxically, this dependence on government leads to further inefficiencies, as the utilities are subject to political interference in potential cost-saving areas, such as reduction in overstaffing and disconnection of delinquent consumers.

It is now clear that "small is not beautiful" with respect to urban water supply and sanitation. All things being equal, the urban utilities that have performed the best during the Decade have been the larger ones. They have shown themselves more resistant to political pressure than smaller utilities and, better able to attract qualified staff, they run more efficient operations. For the smaller municipalities and townships there are several institutional arrangements that have been shown to work efficiently, such as joint water and sanitation authorities for a river basin, or regional authorities. But, whatever institutional arrangements are chosen, experience has shown that the utilities formed should have a certain critical mass.

To date, the record on asset management in most urban water and sanitation utilities in developing countries has been poor; wastage and leakage often exceeds 50%, no

provision is made for depreciation of assets, and tariff structures often mean that the poor pay the highest rates. A major lesson learned is that, if urban utilities are to become efficient (and so be in a position to benefit the poor), assets must be managed efficiently to optimize the return on investment. With qualified staff it is possible to implement asset management programmes so that the result is realistic depreciation of assets, reduction of wastage and leakage, and tariffs that are equitable and at the same time efficient in economic terms.

utilities can be efficient and profitable if government is willing to give a large degree of autonomy

There are a few utilities that have become fully or semi-autonomous and are successfully attracting financing (Côte d'Ivoire, Morocco, and Tunisia). Provided these utilities meet performance targets set by government, there is little or no interference by government in their day-to-day operations. These utilities are demonstrating that, provided a government is prepared to give a large degree of autonomy to a water or sewerage utility, it is possible to have utilities that are efficient and profitable. Particularly with respect to human resource development, it is clear that the more autonomy a utility has, the better are the chances of recruiting, retaining and motivating its staff. Those utilities that are not bound by government rules are able to pay realistic salaries, to offer incentives benefits and attractive careers, and to have comprehensive training programmes for all levels of staff.

Privatization of urban water supply and sanitation utilities can take many forms, from maximum privatization where the utility is "almost" a private company in which individuals can buy shares (because the utility is in a monopoly position, government has to retain certain controls) to minimum privatization where one operation or maintenance activity, such as meter reading, billing and collection, is contracted out to a private contractor. There are now several initiatives underway with respect to privatization of water and sanitation utilities and the next few years should see a rapid expansion in this area as urban utilities are forced to become more efficient to meet increasing demand.

3.1.4. The Peri-Urban Problem

A problem that has come to the forefront towards the end of the Decade and will likely dominate the 1990s is that of the exponential growth of often informal settlements at the ever-expanding margins of the cities of the developing world. The efficient urban water supply and sewerage enterprise cannot profitably -- or will not -- serve these settlements. Settlement is often illegal; people may be transient; access is difficult; revenues are hard to collect.

environmental, health and political problems will be unprecedented

The peri-urban problem is already recognized in Latin America and in parts of Asia. In Africa, where urban populations are expected to grow by a factor of five by the year 2020, dramatically altering the settlement patterns of the continent, many governments do not yet recognize the seriousness of the problem. At the same time, many of the major donors do not provide funds for urban projects, in the belief that the poorest people and the greatest problems are in rural areas. For many governments and external agencies, the legal and political implications of squatter settlements inhibit the adoption of affirmative action that may resolve the problems of service provision. However, hundreds of millions of people will find themselves in the margins of cities, and the environmental and health impacts of uncontrolled solid and liquid waste disposal, coupled with the political and social problems arising from large underserved settlements, may be unprecedented.

Limited experience during the Decade indicates that peri-urban areas can be regarded as the interface of urban and rural solutions. Bulk purchasing of water from an urban enterprise by community associations, and their subsequent management of distribution within the settlement, is a solution. Community-based primary collection of solid waste and transport to a transfer station where the municipal collection system can take over is also a demonstrated solution; the use of on-site sanitation utilizing dry latrines or pour flush toilets is a widely accepted strategy for excreta disposal; condominial and simplified sewerage, where community organizations manage their own branch sewers, is also a proven option. All of these solutions are interim steps in the evolution of urban services, until the point is reached where formal sector institutions will have the incentives to extend services to better-established and integrated settlements. This point will be reached early if the utility is efficient and financially sound.

Generally, NGOs have not been involved in conventional urban water supply and sanitation provision, but in many countries there are active programmes in peri-urban areas. In India, hundreds of thousands of on-site pour flush toilets have been installed by an NGO. In Pakistan, several urban settlements are now served by low-cost sewers and pour flush toilets installed through community-based NGOs.

Box 7

Orangi Pilot Project

Orangi is one of Pakistan's largest squatter settlements, with a population of about 800,000. The project sought to build a sewerage system for the settlement, to raise health awareness, to support community-based institutions, and to strengthen technical, managerial and organizational skills among the residents.

The first step was to create community organizations, which were associated with lanes in the town. Each lane had 20 to 30 houses whose inhabitants knew and trusted each other. The Orangi Pilot Project arranged for one of its social organizers to meet with the residents of lane, discuss the sewerage plans and encourage them to form a lane committee and elect a manager. Once the committee had been established, a member of the Orangi Pilot Project technical staff surveyed the lane, set up benchmarks and prepared plans and cost estimates for sewerage work. Lane managers then had the task of collecting money for the scheme from the residents.

Since July 1981, 2,230 primary drains and 147 secondary drains have been installed by the residents. The completed sewerage systems were often of to a higher standard than those built by the municipality.

3.1.5. Human Resource Development

the calibre of an institution is determined by the motivation and competence of its staff

Human resource development is at the heart of institutional strengthening. The calibre of an institution is determined by the motivation and competence of its staff. Shortages in qualified and committed professional staff are common to most sector agencies. On the other hand, most also suffer from an excess of semi- and unskilled labour. With real commitment, excess staff can be reduced, whereas the recruitment, training and retention of skilled staff of adequate number and calibre is a serious problem for many agencies.

Human resource development goes well beyond training. A central concern is staff motivation. Salaries, for example, are important in staff motivation. The ability to offer competitive salaries is closely linked to the financial autonomy of the institution. Many agencies in this sector are constrained by very low public sector salary scales and cannot compete with private enterprise for qualified staff. There can be non-monetary incentives, however, which go a long way towards retaining committed staff. These include well-designed career structures, in-service training, active advancement policies and consistent personnel management. All are part of a progressive management strategy.

The most successful agencies in this respect are those that have developed sizable in-house training programmes which are integrated into their operations. Such programmes need not require excessive resources, but they do require the active participation of staff -- both as trainers and trainees -- and the full commitment of the organization.

gender-related constraints limit access for women to training and careers

In most countries, women represent only a small fraction of the formal labour force, and this is particularly true at the technical and professional levels. Gender-related constraints severely limit access for women to appropriate training programmes and career paths. Yet increased participation by women at all levels can be accomplished only through conscious efforts and policies specifically aimed at increasing the numbers of women recruited and trained. Such efforts will significantly increase the pool of skilled people.

university curricula require upgrading; refresher courses are needed for practising engineers and other disciplines

Typically, higher-education programmes in engineering, health sciences and public administration are based on Western university curricula and are almost exclusively oriented towards conventional urban technologies and concepts. Courses on tropical diseases, community development, community management, communications, hygiene education and low-cost technologies are often excluded. Without the necessary background and experience, engineers are hesitant to incorporate these elements into their projects. To change this situation, university curricula require upgrading, and refresher courses are needed for practising engineers and other disciplines. The International Training Network for Water and Waste Management initiated by UNDP and the World Bank is an example of a Decade effort of

capacity-building. It is comprised of three sub-regional and seven national training centres for sector engineers.

Human resource development is not only needed in the formal sector agencies, but is equally important in the private sector and within user communities themselves, particularly where community management is the institutional option of choice for service delivery. Trained and certified artisans have proved to be a most effective mechanism for delivering simple water supply and sanitation services, and have played a major promotional role in encouraging the adoption of improved services, such as on-site sanitation and handpumps. The Decade has seen major strides made in community-level training, initially to encourage participation and more recently to strengthen the capacity for management. Participatory training techniques have been adapted to sector needs and promoted during the Decade, paying particular attention to facilitating the training of women by taking their specific requirements into account. This subject is dealt with in more detail in Chapter 4.

3.1.6. Information Exchange

Ready access to relevant information is central to capacity building. The lack of published information on successful approaches, difficulties in obtaining relevant information, poor accessibility to information by middle- and lower-level workers due to language problems and poor functioning and absence of sector libraries and documentation centres have all contributed to the slow process of information transfer. At times this has led to a serious waste of resources due to the selection of inappropriate solutions.

The Decade has seen major efforts to establish and strengthen information centres in an attempt to encourage networking between sector institutions. Several international agencies also provide active reference services at global and regional levels and these are playing an increasingly crucial role in ensuring access to current information. While efforts have been relatively successful at the international or regional level, few countries have functioning documentation centres capable of adequately serving the information needs of the sector. Regional centres in Thailand, Burkina Faso, Kenya and Peru foster information exchange. NGOs have contributed increasingly to the exchange of information on Decade issues. International and national NGOs orientated to the promotion of appropriate technology, primary health care and rural development have published manuals and communication materials in support of community-based, sustainable development.

3.2. Outlook and Issues

3.2.1. Institutional Reforms

In light of projections for service coverage for the 1990s and the early years of the next century, a key instrument for turning the tide would seem to be that of institutional strengthening and substantial reform within the sector. Reform will not be easy and will require bold and enlightened actions by governments.

Urban Areas

On the urban front, water supply and sewerage enterprises need to be encouraged to achieve financial independence and viability, thus breaking the downward spiral of inadequate revenues, deteriorating assets, greater inefficiencies, increasing costs and the consequent need to raise tariffs. This independence can be achieved either by giving a lighter degree of financial authority to public utilities or by privatization, with the necessary controls in place to protect the consumer. Incentives for agency staff need to reflect the performance and efficiency essential for a profitable enterprise.

The rapidly growing, densely populated, low-income areas of cities will pose the most intractable problems in the 1990s. NGOs and some municipalities have developed community-based approaches which offer potential solutions. However, they require substantial adaptation and refinement before being readily transferable between municipalities.

Rural Areas

On paper, the prognosis for rural water supplies is favourable, with coverage towards the end of the century projected to continue climbing fairly rapidly. There are two caveats: first, that coverage often means very low service levels, such as 300 to 500 people served by a single standpipe or handpump; and second, that numbers of installations do not necessarily mean that they are functioning or that they are being used. Improving service levels and increasing sustainability and effective utilization are problems that must not be underestimated. Lessons have been learned again and again in the Decade of the problems of governments in providing and sustaining services to poor rural settlements. In many parts of the world a significant shift in the role of central government is indicated, from provider of services to promoter or facilitator of service provision, creating the "enabling environment" within which local bodies can get on with the business of marketing, delivery and management of services. It is important to emphasize that this process can rarely be left to market forces alone, and that government has a critical role to play in developing special programmes that target the poor,

involving extension, training, technical assistance and limited subsidies.

