

# THE DECADE AND BEYOND: AT A GLANCE

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# THE DECADE AND BEYOND: AT A GLANCE

by Joseph Christmas and Carel de Rooy<sup>1</sup>

## ABSTRACT

The International Drinking Water Supply and Sanitation Decade ends in 1990. Though the Decade has not achieved its numerical objective of universal access to water and sanitation, it has been quite successful in creating awareness about the sector and in developing workable strategies and models which enhance sector sustainability.

The disparity in coverage between urban and rural areas, the wide differential between the provision of water supply facilities and those for sanitation, the active and meaningful involvement of women in the management of water and sanitation programmes, and effective means of accelerating coverage in a sustainable manner, are all issues for which effective answers must be found during the 1990s.

Additionally, it is clear that with approximately 30% of the total capital investment required to provide water and sanitation services to all by the year 2000, 80% of the unserved could be reached by use of essentially low-cost technologies. This fact calls for a concerted effort to shift some resources from high-cost technologies to low-cost alternatives.

If the sector were to perform in the 1990s, similar to its performance during the 1980s, a significant proportion of developing countries' population will yet be unserved by the year 2000. Thus, the strategies of the 1990s must be such that their combined effect will make an enormous difference with respect to sector performance. A more management-oriented sector, based on frequent and systematic monitoring at country and global level, with an institutionalized entity for global advocacy, should form the corner-stone of the thrust for the 1990s.

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# 1. INTRODUCTION

On 10 November 1980, the General Assembly of the United Nations proclaimed the period 1981-1990 as the International Drinking Water Supply and Sanitation Decade (IDWSSD). The primary goal of the IDWSSD, as conceived then, was to achieve full access to water supply and to sanitation for all inhabitants in developing countries by 1990.

At this point in time, at the virtual end of the IDWSSD, it is clear that the primary goal of full access to water supply and sanitation will not be achieved by the target year of 1990, as a formal assessment by the World Health Organization (WHO) has shown. (Some of the IDWSSD material used herein is based on the WHO assessment). Consequently, both the developing countries, themselves, and the External Support Agencies (ESAS) have reached a broad consensus to continue the existing thrust of the IDWSSD, beyond 1990, to coincide with the goal of "Health for All by the Year 2000".

Therefore, the primary goal of achieving universal access to water supply and sanitation is now re-targeted for a future date.

## 2. EVOLUTION OF CURRENT WATER AND SANITATION DECADE (1980s)

### *2.1 Concepts and Approaches*

The International Drinking Water Supply and Sanitation Decade (IDWSSD) of the 1980s, ushered in several novelties, gleaned from past evaluations of water and sanitation programmes in several countries. This new thrust directed attention to several hitherto untouched issues, including the following: institutional development and sector planning; the development of community-awareness and participation, including increased involvement of women; the development and utilization of affordable, appropriate technologies; the integration of water supply with sanitation and hygiene education; the importance of adequate operation and maintenance of systems; the mobilization of communities to manage their programmes, including development of their own cost recovery measures for operation and maintenance; the significance of human resources development; and the need for international coordination and cooperation regarding sector inputs.

### *2.2 Performance*

The "Water and Sanitation Decade" was launched in November 1980 at the same time that the downturn in the world economy had begun to be felt in the developing

countries. Gross Domestic Product (GDP) growth rates in developing countries started to drop and their long-term external debts during the 1980s more than doubled. Demographic growth, particular in urban areas, further complicated the problem of expanding water and sanitation facilities to a fast-growing population. Even at the end of the 1980s, there is no general, significant improvement in the adverse economic climate and the explosive population growth among developing countries. However, there are regional disparities regarding the effects of the economic situation and the responses. Asia is showing more buoyancy and resilience whilst Africa and Latin America are suffering immensely. Thus, two factors – inadequate funding and high population growth – contributed significantly in curtailing the coverage rate for water and sanitation, thereby preventing the achievement of universal access to these facilities.