3.2.2. Building Capacities: Questions for the 1990s

Capacity building for sector development became a central issue during the past Decade. Many programmes received external support for institutional development and momentum was established. There are, however, several questions remaining as we move into the 1990s:

1. The remaining unserved populations are principally the lower-income groups in the urban settlements and rural areas. They are less accessible and more difficult to service. What methods are appropriate in such areas? How can technologies, service levels and management be chosen to ensure affordability in these areas? How can existing institutions adapt, enabling them to tackle the problems of the 1990s?

2. The shift from directly providing services to supporting the provision of services by others implies major changes in orientation, ways of doing business, organization and even staffing. What mechanisms can be put in place to assist institutions in the process of change? How can policies and implementation methods be adapted? Are exchange programmes feasible in which experiences and approaches can be transferred between municipalities, countries or regions?

3. Institutional strengthening requires appropriate policy and legislative mechanisms that provide for clearly defined mandates, responsibilities, incentives, pricing mechanisms and enforcement. What actions, including sector analysis and planning, are required to define and establish such mechanisms and policies?

4. The private sector offers substantial resources to the sector which were not well used during the Decade. How can an environment be created and supported so that this sector can effectively tap into the private sector's enormous resources?

5. Capacity building requires efficient information exchange. Much effort has gone into information systems at the international and regional levels. Much remains to be done at the country level. New and innovative approaches are needed to ensure that relevant information is reaching, and being shared by, planners, project managers and field staff. This implies a better understanding of existing communications and means of information exchange. How can these be adapted and upgraded? How can the information user's demand be heightened? How can projects and the private sector assist the process?

6. NGOs have proven abilities in community-based programming and have developed methodology for community participation and management in this sector. How can the NGOs' efforts be expanded and their considerable experience and resources be drawn upon in a more effective and coordinated fashion?

7. Human resources are the heart of the institution and its development. What initiatives can be taken, what resources are needed and what procedures can be followed to ensure that, during the 1990s, institutions are appropriately and properly staffed, that they are adequately motivated through well-designed incentive schemes and trained in up-to-date methods, that women are well represented in professional and management capacities and that the staff is deployed in a way that guarantees operational efficiencies?

4. COMMUNITY MANAGEMENT, EXTENSION AND COMMUNICATIONS

The Decade has seen a shift from community participation to community management, with a growing number of countries concluding that community management is an effective option for sustainable sector projects in poor rural and urban communities.

Community management goes beyond participation to encompass ownership of and responsibility for water supply and sanitation services; it entails decision-making, not necessarily just the provision of labour. Experience is demonstrating that community management is a viable solution in situations where there are inadequate incentives for public or private enterprise to provide reliable services; in these circumstances community management works where nothing else will. Community management of sector services may be an interim step in the development of local institutions. At one end of the institutional spectrum, community management could mean an extended family caring for a spring or a village water committee managing the maintenance of a handpump; further along the spectrum it could mean a voluntary board of directors employing staff to manage a large piped water supply scheme providing only house connections. However, these differences are only ones of scale, cost and complexity; the basic model remains the same. At the other end of the spectrum, community management merges into formal public sector management, as local institutions shoulder the responsibility through a public works agency, a parastatal, or even a private sector management or lease contract.

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community-managed schemes can succeed where top-down methods have failed

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Field experience, however, suggests that community management of water supply and sanitation services entails far more than a mere redefinition of responsibilities: it is anchored in local socioeconomic, administrative, and political realities. Furthermore, community management requires an "enabling environment", with appropriate policies, with support mechanisms such as extension, and with goods, services and finance available at the community level.

4.1. Present Status, Needs and Lessons

4.1.1. Sustainability: The Need for Participation

A great deal of attention has recently been given to the question of how to sustain services (*i.e.*, how to ensure that systems will continue to function and produce intended benefits after project completion) and how to improve delivery. The limited success in achieving system sustainability may be attributed to a lack of clarity about the appropriate roles of public, private and community institutions in the management of water and sanitation systems. Often, service delivery is organized around the assumption that people have basic needs for water that need to be met, rather than around the actual demand and willingness to pay for these services. This may result in externally determined and prescribed levels of service that do not reflect local desires.

Community participation is a strategy that has been widely adopted to improve sustainability, as it involves people in decisions and actions affecting their welfare. The objectives of community participation in the context of development programmes usually include: (a) sharing project costs (beneficiaries contribute money or labor), (b) increasing project efficiency (beneficiaries assist in project planning and implementation), (c) increasing project effectiveness (beneficiaries have a say in project design and implementation), (d) building beneficiary capacity (beneficiaries share in management tasks or operational responsibilities), and (e) increasing community empowerment (beneficiaries share power and increase their political awareness and influence over developmental outcomes).

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participatory water and sanitation programmes emphasize capacity building and organization

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Participatory water and sanitation programmes emphasize capacity building and organization. They are designed to improve the problem-solving capacity of the community as measured by behavioral change. With this approach, project preparation takes considerably longer, as it involves community orientation and the training of key persons. High priority is given to developing human resources, with the result that the beneficiaries are given a sense of responsibility and commitment toward the project.

4.1.2. From Participation to Management

During the Decade, even when community-based participation was encouraged, system sustainability often did not improve markedly, largely because community participation has been narrowly defined as the mobilization of self-help labour or the organization of local groups to ratify decisions made by outside project planners. Externally imposed solutions do little to build capacity, increase empowerment or create support structures that represent the interests of users willing to maintain these water and sanitation systems on a long-term basis. Often the call for community involvement has been answered by imposing management methods designed outside the community, which do little to build local capacity.

Before any significant advances can be made in the direction of community management, planners need to reach some agreement on what community management means and how community capacity for development can be enhanced through extension services. They also need to keep in mind the distinction between community management and participation because there are significant differences in their underlying purposes.

a collaborative partnership between the community and the government

Community *management*, as distinguished from community *participation*, is taken to mean that the beneficiaries of water supply and sanitation services have responsibility, authority and control over the development of such services. At the same time, community management should not be thought of as a simple choice between a top-down or bottom-up approach. Rather, it is the outcome of a collaborative partnership between the community and the government in which neither is dominant and each understands and accepts its role. This type of relationship places new demands on both parties: communities become the focal point of decision-making, and external support agencies (ESAs) can also play a large role in bringing about such partnerships.

communities become the focal point of decision-making

Until recently, community participation as applied to the water supply and sanitation sector has generally been concerned with questions of maintenance, the participation of women and in-kind contributions, all of which were said to promote sustainability. Yet field experience has shown that sustainability depends on more than community participation alone. Because community *managed* systems place the authority and responsibility for O & M in the hands of the users, maintenance is usually more efficient and effective, and overall system performance is better. As consumers and owners of improved supplies, the community users will be motivated to keep the system performing efficiently. They will want therefore to establish and enforce timely revenue collection systems and schedules for preventive maintenance and routine repairs.

The preconditions for community management at the community level are the following:

- there is community demand for an improved system.
- the community understands its options and choices of service level and is willing to take responsibility for the system.
- the community is willing to invest in capital and recurrent costs.
- the community is empowered to make decisions to control the system.
- the community has the institutional capacity to manage the development and operation of the system.
- the community has the human resources to run these institutions.

At the same time, the following elements are necessary to create the "enabling environment" in which community management can occur:

- the information required to make informed decisions is available to the community.
- technologies and levels of service are commensurate with the community's needs and capacity to finance, manage and maintain them.

- there is a policy framework in place which permits and supports community management. This implies flexibility in programme design and implementation.

- effective external support services are available from governments, donors and the private sector (training, technical advice, credit, construction, contractors, etc.).

4.1.3. Women and Water

In many rural areas, it is not uncommon for women to spend 15%, or even as much as 25%, of their waking hours carrying water. In estimating the benefits of improved water supplies, assessing the value of women's time saved is difficult but important. A recent cost-benefit analysis, carried out for appraisal of a rural water project in South Asia, revealed an internal rate of return of 14% based solely on the assessment of women's time saved that could be spent in commercially productive pursuits. As a result, the project competed in the "productive" economy for development funds. By undervaluing women's time, the sector's ability to compete for funding against other sectors such as transportation and industry is limited.

the centre of demand is the woman of the household

If more of a marketing approach to the sector were adopted, the focus would be concentrated on the reasons why the service is in demand -- who is asking for it and how it can be produced and delivered to the consumer at a lower cost than any alternative. In the past, this approach has not been followed. The centre of demand is the key, and in the water sector that key is the woman of the household. She is responsible for water supply in the household and for hygiene and health in the family. She has clear ideas about what improvements are necessary and is the first to ask for them.

only a minority of programmes appear to have included women in meaningful roles

The fact that water and sanitation is in large part a women's sector is finally being accepted. However, despite the recognition that women are of paramount importance to programme success, only a minority of programmes appear to have included women in meaningful roles. In many traditional societies, women are restricted from participating in public meetings. Often they are best approached in their own homes or where they normally meet other women. The participatory approach, focuses on building self-esteem and confidence, encouraging group creativity, planning, and assuming responsibility for action.

4.1.4. Implementing Community Management

The public sector has a critical function in the design and implementation of a legislative and regulatory framework that can enhance community management and ensure that goods and services are available to communities at affordable cost. The public sector can also support the private sector through training, quality inspection and certification.

Planners need to understand and respect community problems and needs, and recognize how both the agency and community can address them. Decisions on level of service and location of infrastructure within the community are best made by the community, taking into account costs and technical viability and efficiency. Communities do have the capability for making rational choices in their own interest if given adequate information. Token participation in which no real options are provided normally results in the community's eventual perception of the project as being external and not its own, which in turn results in lack of support.

it is essential that the community committees represent all users

It is essential that the community committees or associations represent all users: wealthy and disadvantaged, male and female, and all ethnic groups within the community. In particular, women should be represented in such a way that they can influence project design and implementation and have the opportunity to gain management and leadership experience. In some societies this will require innovative approaches to ensure women's meaningful involvement, but examples from Pakistan and the Middle East have demonstrated that this is possible. Existing organizations, projects and experiences point the way to the most efficient and appropriate organizational models that can accommodate social and political constraints. The community-based organization should have legal authority to own land, employ people, maintain a bank account or its equivalent and collect user fees.

Communication

The implementation of community management will require changes in the behaviour of everyone from the most senior policy-maker to the community members. A critical element in shifting the role of communities from recipients of services to managers of their services, and the role of government from provider to promoter, is that of communication. Communication should not be viewed only as a media product, but rather as a process of changing human behaviour through a two-way exchange of information and ideas.

interaction must be based on mutual respect

Interaction between agency and community should be based on sharing and learning in an atmosphere of mutual respect. The agency invariably benefits not only from the information it gains but also from the support it obtains from the community and from the ultimate success of the project. Good communication is the key to success. This involves simple methods, such as asking a community to prepare a village map, which help to develop skills in planning and problem-solving. Participatory methods such as this can be helpful to encourage input by all users into final decisions. Projects cannot succeed where the agency plays the role of benefactor and the community that of recipient. A partnership can develop with common aims. For example surveys can involve community members and go well beyond the usual technical considerations of population numbers and settlement patterns to include the following: an understanding of the community organization structure; decision-making processes; water rights and ownership; current water fetching and use practices; community perceptions of needs, priorities and expectations; defecation and hygiene habits; health beliefs and practices; means of subsistence; willingness to pay; spending patterns; cooperative and credit systems; formal and informal communications channels; and the effectiveness of various methods and media in communication.

Extension

Outreach support is a prerequisite for sustaining community-managed water and sanitation services. This support assists both in problem solving on demand and in the progressive building of technical, financial and managerial skills, not only at the community level but also within supporting institutions, such as the local private sector and local government. A special target for outreach is women, as the task of water collection for the family almost always falls on women. When water and sanitation schemes are being planned and constructed, there is a short-term need for a major extension effort to the communities; after the schemes are operational, there remains an indefinite need for a lower-level of extension activity, which may include training, monitoring and assistance with technical and/or financial issues.

extension workers need to have access to vehicles, funds for training materials, and job security

A field worker cannot be expected to 'deliver' community participation without sufficient support. This means extension workers need to have access to vehicles, funds for training materials, and job security. Programmes that are designed with specific focus on all the hardware aspects but that are vague about institutional linages, staffing plan, budget and work plan for software aspects will not work.

Communities are often fractionalized and lack important organizational, financial and technical skills. Community management therefore requires significant investment in software, extension services, promotion, community mobilization, training, monitoring and evaluation, and continued follow-up support.

Training

Training is another key element in promoting community management. Training needs to occur at all levels to re-orient sector institutions to assume appropriate roles. Central to this training is the community, which needs the skills to manage and coordinate the planning, financing, construction and operation and maintenance. Also, government line departments may need training to assume normative functions associated with regulation, legislation, and enforcement. They may need support in developing and implementing extension programmes.

training needs to occur at all levels

Training at the community level could include leader orientation, training in management, bookkeeping, and public relations. While the technology and training of system caretakers and mechanics are designed to limit external support requirements, continued back-up support is usually required for spare parts or refresher courses and monitoring.

Effective hygiene education is only possible through long-term sustained effort and is enhanced by the use of local

institutions such as health clinics, schools and women's groups.

The role of the formal and informal private sector should not be ignored during the training process. The private sector plays an important part in the provision of goods, financing and services, and may need to be strengthened in order for it to effectively respond to community demand.

4.1.5. Programme Implications

Commitment to community management needs to be reflected in the policies adopted by government before large-scale investments can be made. This is the first step, which requires political will and commitment. If communities are to assume managerial responsibilities, the activities of the government must be refocused and those of the community and private sector redefined.

There are now numerous small-scale projects (mostly initiated by NGOs) that demonstrate the value of the participatory approach in releasing community energy and resources and in expanding projects at lower cost and far more rapidly than would have been the case had the conventional engineering/contractor methods been used. There are also examples where full-scale programmes affecting millions of people have been successfully based on community participation, and where the beneficiaries are paying for the scheme, having taken over (at least) the cost of operation and maintenance, if not capital costs. There is an urgent need to get on with the job of incorporating successful approaches into full-scale programmes elsewhere.

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community-managed systems take time to evolve

It should be remembered that community-managed systems take time to evolve. It is not a quick process and involves contributions from central government to local government, from NGOs, from the private sector, and from communities themselves. Also, few clear guidelines are available. Institutions may need to be established to handle the delivery of services, and practical guidelines formulated on how institutions and communities can collaborate to create the "enabling environments" that will support community management. However for specific situations, community management is without a doubt an appealing solution to the current sustainability problems communities are experiencing with water supply and sanitation services. Community management may also be seen as a first step in the undertaking of other development activities by the community and the government.

In summary, in areas where community management is to be promoted and supported, the following conditions are important in programme design:

- the commitment to community management is supported by the creation of a favourable environment that encourages, for example, the role of the formal and informal private sector in delivering goods, services and channelling funds;
- sustainability and capacity-building are considered in programme design, and programme reviews are conducted at the national level which may lead to investment plans and project preparation that can attract financing;
- commitment to community management is ensured by the provision of sufficient resources for software activities, commensurate with their responsibilities (this may require budgeting 10-25% of total project costs for these components);
- training and orientation in the participatory approaches are implemented at all levels, from chief engineer to community worker and from local mason to politician, and the training is experiential, enjoyable and relevant;
- project monitoring and feed-back involve the community and rely on both quantifiable, verifiable indices and those parameters more difficult to quantify, such as women's opinions and community-based capabilities;
- the process of establishing community management is regularized and documented in a way that is useful to large-scale programmes. Manuals, promotional and training materials, and guidelines need to be prepared on the basis of existing experience.

4.1.6. The Risks of Community Management

Experience is demonstrating that community management is a viable solution in situations where there are inadequate incentives for public or private enterprise to provide reliable services; in these circumstances community management works where nothing else will. However, community management of water and sanitation services is generally risky and inefficient. Formal single-purpose institutions are better equipped to manage infrastructure services of this nature, particularly where legislation (for example, regarding water quality standards) creates special requirements. People living in the poorest communities are already busy dealing with survival; managing a water supply is an extra burden that community members may prefer to delegate to others. However, managing that water supply can contribute to

the integrity of community institutions, thus hastening development and raising the awareness of the needs for representative local authorities, whose role will include taking the responsibility for serving the electorate.

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ensuring effective outreach minimizes the risks of community management

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Questions include the nature of such extension services, whether public sector or private sector or NGO, and the financing of these services. While extension services in other sectors (e.g. agriculture, health) are generally provided by the public sector, there are many successful experiences in Africa of NGOs undertaking this task. Single-purpose outreach NGOs could be funded through both community association membership dues and government subsidy. Such NGO "associations of associations" can also play a major role in representing community interests at a regional or national level. Ensuring effective outreach minimizes the risks of community management.

4.2. Outlook and Issues

Low-income communities have been managing their own affairs for centuries. Communities have participated in NGO and government-sponsored projects for decades. Community participation is nothing new, but it has only taken hold on a large scale in this sector during the past Decade. The previous sections have described and emphasized the need to go beyond community participation to community management in water supply and sanitation projects.

To the majority of sector institutions community participation and management is something new and entails making difficult policy choices, often with short-term setbacks to achieve long-term sustainability; their resolution will have major implications for governments and for external support agencies financing sector investments. The policy implications of decentralization and community management are also substantial for effective local government. A series of issues and questions are raised:

1. As advocated in this chapter, should governments change their emphasis from provision to one of primarily promotion, and if so under what circumstances? What are the implications for the other institutions operating in this sector?

2. Should greater responsibility for provision be shifted from central government to local bodies, and, if so, how can local institutions be strengthened to facilitate the implementation of sustainable services? What roles would communities have?

3. Community management on a large scale will require not only new approaches but an array of community-oriented professionals trained and committed to implement them. Where will they come from? How is this new cadre of human resources to be created? What recruitment and training programs are required? Where will they get their experience, especially in countries which have few or no community-based development projects?

4. It is true that great strides are being made at the small project level in identifying methods for community involvement, and that there are a number of community-based programmes succeeding at the full-project level, but in other programmes, there are still very real problems in scaling up. Targets must be measured in millions of beneficiaries, not thousands. There are clear and urgent demands from the bilaterals and banks to start dealing with the millions. How can numbers be scaled up? How can the international agencies assist in the transfer of community management models?

5. There is a gap between rhetoric and action. Community participation has become a byword of the sector. But involving the community is sensitive and takes time. The pressures for rapid disbursement and reaching targets are great and take precedence over involving the community. How can projects be protected against these pressures, especially when achievements are still counted in terms of dollars spent and number of installations made?

6. Monitoring and evaluation of projects should focus on the effective management and utilization of water supply systems and community capacities to solve problems and ensure sustainability of services. How should such monitoring and evaluation be set up? What specific indicators of these criteria should be used? How can the community itself be involved in monitoring and evaluation? How can lessons learned be fed back into other programmes elsewhere?

7. Sector planning is an important tool through which policies and strategies can be identified and implemented. Box 8 describes an example of sector planning. Is this approach appropriate in other areas? If so, how can other countries take advantage of it?

Box 8

Programme Planning

In 1987 CIDA and the World Bank undertook a review of the Rural Water Supply, Health and Sanitation Sector in Pakistan. Sustainability and the cost of central maintenance of water systems were the key issues. The solution - operation, maintenance and cost recovery by the users.

To convince the chief engineers, six case studies of community-based projects inside Pakistan were carried out, and a policy conference held. Seeing was believing, and policies were adopted at the national level which were eventually incorporated into the subsequent Five Year Plan. The World Bank and CIDA came back for a mammoth project preparation exercise in 1989. Six teams covered all of Pakistan's regions. Starting with the development of strategic investment plans and ending with project preparation, the teams covered all aspects: institutional, community development, technology, economic and financial analysis, hygiene and sanitation, private sector, and demographic.

As a result, projects totalling over $100 million are being funded by a variety of international donor and lending agencies. All are based on community involvement, sustainability and cost recovery. Typically, agencies will undertake demonstration projects in which detailed methodology will be worked out. Methods will be standardized, guidelines written, staff expanded and trained and the demonstration projects enlarged to full-scale programmes, the new methodology replacing the old over time.

8. Documentation and dissemination of community experience is urgently required. A series of documents have been suggested including guidelines for project preparation, planning and management tools for project managers, field manuals for field staff and promotional materials for policy makers and donors. Are these appropriate, what other documentation needs are there? What steps must now be taken to ensure that their widespread availability in the early 1990s?

5. DEVELOPMENT, APPLICATION AND TRANSFER OF TECHNOLOGIES: Preparing for the Future

5.1. Present Status, Needs and Lessons

5.1.1. Technological Advances During the Decade

One of the most significant achievements of the Decade for the sector has been the development and application of a range of technologies well suited to conditions in developing countries. Technical advances have included innovative approaches to long-standing problems of maintenance and construction, adaptation of technical design to the constraints of skills and spare parts availability, use of improved manufacturing and construction technologies, improvement in quality control, use of appropriate materials and adaptation to differing local conditions. They have responded to a wide range of needs at various levels of affordability.

As a result, technology has been the driving force behind many of the most successful rural programmes. Now being adopted on a worldwide basis, handpumps in Cote d'Ivoire and Kenya, gravity-fed reticulation schemes in Malawi and Rwanda, and pour flush toilets in India and Pakistan have shown the viability of providing water and sanitation service at a fraction of the cost of conventional systems. These advances have created considerable potential for further sector development within constrained financing conditions. But the realization of this potential also depends on the ability of policy-makers to create the institutional and financial environments conducive to the development of sustainable programmes. If the 1980s have been a decade of technology refinement, a major issue of the 1990s will be how to create policy environments that facilitate technology adoption and that encourage the production, manufacture and marketing of these technologies.

Developments in water supply and sanitation technologies and design methods have focused on the provision of technologies that are best suited to the local environment. As an example, technology choice for water supply for small communities is described in Box 10. These developments include:

Gravity-fed water supply: Where adequate water can be drawn from a protected spring and fed by gravity to standpipes, this is the preferred technology due to its ease of maintenance and low operating cost, including no need for pumping. Gravity-fed systems have gained widespread acceptance in hilly and mountainous areas.

Slow sand filtration: Water treatment by slow sand filtration is a well known low-cost, treatment process that is gaining in popularity in places where moderately polluted surface water has to be treated and skilled operators, chemicals and spare parts are not readily available. Its use with more turbid waters is now possible using roughing filters for pretreatment.