However, the Water and Sanitation Decade of the 1980s is not only a matter of numbers. Despite the inability to achieve 100% coverage in water supply and sanitation by 1990, it has succeeded in introducing low-cost technologies, and in focusing attention on the user communities as active participants in the developmental process, rather than their being merely passive recipients as hitherto.

Despite the austere economic climate, total global annual funding for the water and sanitation sector among developing countries, is estimated at \$10,000 million. Globally, it is approximated that 65% of sector funding, during the 1980s, came from national sources. In the case of Africa and the least developed countries, where the major reliance appears to have been on external funding, this proportion was only slightly in excess of 25%, whereas in the countries of the Middle East, the figure was about 90%.

The U.N. Inter-agency Steering Committee for Cooperative Action for the Water and Sanitation Decade is involved in fostering collaboration with governments in the implementation of programmes. Coordination of the Water and Sanitation Decade activities is facilitated via this Steering Committee which is chaired by UNDP.

### *2.3 Coverage Status at End of Decade (1990)*

The available information indicates that modest progress, in extending service coverage to the population of developing countries, took place between 1980 and 1990.

The most dramatic increase took place in the case of rural water supply where the number of persons provided with facilities in 1980, increased by 240% by 1990. The number of rural inhabitants provided with sanitation facilities in 1980 also increased, though less spectacularly, by 150%. Increases in the number of people provided with facilities in 1980, relative to 1990, were 150% each for urban drinking water supply and for sanitation. However, in the face of rapidly expanding urban population, these increases in the number of inhabitants provided with adequate services did not necessarily translate into equally significant increases, in the proportion of people with services, relative to the

total population. Only in the case of rural water supply did it result in a doubling of the proportion served between 1980 and 1990.

Table 1 summarizes changes in service coverage achieved during the period 1980-90, on a regional and global basis. Figures 1, 2, 3 and 4 graphically represent the percentage changes in service coverage, during the same 10-year period, on a regional and global scale, whilst Figures 5, 6, 7 and 8 depict the changes in coverage, in absolute population, for the same geographic regions. The data show, among other things, that over the 10-year period an additional 1,347 million and 748 million persons were served with water and with sanitation facilities, respectively.

As expected, there are significant variations from region to region (and even from country to country within a region). A review of progress in Africa is of particular interest since the continent contains most of the world's least developed countries, and has suffered acute water problems associated with drought during the 1980s. Overall, countries in the African region fell significantly short of their targets for the decade of the 1980s. Despite the absolute numbers of people served, the proportion for urban water supply coverage increased by a mere 5% from 77% in 1980 to 82% in 1990. For urban sanitation, the gains were extremely modest, as coverage increased by only 3 percentage points. For rural Africa, the relative success achieved in water supply coverage compares favourably with that for sanitation as, during the 1980s, the former rose by 9 percentage points as against the latter's 8 percentage points.

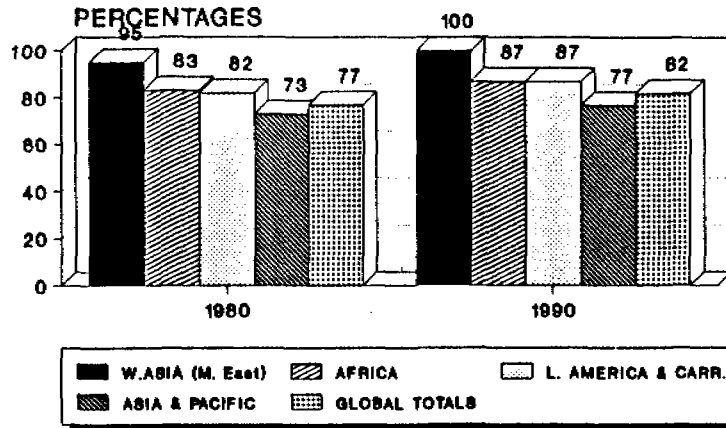
After 10 years of intensified global effort, the water and sanitation coverage in 1990, among developing countries, is approximated by the following statistics: urban water 82%; rural water 63%; urban sanitation 72%; and rural sanitation 49%. Figures 9, 10, 11 and 12 illustrate. Thus, in absolute terms, at the start of the 1990s, there are an estimated 1,230 million people in developing countries without access to adequate and safe water supplies, and 1,740 million without access to appropriate sanitation, i.e., 31% without water, and 43% without sanitation. The consequences of this, in terms of human health and suffering, as well as social and economic cost, are staggering.