Simplified water treatment processes: For conventional water treatment plants a variety of relatively simple hydraulic or gravity processes has been developed to overcome dependency on electro-mechanical equipment.

Well/borehole sinking: Improved hand-dug well techniques have utilized better well-lining materials, digging equipment and pumps, which have resulted in increases in well depths and yields. Where soils are suitable, improved hand augers have provided quick low-cost means of drilling. Mechanized borehole drilling has made important advances, with the availability of a greater variety of drilling equipment at lower prices.

Handpumps: Groundwater is particularly attractive as a source. If wells and boreholes are located and constructed properly, the water is safe. Also, groundwater has a substantial storage buffer to cope with droughts and variations in demand. Extraction using handpumps is not only low in cost but allows the community itself to manage and maintain the system, as the technology is not complex and routine maintenance capability is available or can be developed within all communities. Decade research has focused on making handpumps durable and more easily maintainable. There is no single universal handpump applicable to the full range of conditions. Direct-action pumps, drawing water down to 15m in depth, have been developed during the Decade. Examples are the Tara and Nara pumps. Having neither lever-handle nor bearings, they are low-

Box 9

Technology Choice

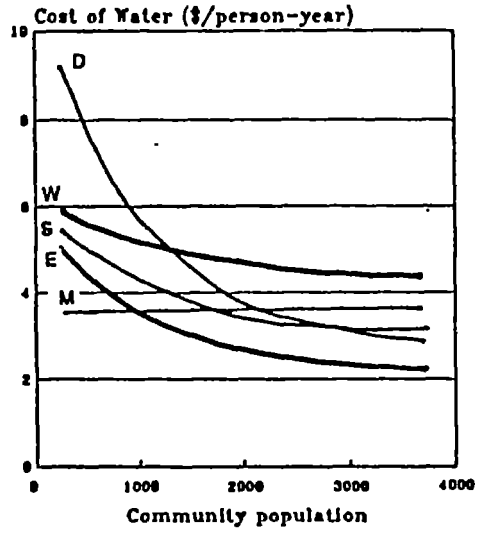
The choice of technology for water supply is made on the basis of technical feasibility, cost and demand. Where the source is groundwater, for example, the choices are pumping by handpump (manual), electricity, the sun (solar), diesel and wind. The factors most affecting cost are the size of the community and whether water is provided directly to the home or to standpipes. Other factors, such as water use (assumed below as 20 l/c/d), annual O&M cost as percentage of mechanical equipment (estimated 10%) and energy cost, will also influence service cost.

These and other factors can be used in cost analysis as illustrated in Figure 1, which shows the change in costs with the size of community. In populations above 1,000, electrical pumping is the best cost option (assumed to be $.10/KW/hr). At the chosen wind speed of 15 km/hr, windpumping is the most expensive for communities with a population above 1,200 people. However, there are specific locations where wind speeds are sufficiently high to make windpumping the least-cost alternative. Interestingly, in areas where groundwater is not excessively deep, solar pumping is the least costly alternative for communities without electricity that are willing to pay for higher service levels than handpumps will allow. It is expected that solar pumping costs will continue to fall in the coming years because of reduction in solar panel costs.

Figure 2 compares service levels by comparing the costs of water delivery by yard taps or point sources (standpipes or handpumps) for various community sizes using least-cost pumping technology. Storage and distribution double costs.

Figure 1

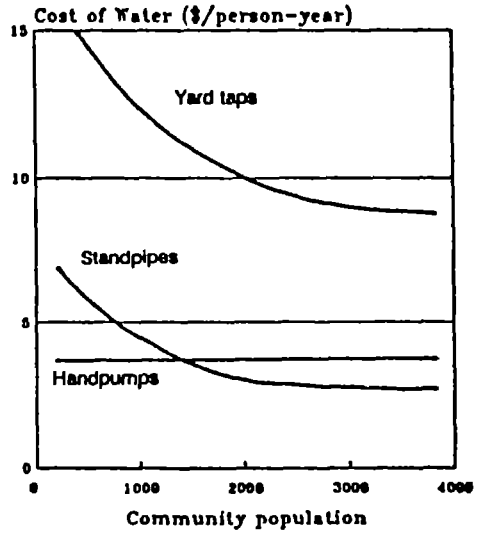
TECHNOLOGY CHOICE



D - Diesel
W - Wind
S - Solar
E - Electric
M - Manual

Figure 2

SERVICE LEVEL



cost and easy to repair. There is a potential for over 50% of all handpumps in Africa to be of this type. Other high-lift pumps that have been developed, manufactured and marketed during the Decade are the India Mark II and III, the Afridev (see Box 10), the Volanta and the Vergnet.

Solar pumps: Advances in the development of the photovoltaic cell have brought the solar pump into the affordable range for medium-sized communities (see Box 9). The pump and photovoltaic array are reliable; breakdowns occur mainly in the wiring and the invertor. These repairs can be made by a technician. Newer photovoltaic systems obviate the need for the invertor.

On-site sanitation: Important advances have been made in latrine technology development and dissemination. The vented improved pit latrine, incorporating a vent and fly screen to minimize odour and fly problems, has been extensively promoted in Africa and is now being widely adopted. The double-pit pour-flush toilet has had widespread application through both public and private sectors, especially in South Asia.

Sewerage: Substantial cost reductions are possible through two important technology developments: (1) shallow sewers, which are similar to conventional sewers but laid in shallow trenches at minimum slopes. They have been successfully used in Pakistan and Brazil and, experience has shown that, provided easy access for maintenance is provided, the technology works well. (2) solid-free sewers, which remove solids in settling tanks at the household, allowing small diameter pipes in shallow trenches, reduced pumping and almost no manholes. Both types of sewer are applicable to low-income settlements where the community is willing to be responsible for maintenance.

Computer software: Computer software is now widely available for such applications as water supply and sewerage network design billing and collection and MIS (management information systems). Introduction of the software in developing countries is now accelerating, resulting in a reduction of the cost of water and sanitation systems and increases in the operating efficiency of utilities.

Many of these technological advances began prior to the Decade but successfully reached full-scale application during it. The momentum for technological progress which has been achieved should continue during the 1990s.

5.1.2. Reducing Costs and Meeting Demands

Expenditure on water and sanitation services by governments and external support agencies (ESAs) during the period 1981-1989 has been estimated at between $100 and $120 billion (1985 $). This amounts to approximately $100 for each additional person served during the Decade. Investment levels of the 1980s, if not increased in the 1990s, would amount to only about $20 per unserved person, given the unserved population as of 1990 plus the expected population growth.

What can be done to close the gap, since, in view of global economic conditions, it is doubtful that public financing of water and sanitation sector activities will increase significantly? Possible courses of action include (a) striving to lower the cost of services further, (b) increasing the willingness of users to pay for services by meeting the demand for services more precisely and (c) drawing on private resources.

(a) lowering the cost of services

The objective of the Decade's technological advance has been to reduce capital and recurrent costs, improve sustainability, and ensure the social acceptance and environmental compatibility of technologies while maintaining functional efficiencies and service levels. Meeting these criteria has not been easy but in almost every case success has been achieved.

The Decade has provided a broad range of low-cost technologies, which are now well proven in the field and can be applied in programmes worldwide. These will continue to allow dramatic reductions in costs of service provision.

Most of these innovations aim at providing a basic service level. But provision of basic services does not imply a commitment to that level of service indefinitely. Future demand for services depends on a number of factors, including changes in income, household characteristics and perceptions of needs and benefits. Technology is now available which is capable of being upgraded so that as little of a first investment as possible need be written off when a higher level of service is installed at a later date.

(b) meeting effective demand

Effective demand is the expressed willingness of the consumer to pay for a given level of service and a given type of technology. A frequent criticism of the use of demand as the basis for service provision is that the needs of the poor are not met because they are unable to pay for improved services. Targeting subsidies at technologies rather than income groups is a means of overcoming this problem. In a free market, high-cost services such as sewerage will not be demanded by the poor because of their inability to pay the cost. Similarly, solutions that only meet basic needs will not be demanded by higher-income groups who aspire to, and are willing to pay for, a higher level of service. Therefore, subsidies need to be directed to the most basic technology alternatives, making them affordable to the poorest of the poor, whereas full cost recovery of more expensive alternatives can be obtained from users who demand that level of service.

The outlook for the future is that funding on a scale adequate to achieve universal service coverage is not a realistic expectation within the foreseeable future. Because of continuing high rates of population growth and migration from rural to urban areas, demand for services will become increasingly pressing, especially in urban areas. This will require decisions about who is to be served now, and who is to be serviced later, and at what service level. Technologies that match levels of

Box 10

Development of the Afridev Handpump

The Afridev is a deep-well handpump designed for rural conditions. The objectives in designing the pump were to develop a community-maintainable pump that could be manufactured in countries with limited industrial resources. The pump has evolved from prototypes developed in Malawi, field trials in many East African countries and extensive laboratory testing to a stage where it is now in mass production. Manufacturing capacity is currently being developed in India, Kenya, Malawi, and Pakistan and is also planned for Ethiopia and Nigeria. Plastics research and development has played a vital role in the success of the project. The Afridev incorporates many of the concepts that are important for community-based management:

- moderate purchase price
- inexpensive wearing parts
- rising main and cylinder diameters suited to the strength of plastic
- mechanism repairable by community members
- design in the public domain
- ability to be manufactured locally at prices competitive in the international market.

The pumphead is an all-steel fabrication especially designed for easy manufacture and maintenance. The replacement of the fulcrum and hanger bearings can be carried out quickly and simply with a single spanner. To prevent nuts from being lost, nuts and bolts need only to be slackened and cannot be removed. The pump rods are joined without tools, using easy-to-fasten hooked connections, and the rods, plunger and footvalve can be removed from a deep well with one tool.

Standardization means limited spares requirements, reduced forces mean lighter components that are cheaper and easier to remove for maintenance, and a higher yield gives greater potential for multi-purpose water use -- drinking water, small-scale gardening, cattle watering -- from the same water source.

effective demand and willingness to pay and that are reliable and easy to operate and maintain over the long term are vital for maximizing coverage.

With respect to what people want in the way of services, the following lessons have been learned during the Decade:

- service levels and technologies are only effective if they are designed to meet effective demand, as expressed by a willingness to pay for them. Neither the luxury of service levels exceeding demand nor the provision of services of a lesser standard than demanded provides both consumer satisfaction and efficient use of resources;

- there are interlinkages between technological change and social change that require, in rural and peri-urban areas, a high degree of community participation in programme design and implementation, and in urban areas a knowledge of the aspirations and needs of various sections of the community;

- financing and cost recovery policies, which result in service charges well below economic cost, have caused distortion in service levels and the demand for subsidies. They have generally resulted in cost recovery being inadequate for services to be sustained and expanded without the need for continued subsidies;

- inequitable user charges often result in higher-income consumers enjoying a high service level at a price below the cost of supply, whereas the poor suffer low standards of service for which they pay proportionately more.

(c) drawing on private resources

The private sector was instrumental in providing services long before governments became involved. The family handpump and latrine are examples of how the individual household and private sector interact to provide and sustain services at little or no cost to government.

Government is in a position to stimulate demand through promotional and educational campaigns and to support the private sector by encouraging technology development.

This has implications for technology choice. Use of local small contractors, such as well-diggers, handpump installers and latrine masons, has many advantages -- they are familiar with local building materials and methods and, as they provide services in a very competitive

environment, the cost is usually less than if provided by the public sector. In order to generate more clients, the contractors themselves also promote the advantages of improved sanitation or water supply. The disadvantage is that there is usually little control over the technologies, design and materials they use. This disadvantage can be overcome by

- offering the contractors training in design, construction and promotion
- establishing licensing arrangements whereby a trained contractor is authorized to work in a given area on a given technology
- linking subsidies to the use of licensed contractors.

The availability to households of free or subsidized materials (such as latrine pans or slabs) for installation by private-sector contractors serves both to encourage development with private funds and to pre-determine the design that will be used.

5.2. Outlook and Issues

During the Decade, development of low-cost, appropriate technologies for the delivery of water supply and sanitation services to the poor has resulted increasingly in sector investments being well spent. Coverage is not only wider for each dollar spent but the service provided is also more reliable. There is now a general understanding of the need to provide technologies to meet effective demand and there is a range of technologies available to respond to this objective.

On the other hand, the substantial advances in technology made during the Decade have resulted in a general perception that all technology issues have been settled and that technology research and development (R & D) should now be relegated to a low priority. While many technical solutions are now available, problems are becoming more complex and there is a continuing need for R & D, particularly as related to the peri-urban and water-scarce areas.

The momentum of technological advance established during the Decade needs to be maintained if the complex challenges of the 1990s are to be met. There are several questions related to technology development arising out of the experiences of the Decade, the answers to which will provide the basis for efficient technology development in the coming years.

1. Technology transfer and development have been crucial issues of the Decade. It has been demonstrated time and again that technologies cannot be simply transplanted and expected to take root and flourish. Adaptation of technology to local conditions is essential as products are then better suited to the environment in which they have to function. Technology must also have the backing of the agencies responsible for the adaptation which then have a stake in ensuring that it is widely demonstrated and used. Yet resources for R&D in developing countries are very limited, especially in those countries in greatest need of innovative low-cost solutions. How can governments and ESAs best provide environments that foster local technological R&D ? What resources are available and how can they be strengthened?

2. R&D is typically the preserve of universities but, due to lack of resources and an academic orientation, researchers typically fail to respond to practical problems in the field. How can universities and other research institutions be encouraged to relate their research to practicalities and be supported in their efforts to achieve full-scale application of their innovations?

3. Despite calls to the contrary (and with one or two notable exceptions) the private sector has not responded to R & D needs in this sector. How can it be encouraged to participate? How can its considerable resources be drawn upon to benefit this sector's technological development?

4. The links between development, manufacture, marketing, distribution and sales of product and materials that are used in the water supply and sanitation sector are not only complex but are continually changing. Yet knowledge of these links is very limited; most R & D resources continue to be spent at the upstream end of technology development: in the laboratory and on pilot tests. What steps can be undertaken to improve the understanding of and increase support for the downstream end of product development and marketing?

5. Government's role in manufacturing is best limited to implementing policies that favour local manufacturers of equipment, such as pumps and pipes. This can mean, for example, initial credit support to private manufacturers endeavouring to start up handpump manufacture; it could also mean standardizing and maintaining quality control over manufacture. What measures can be taken to acquire the benefits of standardization and quality control without constraining innovation or competition in the marketplace?

6. One of the difficulties facing this sector is that R & D efforts tend to be made in isolation. There is little communication, networking or information exchange between researchers. How can this situation be improved? What are the global and/or regional

mechanisms necessary to overcome isolation and ensure symbiosis between sector innovators?

7. One example of technology development needs is the optimization of infrastructure in peri-urban areas, including drainage, solid-wastes management, human waste disposal and water supply. Another is the management of groundwater resources in water-scarce areas. Both, however, have strong social, economic, management and even political overtones. The problems of this sector are seldom only technological, but are almost always multi-disciplinary. How can research groups be encouraged to respond to the multi-disciplinary nature of this sector's problems when they are typically isolated and experienced in only one discipline, such as engineering or health?

8. Technology research tends to be carried out in laboratories, yet experience in the Decade has strongly demonstrated the advantages of community and user participation in problem-solving. How can the community participate in technological research so that considerations of social acceptance, willingness to pay, local technical competence and perceived needs and expectations are taken into account?

6. FINANCING THE WATER SUPPLY AND SANITATION SECTOR

6.1. Present Status, Needs and Lessons

The availability of financial resources for the provision of water supply and sanitation services is now and will continue to be a constraint on sector development. Equally important, however, have been the difficulties faced by countries in effectively allocating or utilizing the funds that are available in a manner that is conducive to the long-term sustainability of the sector. It would be unrealistic to expect that there is some as yet undiscovered mechanism or financial gimmick that will solve the problem. Rather, improving financial resource mobilization will require simultaneous and concerted efforts on a number of fronts.

6.1.1. Availability of Financial Resources

The decade of the 1980s has been an extremely difficult one for domestic resource mobilization and expenditure. It has also been an unfavourable period for increasing external resource mobilization. Extensive external borrowing in previous decades resulted in large outflows to meet debt obligations. From 1986 to 1988, the net outflow from heavily indebted countries was over US$ 100 billion. In 1988 these countries paid out about 4.7% of GDP in debt repayments. The region of Sub-Saharan Africa has been particularly hard hit. The countries in this area, while not as heavily indebted in total, have a much larger debt-to-export ratio and debt-to-GNP ratio than the 17 most heavily indebted developing countries. During the 15-year period from 1965 to 1980, income grew rapidly enough that over 90% of developing countries had positive growth in per capita income. However, in the 1980s over half of them experienced a reduction in per capita income, and in more than 80% of these the decline was more than 1.5% a year.

No one knows for certain how much money is being invested in water supply and sanitation services in developing countries -- by governments, external support agencies (ESAs), private business and individual households. Least well documented are the financial contributions of the latter two. A recent estimate by WHO for government and ESA sector investments in the period 1981-85 indicates a total of US$ 70 billion (1985 dollars), an average of US$ 14 billion per year. The World Bank estimates investment by governments and ESAs at about US$ 9.3 billion (1985 dollars) a year for 1985-89. One explanation for the estimated lower levels of investment for the last half of the decade is the generally lower rates of economic growth during this period in most developing countries. Data available through CESI indicate that ESAs slightly increased their allocations to the sector during the period 1985-89, and provided about US$ 3 billion a year of the total US$ 9.3 billion.

ESA participation has been substantial and has had strong beneficial impacts on sector development, not only in terms of numbers of people served but in improving efficiency and cost effectiveness of how those people are served. The momentum of ESA support achieved during the Decade should continue. External funding should be encouraged to provide support for activities which would not normally be provided for through national funds; for example inter-country exchanges, external technical assistance, international training and the like. Thus bilateral and multi-lateral international support agencies should be called upon to expand their participation in this sector in the decade ahead.

Comprehensive data are not available on the share of public investment allocated to water supply and sanitation. An estimate has been made, however, based on recent public investment and expenditure reviews conducted by the World Bank. Data on 29 countries, with each major region represented, were included in the estimate. This research shows that total public investment declined, on average, from 10.9% of GDP in 1985 to 8.7% in 1988. Over this same period, investment in water and sanitation held virtually constant at about 0.4% of GDP or about 4.3% of public investment.

The positive aspects of these figures -- the relative stability of the share of GDP and a slightly increased share of public investment allocated to the sector -- are overshadowed by their negative implications for future coverage. These levels of investment are insufficient to provide services to cover projected population growth at current per capita costs even without any increase in

levels of investment are insufficient to cover projected population growth

coverage for those people currently lacking service. Moreover, the financial problems of local institutions create grave doubts that all of those currently served will be provided with reliable and sustainable services in the future.

The financial situation may well be even more critical than these figures suggest, since additional cost-increasing pressures can be expected over the next decade. Because of an explosive combination of factors -- growing water scarcity, deteriorating water quality, limited investment in waste collection, treatment, and reuse of water, as well as continued rapid growth in demand for competing uses of available water -- the only reasonable assumption to make for the 1990s is that the per capita cost of water provision and its environmentally safe collection and disposal will rise dramatically. The expansion of coverage by water supply and sanitation at the increased costs is likely to impose major financial demands.

countries will be forced to rethink their investment priorities

The conclusion is that in the coming decade virtually all those developing countries that wish to expand the coverage of water and sanitation will be forced by financial pressures to substantially rethink their investment and expenditure priorities in the sector. In particular, there will be little room for strategies which adopt levels of service that create larger financial burdens on users than they are willing to shoulder.

6.1.2. Governments and External Support Agencies as Providers of Finance

In most developing countries government and ESAs continue to provide the bulk of financing for the water and sanitation sector through public sector allocations. A major proportion of these are made available in the form of direct subsidies to public utilities, government departments, and to local organizations and administrations. In some countries ESAs play an especially important role, particularly in the rural sector, where they may contribute as much as 80 to 90% of all financing for water and sanitation. Even though, in urban areas, many people are charged for the provision of water and sanitation services, the majority of systems continue to depend on relatively high levels of subsidies, especially for the financing of capital costs. Generally, the private sector has had a limited role in the provision of either services or finance. It should be noted, however, that because of poor or non-existent service, large numbers of people are essentially providing for their own water and sanitation services in their private capacities, often at considerable personal expense.

gains have been undermined by breakdown of facilities

A major problem with current mechanisms for mobilizing and allocating resources is that they have tended to encourage a top-down approach to decision-making which has not always taken the ultimate beneficiaries into consideration. Resources have often been provided without proper concern for user perceptions of the value of the improvement, for recurrent cost implications, and for selection of service levels for which users are willing to pay. In some cases, the result has been the construction of facilities that are underutilized by the intended beneficiaries or are excessively costly. In addition, high levels of external assistance have, in many instances, led to rapid investment in new facilities without sufficient attention being paid to strengthening the capacity of countries to sustain the facilities provided or to ensure their proper utilization. As a result, initial gains have often been undermined by rapid breakdown of facilities or failure to utilize the services at all.

Weak planning and budgeting capacity as well as competing claims on restricted funding resources have often meant that government and external funding have been both limited and erratic, leaving service agencies unable to depend on a regular flow of resources. Unable to generate sufficient cash from their operations, such institutions have found that the resultant cash flow restrictions have made it difficult to provide adequate and reliable service, let alone meet additional financial requirements. The situation is often made worse by the fact that for many agencies, revenues are not necessarily related to the quality of services they provide, but rather to the case that each agency can make to the central authorities for more funds to cover costs. Poor performance is thus rewarded by additional funds, undermining sector incentives to improve efficiency by controlling costs, raising revenues or improving financial performance. Unfortunately, those who are often most adversely affected by the poor performance of service agencies are the low-income populations.

Thus, an important lesson that has emerged from the experiences of the Decade is that, although lack of financial resources is a major constraint on the future

financial resources alone will not solve problems

development of the sector, availability of financial resources alone will not resolve the problems of the sector. The major constraints which require attention appear to be the following:

- weak sector institutions and poor "incentive environments";
- inappropriate pricing policies which are not conducive to long-term sustainability of the sector;
- insufficient appreciation of the role of effective demand in the investment process;
- difficulty in devising charging structures and mechanisms that are effective in generating resources but also protect the interests of the poor;
- lack of suitable financial intermediaries to facilitate the funding of large-scale investment.