## *2.4 Lessons of the 1980s*

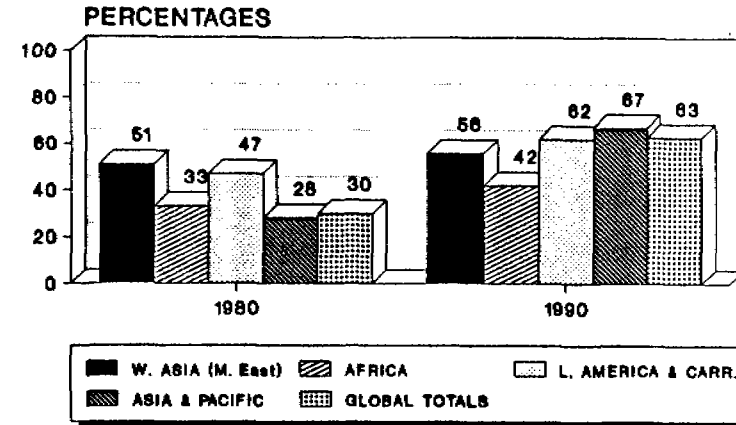
In retrospect, the decade of the 1980s has revealed the following:

- ▶ Progress has been made in developing models for sustainable development of water and sanitation programmes in rural and peri-urban areas of developing countries. But greater efforts are required to translate these models into workable approaches for application to programmes, especially for the rapid delivery of programmes and acceleration of the coverage rate.

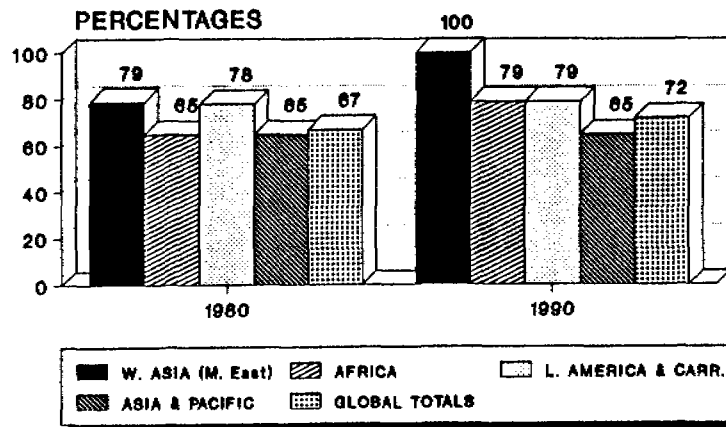
**Fig. 1: DECADE PERFORMANCE  
URBAN WATER SUPPLY COVERAGE**



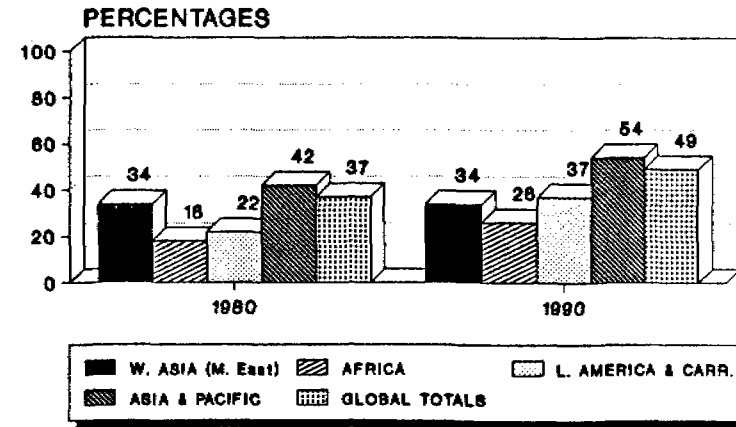
**Fig. 2: DECADE PERFORMANCE  
RURAL WATER SUPPLY COVERAGE**



**Fig. 3: DECADE PERFORMANCE  
URBAN SANITATION COVERAGE**

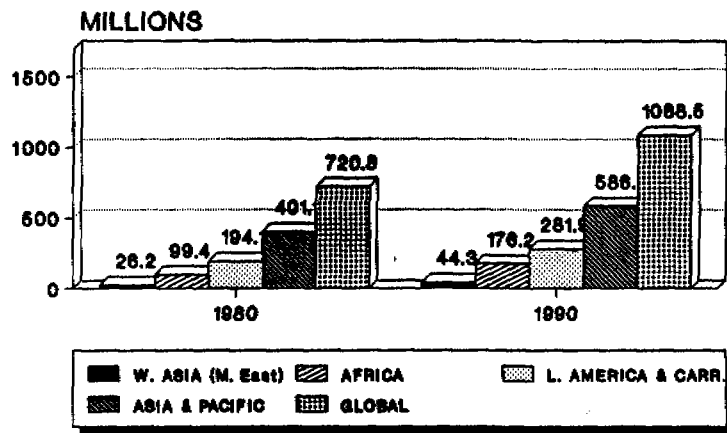


**Fig. 4: DECADE PERFORMANCE  
RURAL SANITATION COVERAGE**

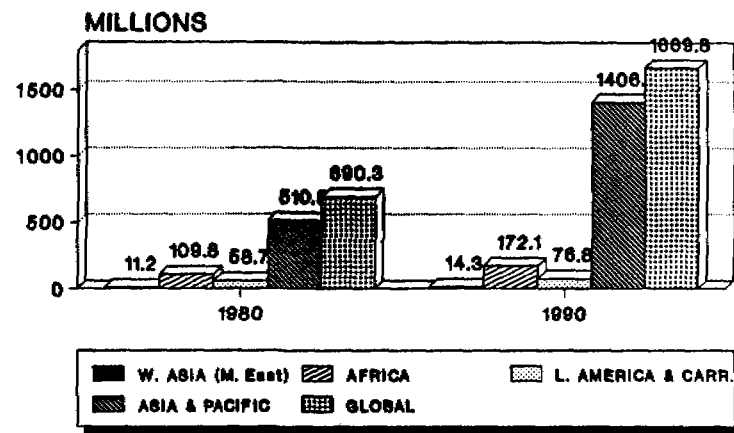




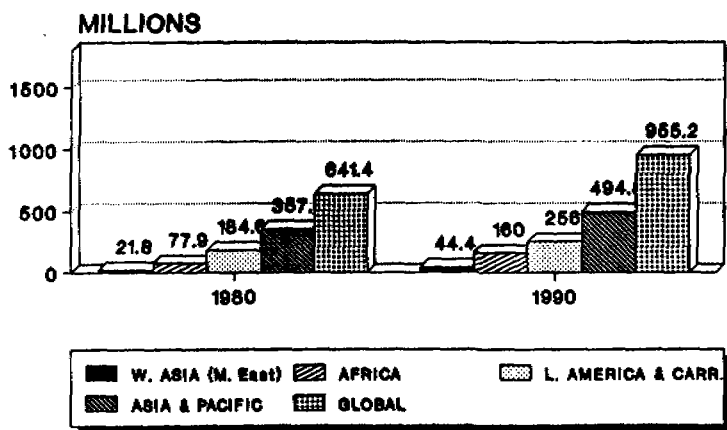
**Fig. 5: ABSOLUTE COVERAGE 1980s  
URBAN WATER SUPPLY**