6.1.3. Financial Weakness of Sector Institutions

There is considerable variety in the type of institution that serves the water and sanitation sector. The urban areas of most countries tend to be served by large-scale public utilities, many of which are wholly or partially government-owned and -controlled. In rural areas the type of organization responsible for water and sanitation tends to be more diverse, ranging from public utilities to local government administrations, from community-managed associations to, in some instances, private cooperatives. In most cases both rural and urban agencies responsible for water supply and sanitation are not financially sound. However, of the two, rural agencies are usually very much the weaker.

Broadly, the most glaring deficiencies are the following:

- less willingness to pay for service than predicted;
- lower sales volumes than expected, both in absolute terms and on a per-connection basis;
- much larger increases in O & M costs than expected;
- low revenues;
- system deterioration due to inadequate maintenance.

The direct financial consequences of these factors are easy to predict: an inability to meet financial obligations from cash flow; the need for unanticipated additional financial assistance; and little or no revenue to cover depreciation or to finance expansion.

Many of the above problems are the result of inherent institutional weaknesses due to over-staffing, lack of trained managers and staff, inappropriate administrative structures, institutional constraints on personnel management and pay scales, and poor financial practices. In the case of community associations, the capacity to organize and manage financial resources has often been weak due to lack of accounting skills or familiarity with proper financial management practices.

Many of the problems faced by sector institutions, however, have as much to do with the overall "incentive environment" in which they operate as they have with inherent institutional weaknesses. The operational and financial performance of service institutions is influenced by sector-wide policies, the relative roles of the public and private sectors, the tax and transfer mechanisms employed by governments, the roles of financial intermediaries, the sectoral activities of ESAs, and the regulatory framework under which the institutions operate. These influences can be loosely described as forming the "incentive environment" in which the sector agencies operate.

the 'incentive environment' directly affects what agencies can and cannot do

The "incentive environment" directly affects what sector agencies can and cannot do, while in other cases it influences the behaviour of supply institutions through the incentives and disincentives provided for efficient performance. For example, the fact that many service agencies are able to fall back on government subsidies to overcome difficulties can create a vicious circle of endless financial dependency. The deeper into debt the agency falls, the more dependent it becomes on government subsidy. Loss of freedom is the price paid for government bail-outs and the agency increasingly becomes subject to political priorities and interventions. Ultimately it is caught in a downward spiral caused by an inability to collect adequate revenues, attract quality staff or provide efficient service. Both government and users lose confidence. Government loses the political will to grant the agency financial independence and the user loses the will to pay for services that are not being delivered.

It is clear that institutional weaknesses will continue to undermine the capacity of many countries to mobilize and utilize funds effectively. Institutional efficiency must

therefore be viewed as a cornerstone of resource generation in terms of both holding down costs and increasing the revenues from production.

6.1.4. Pricing Policy

A feature of the Decade has been the growing recognition that the pricing of water and sanitation services (*i.e.* the level and structure of charges) is a potentially powerful tool for the improved performance of the sector as a whole. Unfortunately, it has also been a poorly used policy instrument and one that has often been surrounded by considerable controversy.

User charges

Perhaps the most widely debated aspect of pricing policy has been the extent to which current financial mobilization strategies should be adjusted to increase the share of costs borne by the users themselves. Although user charges in urban areas are widespread and generally accepted, the practice of charging users for water and sanitation services in rural areas, and to a lesser extent in poverty-stricken peri-urban areas, has been less widely endorsed.

Much of the argument against introducing or increasing user charges has been based on the assumption that the majority of people in developing countries, particularly those in the rural areas or peri-urban slums, are too poor to pay for water. Furthermore, water is perceived by many governments to be a social right which they are obliged to provide free of charge or at heavily subsidized rates. The health benefits that are expected to accrue to the public at large as a result of clean water and adequate sanitation are also seen as an important justification for the allocation of public funds to the sector.

the policy of 'free' water has often failed

In reality the policy of 'free' water for the rural and urban poor has often failed to meet objectives of equity. Because of the fact that the total amount of resources remains limited, it has generally been impossible for entire populations to be reached, and those most likely to remain without access to clean water or adequate sanitation are usually the poorest and most vulnerable communities. Indeed, in many countries it is only the relatively affluent people who benefit from services which are heavily subsidized by government or external funds, since they are often more accessible by service institutions than the truly poor. For the latter, such notions as 'free' water bear little relation to their actual situation since they continue to pay a high price for water in terms of time and energy expended in obtaining sources of drinking water and, for some severely affected areas, in terms of money required to buy water from private vendors during water-scarce seasons of the year.

if users don't pay, no one else is likely to

There are several arguments in favour of cost recovery from users. It is often argued that, because of limited central revenues, there is little choice but to recover costs from users since if they do not pay no one else is likely to. Equally significant, however, are the implications of user cost recovery in terms of improving the way in which resources are utilized. Mobilizing funds from users themselves, as opposed to providing them from a central government source, is seen as encouraging a much more effective and sustainable utilization of resources. For example, because revenues are dependent on user payment, user cost recovery can ensure greater responsiveness to user preferences. There will therefore be a greater chance that investments will be more closely oriented to consumer demand and that the level of service chosen will be utilized by the communities concerned. This in turn will increase the likelihood of long-term financial sustainability. Because it increases the accountability of the agency to the user it can also improve efficiency of service delivery. It furthermore provides for rational allocation of resources and setting of priorities; and it permits cross-subsidisation where necessary to ensure service provision in the low-income areas. Effective cost-recovery enables the agency to become more independent and to expand service coverage more quickly; cash flow becomes less dependent on political exigencies and agencies can implement plans with greater confidence. As part of an overall pricing policy, user cost recovery can also ensure less wastage of resources, particularly water, which in some countries of the world is becoming increasingly scarce.

Despite the positive role that pricing can play in the mobilization of resources and the delivery of services, the implementation of effective pricing policies has nevertheless proved to be one of the more intractable problems facing sector planners during the course of the Decade. Many pricing policies have failed to generate the volume of revenue anticipated or to ensure the long-term sustainability of services. In addition, the poor have in many instances failed to pay for or benefit from expanded services.

Effective demand

One of the reasons why some pricing policies have floundered is that sector planners have failed to take adequate account of effective demand or user willingness to pay. Effective demand is largely influenced by income, price and perception of benefits. In many countries real income has been declining while costs have continued to rise. A major contribution of the Decade has been to focus attention on the use of a wider range of standards and levels of service than those that are conventionally available and that utilize intermediate- and lower-cost technologies. However, the adoption of appropriate technologies has been slow and other factors, such as poor management, have tended to increase the overall costs of service provision in most countries. Service agencies have thus been forced to raise prices beyond what consumers may be willing to pay for.

perception of benefits impacts on willingness to pay

Perception of benefits by users themselves can also have a significant impact on effective demand and people's willingness to pay. An important lesson of the Decade is that investments have often failed to be utilized or paid for because they have been designed with the expected benefits as perceived by the sector planners in mind rather than those perceived by the users themselves. In rural areas in particular, such considerations as distance, convenience, reliability and quality can be as significant an influence as income and price. If new facilities do not offer improvements in these areas it is unlikely that communities will be willing to pay for them. This may also mean that in some instances communities might be willing to pay for a higher or more costly level of service than sector planners have assumed.

In the case of sanitation, perceived benefits are typically much lower in rural areas than in urban areas, particularly in sparsely populated areas where the connection between poor sanitation and poor health is often not made. Even with sufficient income, many communities are likely to accord a higher priority to other needs, such as health and education facilities, than to sanitation. In such instances, health education campaigns, which can inform consumers of the less obvious benefits of improved water and sanitation facilities, can be a useful way of generating increased demand.

Charging structures and mechanisms

Another factor that has made pricing policy problematic is the difficulty that has sometimes been encountered in devising workable tariff systems and structures. Appropriate charging structures and mechanisms are important for ensuring that the desired level of cost recovery from users can be attained. If these are inappropriate or perceived as unfair by users, there will be resistance to paying for services. This aspect of pricing can be particularly problematic in rural areas where water points and sanitation facilities are often communally owned and where it is difficult to find a charging system that does not penalize low users and benefit high users, or that adequately distinguishes between people who are more or less able to pay. In addition, such factors as seasonality of income make it difficult to impose a system of regular charges of the kind that might work satisfactorily in urban areas. Administrative simplicity in the billing and collection of charges is also important to avoid unnecessarily high costs or loss of revenue, but this can sometimes result in unavoidable inequities.

Tariff structures can play an important role in ensuring that the poor have access to services through special provisions, such as life-line rates to low-income groups. This can serve to bring services to the poor at much cheaper rates in real terms than they would otherwise have to pay if obtaining water from private or traditional sources. Some progress has been made during the course of the Decade in promoting tariff structures that increase the share of costs borne by the users yet protect the interests of the poor. However, in practice it has been difficult to implement viable systems that both serve the interests of all income groups and ensure efficient use of resources.

charging mechanisms matter to the users

In addition to tariff structures, charging mechanisms and the receipt of payments matter a great deal to users. If payments are made to a central utility, yet no benefits are seen to accrue to the users in terms of improved or reliable service, the willingness to pay can be expected to decline significantly. This tends to be a particular problem in rural areas or small towns or communities which do not have direct control over the financial management or function of their facilities. An important development of the Decade has been the increased decentralization of financial responsibility for water and sanitation services to the local or community level, thereby giving communities and local administrations greater control over the utilization of funds generated. In such cases this has helped create the perception among users of a greater positive link between costs and benefits; this in turn has in many instances served to engender a greater willingness to pay for the O & M of facilities.

In establishing charging structures and mechanisms it is important to ensure consistency of pricing policy as well as public understanding of the rationale for user charges.

people need to know the basis of charges and why they must pay

As the experiences of the Decade have shown, widely differing conditionality for the granting of resources from ESAs to public utilities, local institutions or communities can sometimes undermine efforts to implement effective pricing policies if, for example, some areas are expected to contribute towards initial capital costs when others are not. Meanwhile, experience has shown that political problems can be reduced by the provision of consumer information about the rationale and basis for charges, so that people know why they are being asked to pay, particularly in countries where people have become accustomed to paying low water tariffs or none at all.

Cost recovery and investment

Charging for capital costs brings to the fore a different set of problems deriving from the large size of initial investment costs. This is particularly problematic in rural areas where community organizations are expected to mobilize resources locally. In these instances the per capita costs involved may be well beyond the reach of most individuals. Credit schemes for the construction of water systems are not always easy to implement as water and sanitation are not generally viewed by financial institutions as a productive investment with a cash return. In any case, such institutions are generally poorly represented in rural areas where the working capital tends to be low and the rate of default high. Credit, if granted at all, is usually provided on a short-term basis and at very high interest rates. Rural people themselves are often reluctant to borrow for water and sanitation improvements unless these are directly tied to an income-generating activity. It has been noted that, in many communities where funds must be raised for specific capital projects, the preference is to save money over a certain period of time and then pay in advance, rather than to borrow the money and commit the community to a fixed repayment. This is understandable in those societies where living conditions can be unpredictable and control over one's outlay of funds is of major practical and psychological importance.

communities should be involved in the initial investment decision

In view of the above difficulties, supplementary funds or other financial support from government or ESAs often become the only means of financing investment in new facilities. However, government and ESA officials, charged with allocating resources among sectors and facing overall financial constraints themselves, are reluctant to put funds into activities that imply the need to sustain a continuing and uncertain subsidy level. For this reason it is important that communities are fully involved in the initial investment decision and that they to the financial implications, preferably through a clear demonstration that the users can and will pay the costs for subsequent O & M. This will also serve to ensure that investment is demand-induced by the users themselves and not supply-driven by sector planners and donors.

6.2. Outlook and Issues

The economic downturn in developing countries during the 1980s greatly curtailed the level of financial resources from both national and external sources that might otherwise have been allocated to this sector. Indications are that fiscal restraints will continue into the 1990s. In addition, continued high rates of population growth around the world are expected to pose a major obstacle to achieving targets in terms of coverage.

Currently 5.2 billion, the world's population will increase by over 90 million each year to the end of the century. To achieve full coverage, a programme faced with a growth rate of 3.5% (common in the Middle East and South Asia) has to allocate two thirds of its budget to populations yet to be born; only one third goes to the people without services today! Coverage figures of the Decade attest to the difficulty in catching up to population growth and the outlook for the decade ahead is not any more optimistic.

increased coverage is being achieved at the cost of sustainability

However, the experiences of the Decade have shown that aiming for increased coverage targets is not sufficient unless attention is also paid to the sustainability of those target levels once they have been achieved. At present, rapidly increased coverage is in many cases being achieved only at the cost of sustainability. Where credit or grant assistance has been provided for new and improved water and sanitation facilities, countries have sometimes found it difficult to mobilize sufficient domestic resources to ensure that these investments are properly operated and maintained in the longer term. In many instances domestic budgets have become severely strained by the financial obligations which increased coverage have brought. This has had adverse repercussions not only on

the new investments provided but also on existing facilities.

In addition to the above, the financial and institutional capabilities of many countries continue to be too weak to ensure that the resources provided can be absorbed by the sector in a manner that is effective and equitable.

The challenge of the next decade is therefore not only to generate more resources for investment in new and improved services, but to find appropriate mechanisms to ensure that adequate resources can be mobilized domestically, and utilized efficiently and equitably so that investments are sustainable on a long term basis.

The experiences of the Decade point to many reasons why increasing the share of costs to be borne by users is an effective means of generating resources. However, experience has also shown that for cost-recovery policies to work it is essential that proper attention is paid to the role of effective demand, that appropriate financial and institutional mechanisms are in place in that a suitable regulatory framework exists for the sector. These points raise several questions, not the least of which are posed in the following paragraphs:

1. How can increase levels of external support to the sector be mobilized and on what should they be spent to maximize their beneficial impact on sector development? In terms of domestic resource mobilization, what institutional arrangements, charging structures, collection procedures and financial management practices might be recommended to make user cost recovery policies feasible and able to ensure greater effectiveness and equity in the allocation and utilization of resources?

2. Resource generation from beneficiaries has been shown to be more feasible when the consumer understands the reasons why he or she is being asked to pay, is provided with reliable service in return and derives the kind of benefits from the service which he or she considers important. This calls for improved consumer relations. How can agencies upgrade their marketing, service delivery, information dissemination and educational efforts to enhance willingness to pay for services?

3. The choice of technology and service level should reflect effective demand and willingness to pay. The latter are strongly influenced by the perception of benefits, tariff structures and charging mechanisms. This implies a requirement to assess the level and conditions under which a community might be willing to pay for a given service, and to collaborate with the community in the early stages of planning. How can agencies best incorporate these requirements into their planning procedures?

4. On-site sanitation programmes have demonstrated success where subsidies have been kept to a minimum and where the latrine is regarded as a household commodity installed by the private sector. But government support may still be required in such programmes, particularly where the public benefits exceed the private benefits perceived by the users. What kind of support and what level of subsidies are appropriate to ensure long-term sustainability and expansion in such programmes?

5. Many water and sanitation agencies find themselves caught in a vicious circle of financial insolvency because of low tariffs and inability to collect revenues, dependency on higher levels of government for bail-out, politicization of programmes, inefficiencies in service delivery, and unwillingness of users to pay for less than satisfactory services. How do agencies break out of the circle and establish themselves on a sound financial and managerial footing? What policies need to be established and what steps need to be taken?

6. Increasingly, many communities are assuming direct responsibility for mobilizing resources to cover all or part of initial investment costs as well as operation and maintenance costs. There is a variety of fund raising mechanisms such as community trust funds, revolving funds, in-kind contributions and such traditional communal collection systems as the *susu* in Ghana, *merry-go-round* in Kenya · , *bisti* in Pakistan and the *tontine* in Togo. How can such traditional saving and lending mechanisms be tapped for the purposes of financing the sector and integrated with other sources of funding which may be made available, particularly for initial investment?

7. There is a variety of credit mechanisms already operating in the rural and peri-urban areas, including credit cooperatives and the *Grameen* Bank type of credit facilities. However these are not often used to finance water and sanitation projects. Furthermore some of these institutions, particularly in the rural areas are very weak. What measures can be taken to strengthen the performance of these financial intermediaries both as a potential source of credit for rural communities and as a means of channelling centrally generated financial resources to the community lever?

8. What kind of measures can be taken to improve sector wide policies and the overall regulatory framework under which policies are implemented so as to create the incentives necessary for improved efficiency and financial viability of the sector?

7. BUILDING THE COLLABORATIVE NETWORK: Coordination at the National, Regional and Global Levels

7.1. Present Status, Needs and Lessons

Coordination of water supply and sanitation activities is carried out in different settings: at country level, within the United Nations system and with other ESAs; all three, however, are closely interrelated.

The Mar del Plata UN Conference on Water Resources in 1977 issued a Plan of Action which included a recommendation that coordination at the country, regional and global levels should be improved and that regular consultations should be held between governments, international agencies, non-governmental organizations (NGOs), and the scientific community. Coordination of the activities of the UN system is carried out through the Administrative Committee for Co-ordination (ACC) Intersecretariat Group for Water Resources, composed of all the member organizations of the United Nations system, dealing with water resources.

At the regional level, the Mar del Plata Action Plan entrusted the coordination of activities for water resources to the Regional Economic Commissions.

Specifically for the coordination relevant to the IDWSSD activities, a Steering Committee for Cooperative Action for the IDWSSD was established.

A series of consultative meetings has been held throughout the Decade at global, regional and country levels and these have greatly assisted collaboration between ESAs and governments in policy and strategy formulation. ESAs have also collaborated through a series of meetings culminating in the creation of the Collaborative Council (CC).

7.1.1. Major Global Co-ordinating Mechanisms

There are presently three major co-ordinating mechanisms for support to water supply and sanitation activities at global level. Two are for the United Nations system: The ACC Intersecretariat Group for Water Resources, a formal body, and the Steering Committee for Cooperative Action for the International Drinking Water Supply and Sanitation Decade. A third, less formal body, with its membership, however, open to interested agencies, NGOs and institutions also outside of the UN system, is the recently established ESA Collaborative Council, a brief description of which is provided below.

Administrative Committee on Coordination (ACC) Intersecretariat Group on Water Resources

The ACC is the main co-ordinating body of the United Nations system. Its members are the Executive Heads of the UN agencies under the chairmanship of the Secretary-General of the United Nations. A number of bodies, sub-ordinate to ACC, deal with specific subject matters. One of these bodies is the Intersecretariat Group on Water Resources (IGW) which is made up of all the organizations of the UN system, which deal with different aspects of water resources. Its tasks include:

(a) Co-operation in the monitoring of the progress being made in the implementation by Governments of the Action Plan adopted by the 1977 United Nations Water Conference. Group serves as the focal point a the global level for the gathering, analysis and synthesis of information from governments in order to furnish the relevant governing bodies of the organizations concerned with the necessary information to undertake their reviews of progress in the implementation of the Mar Del Plata Action Plan. In its periodic reports to the Committee for Natural Resources, the Economic and Social Council and the UN General Assembly on progress of the Mar del Plata Action Plan, IGW identifies areas

where progress is made and provides guidelines for the international co-ordination and development of the water sector;

(b) Promotion of cooperative and joint planning of water-related programmes of the United Nation system and review of their implementation.

The Group is entrusted with the responsibility of drawing up system-wide plans encompassing joint action by the organizations concerned in the implementation of the Mar del Plata Action Plan; and

(c) Assistance in co-ordinating the water-related activities of the United Nations system at country and regional levels.

The United Nations Secretariat through its Department for International and Social Affairs (UN/DISA) provides the secretariat for the group.

Inter-agency Steering Committee for Co-operative Action

The Inter-Agency Steering Committee for Cooperative Action for the Decade, established in 1978 through a letter of understanding between the Administrator of UNDP and the Director-General of WHO, was a response to the Mar del Plata call for better collaboration and coordination.

The Steering Committee up to the present has functioned as an informal body. It has reported on its activities to the ACC/Inter-Secretariat Group on Water, which then has referred to the work of the Steering Committee in its reports to the UN Committee on Natural Resources (CNR) and ECOSOC.

The Committee brought together, under the chairmanship of UNDP, the agencies of the UN system actively collaborating with governments in the implementation of their Decade programmes. The WHO Unit for Community Water Supply and Sanitation (WHO-CWS) provides the Secretariat to the Steering Committee. Since 1978, the Committee has expanded in membership to thirteen agencies of the United Nations system and on a large basis has provided a forum for programme coordination.

The Steering Committee identifies key issues and establishes inter-agency task forces to address them and develop common strategies and approaches in their particular sector-related fields, such as women and the IDWSSD, human resources development, information exchange, and public information.

A major step was taken by the Steering Committee with regard to coordination of activities at the country level by strengthening the focal point role of the UNDP Resident Representatives in support to national Decade programmes, and for cooperation with other external support agencies. One coordinating function of the Resident Representatives is to bring together the expertise of the United Nations' organizations to support National Action Committees and their planning and other activities.

The Steering Committee also has promoted country, regional and global consultations with governments and ESAs, and it has sought to foster joint action at the country level and to review programme implementation.

Collaborative Framework and the ESA Collaborative Council

A Framework for Global Cooperation, involving Governments and ESAs, was outlined at a Global Consultation in Interlaken, Switzerland, 1987.

Subsequently at a Consultation of ESAs held in The Hague, the Netherlands, 1988, it was agreed that an ESA Collaborative Council should be established. The chief aims of the Council are:

- to raise international awareness of the need for intensified efforts to expand water and sanitation coverage during the 1990s;
- to achieve collaboration among ESAs within the countries in which they are active;
- to serve as a forum for exchange of information on achievements, sector strategies, projects and programmes, and analysis of issues and needs, to alert members to opportunities for collaboration and support; and
- to mobilize support from members and others in the international community for development of strategies for the sector in the 1990s. In order to achieve this, the Collaborative Council called on the Secretariat, provided by the World Health Organization, to organize periodic meetings of a temporary committee, to be known as the 1990 Committee, comprising representatives of multilateral agencies and regional banks, bilateral agencies, non-governmental organizations, and invited members from developing countries. The Council also foresaw the need for the 1990 Committee to establish temporary working groups or advisory panels to deal with specific tasks including the preparation of proposals for applied research and information exchange.

Membership in the Collaborative Council is open to all interested multilateral and bilateral agencies, non-governmental organizations and appropriate international research institutions. In this, it is different from the ACC

developing countries are actively participating in country-level and inter-country cooperation

Intersecretariat Group or the UN Steering Committee in which Membership is generally restricted to UN agencies. Developing countries are actively participating in country-level and inter-country cooperation within the framework, and efforts are being made to ensure appropriate representation of developing countries in the global cooperation activities of the Collaborative Council. The Chairman of the Council is presently the UNDP/WHO Decade Coordinator, and UNDP and other ESAs provide core funding for a small secretariat and for Council activities.

The Council's focus is on water supply, sanitation, hygiene education, and broader environmental concerns such as wastewater reuse, solid waste management, drainage, and hazardous waste management, with a broadening of the scope to include environmental health and water resources protection. Emphasis is on country-level activities in developing countries for information exchange and donor collaboration in the implementation of full-scale development projects.

the overall objective is to maintain Decade momentum by using a coordinated programme approach

Without pre-empting the findings of a Temporary Working Group presently reviewing the Council's achievements and prospects for the future, it can be assumed that the overall objective of the Framework for Global Cooperation, as set by the Hague Consultation, will remain relevant and lead ESAs' collaborative efforts through the 1990s: "to maintain Decade momentum beyond 1990 and accelerate the provision of water supply and sanitation services to all with emphasis on the unserved rural and peri-urban poor, by using a coordinated programme approach."

coordination is not an option or a luxury

The primary reason for collaboration is to make better use of already limited resources and to support governments of developing countries. Through the Decade has come a greater spirit of cooperation amongst sector agencies than ever before. As a result of the exchange of experiences by the several means available, governments and ESAs now have a far better understanding of what demands there are on the sector and how they can be met. Coordination is not an option or a luxury; it is essential to keep agencies alert to problems and needs, to provide for exchange and to provide mechanisms for joint action among ESAs and national agencies.

7.2. Outlook and Issues

7.2.1. At the Country Level

The most important coordination and cooperation takes place by governments at the country level. This involves bringing about effective co-ordination and collaboration among governmental organizations dealing with drinking water supply and sanitation, as well as linking water and sanitation issues with associated concerns in other sectors, most notably the environment, agriculture, population, health and education. Thus, a series of mutually supportive alliances can be established. The need for coordination is not limited only to national agencies; it should involve the ESAs as well. National planning would need to be the joint responsibility of central planning, finance and sector agencies. They would need to be kept informed of the nature and level of assistance that may be provided through ESAs, and to maintain a constant dialogue with ESAs on policy and implementation strategies. For their part, the ESAs also will need to be aware of sectoral plans and funding opportunities. Likewise, larger projects often require the coordinated support of more than one ESA, giving rise to the need for a mechanism to ease and ensure ongoing dialogue between the partners in sector development at the national level.

there is no universal model for country-level coordination

UNDP Resident Representatives have enhanced coordination in their role as Resident Co-ordinators of the United Nations system's operational activities for development in providing support to governments and national Decade programmes, and by the promotion of cooperation with other ESAs at the country level. Coordination could be further strengthened by individual ESAs with strong sector interests in a country taking a prominent role in association with lead national agencies. There is no single universal model for country-level coordination; much depends on institutional and even individual characteristics and personalities.

Full and coordinated government responsibility for goal-setting, research agendas, monitoring and management of the sector is urgently required in many countries, ESAs should concentrate on helping to build national capacity -- to improve planning, research, programme implementation and monitoring and management of the sector.

As regards the important function of monitoring, mechanisms to generate annual statistics on a selected number of relevant indices would enhance sector performance. Sector data should be widely circulated, compared to "annual targets", and fed into the national planning and budgetary processes. Likewise, information exchange needs strengthening at the country level -- information systems need to become demand- oriented, relying more on in-country transfer in local languages and format.

In particular, national agencies and ESAs together will greatly benefit from an active information exchange system, comprising information on the sector, programmes, projects as well as technical and public information. The CESI (Country External Support Information) data base and the initiative of the International Centre for Water Supply and Sanitation (IRC) are examples of stepped up Decade efforts.

7.2.2. At the Regional and Subregional Level

Regional coordination is needed to reflect regional characteristics. Regional groups are well positioned to provide fora for information exchange and to provide technical cooperation services as exemplified in UN Economic Commissions and Regional Offices of UN Agencies and other ESAs, Regional Development Banks and Regional Water Supply and Sanitation Support Groups. Their continuing role in serving sector needs has been effectively demonstrated in the organization of regional strategy meetings in recent years.

7.2.3. At the Global Level

Taking the present global mechanisms as a starting point, necessary adjustments and improvements can be made as required in the years to come. No doubt, sector coordination must be continued at global level. The Decade benefitted greatly from the development of clear policy lines that were followed by ESAs and which directly influenced their strategies and approaches. The joint promotional efforts, including public information and the sharing of experiences, although not always as strong as may have been desirable, have proven crucial to developing and maintaining momentum in the support to country activities. This has helped in achieving more effective and efficient use of the relatively limited resources.

Development of common strategies and approaches on a continuous basis would benefit from a more systematic involvement of the countries in the global process.

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a systematic but innovative approach to public information is needed

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Efforts at the global and regional levels to generate political will and commitment for sector development within developing countries have succeeded in sustaining priority and funding levels despite declining economies. These efforts should be continued and strengthened during the 1990s. A systematic, concerted and innovative approach to public information is needed. Messages to the public should be clear and consistent, goals should be realistic, and the follow-up to launching initiatives should be cogent. A structured global promotion and information strategy and capability needs to be created and implemented through the years ahead. The means of getting the message across effectively in developing and industrialized countries alike will need to involve new approaches, as the messages of the past Decade and the ways of communicating them proved inadequate.

Historically, NGOs and the private sector have not been closely involved in this type of effort. In future, efforts should be made to involve them more effectively. These endeavours can be assisted by a greater willingness on the part of other ESAs and the developing countries to recognize that NGOs and the private sector have valuable contributions to make to sector development.

7.2.4. Coordinated Action for Sector Development

Coordination is not simple. The primary goal of coordination is that it is of direct benefit to the countries. During the Decade a number of issues have emerged that are of interest for coordination at country, regional and global levels. Some may be more country specific, others need to be addressed also at regional and global levels. The multi-disciplinary nature of the sector has given rise to a plethora of institutions inside and outside developing countries, all with their own mandates and interests. Experience points to what coordination needs to address. Some of these issues are listed below.

1. *Water Resources*

   Water resources are being exploited, depleted and polluted in many countries. Since in many countries there is an increasing competition for scarce water

resources among its various uses, it is necessary to consider what are the best means of establishing linkages between concerted approaches for water supply and sanitation development and the rational overall management and protection of water resources?

2. *Integration of Services*

Integration of improvements in water supply, sanitation and hygiene and the environment increases health, social and economic benefits. This applies both to the efforts at the national level and to the support from ESAs.

What are the most effective mechanisms and approaches at:

(a) programme and project level

(b) country level

(c) regional and global levels?

3. *Sustainability*

Sustainability also requires coordination between agencies or NGOs, between the private sector and the community or township. What mechanisms and structures can be established to ensure the availability of required technical ability, spare parts, funding and incentives that are essential for the long-term maintenance, functional operation and use of facilities once they are built?

4. *Experience Exchange*

Seeing is believing. Lessons are seldom (if ever) learned by the reading of reports. The spark of an idea leading to innovation and eventually to motivation for change is a personal one triggered by first-hand experience. There are many ongoing programmes that can serve as useful examples, but the potential for transfer of concepts and experience is not being realized. How can agencies learn about and incorporate improvements from the experience of others? A programme of cross-regional exchange, in which national agency leaders would be able to visit and work in selected programmes in other countries, is one means. Well-designed and effectively implemented cross-regional working exchanges have proven extremely successful in inter-country transfer of concepts, technologies and methods of programming. They are not only convincing but they also provide the visiting/working project leaders with detailed practical knowledge of ways to implement change in their own countries.

5. *Information Exchange*

Information exchange has been a crucial element in sector development, especially at the international and regional levels, but it needs strengthening at the country level. Questions have been raised as to what mechanisms, public and/or private (national centres, journals, professional associations), are best suited to enhance demand-driven information exchange. One approach could be to commission an impartial agency to conduct a review of past efforts. This would involve a broad look at past experiences with a view to defining innovative and effective ways of implementing information exchange to and between project and planning staff.

6. *Sector Planning*

Sector planning has been proposed as a first and important step in establishing institutional roles and responsibilities. How can countries best be supported in their sector planning efforts?

Strategic investment planning (SIP) for sector strengthening (outlined in Chapter 3), as initiated in several countries, for example in Bolivia and Pakistan, represents a positive and coordinated approach to sector improvement at the country level. The SIP is supported by ESAs, which are themselves coordinated by a lead agency. The SIP reviews the sector in its entirety and recommends improvements in policy, strategy and implementation methodology. Once agreed upon and put in place, these are used in project preparation activities, again supported strongly by ESAs. Projects are then ready for external support, which includes central components for institutional strengthening and the introduction of programmes based on the policies and methods developed by the SIP. A coordinated ESA-supported programme is recommended, which would involve:

(a) identifying countries interested in the SIP approach,
(b) identifying interested ESAs as well as a lead ESA,
(c) providing guidelines and mechanisms facilitating the activity, based on previous SIP experience,
(d) monitoring the activity to ensure its effective execution,
(e) ensuring outcome in terms of policy adaptation, funding, institutional strengthening and implementation.
(f) encouraging human resources development at all levels.

7. *Progress Monitoring*

Continued and strengthened global monitoring is necessary as a basis for adapting policies and the support to country programmes and projects. This requires a unified approach, including the development of guidelines and indices.

Although real and quantifiable coverage has been achieved during the past Decade, its measurement has not been straightforward. Based as it was on a variety of definitions and perceptions at the national level, the measurement of progress has proven more difficult than had been anticipated. On the other hand, monitoring progress has provided rough outlines of past trends and directions for the future. But how can it be improved?

Governments now need sound verifiable indices on which to base measurement of coverage. Only then can they rationally set targets, plan future programmes and measure progress.

It has been suggested that:

(a) guidelines be prepared for national definition of primary indices to measure levels of sustainable coverage;

(b) baseline surveys be conducted, and rational and realistic targets incorporating both coverage and sustainability be established for the year 2000. There is a need for continuity in monitoring and for a re-iterative process in target setting, if planning is to be effective; and

(c) monitoring systems within countries require strengthening or establishing, where they do not yet exist, with systems for data management to be linked with such systems at regional and global levels.

The establishment of intermediate goals has also been suggested. These goals would relate to policy and regulatory frameworks, institutional development, coordination, resource mobilization, and decentralization of responsibilities to local levels. Appropriate indices could be established to monitor the "enabling environment" in which progress towards sustained coverage is nurtured. This would assist countries in their efforts to better analyze, plan and implement sector development.

8. *Co-ordination mechanisms*

What improvements could be made at country, regional and global levels to strengthen coordination for support to country action?