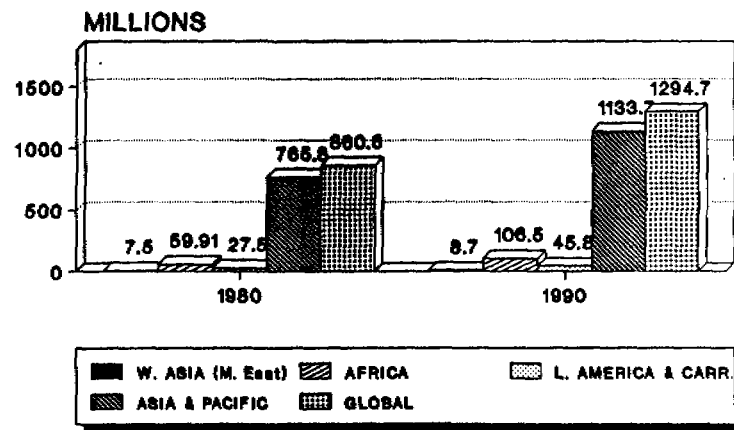
**Fig. 6: ABSOLUTE COVERAGE 1980s  
RURAL WATER SUPPLY**



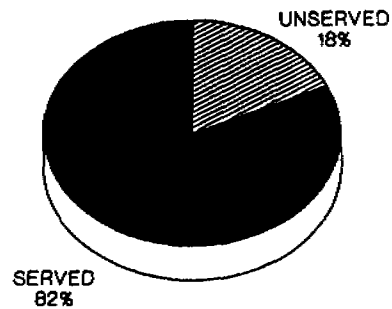
**Fig. 7: ABSOLUTE COVERAGE 1980s  
URBAN SANITATION**



**Fig. 8: ABSOLUTE COVERAGE 1980s  
RURAL SANITATION**

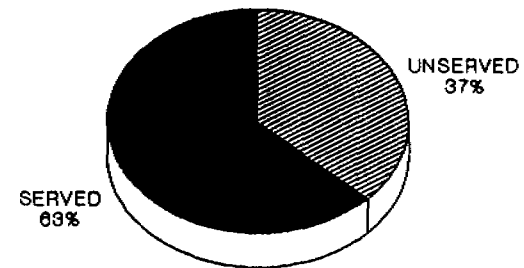


**Fig. 9: ESTIMATED COVERAGE 1990  
URBAN WATER**



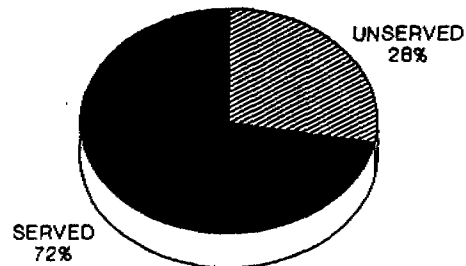
Unserved Population 243.70 M

**Fig. 10: ESTIMATED COVERAGE 1990  
RURAL WATER**



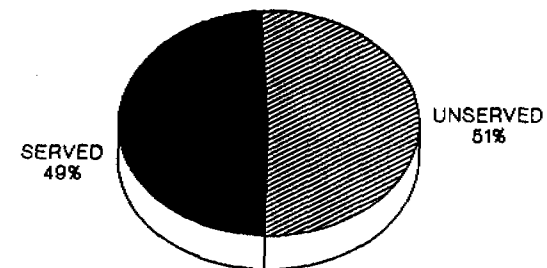
Unserved Population 988.72 M

**Fig. 11: ESTIMATED COVERAGE 1990  
URBAN SANITATION**



Unserved Population 377.00 M

**Fig. 12: ESTIMATED COVERAGE 1990  
RURAL SANITATION**



Unserved Population 1363.79 M

Active and systematic management of the 1980s decade could have resulted in greater progress, if applied.

- ▶ Globally, virtually all developing countries lack properly devised action plans for methodical guidance of their decade activities.
- ▶ Women's involvement, crucial for community participation, has not been systematically applied, but, at best, is ad hoc.
- ▶ The promotion and acceptance of cost-sharing mechanisms (cost recovery schemes for operation and maintenance, etc.) face formidable resistance at government level in many countries, and are difficult to put in practice at the community level.
- ▶ Maintenance still poses significant problems despite the appropriateness of the technologies. The problems relate mainly to sustainable funding for the provision of spare parts.
- ▶ Low-cost technology projects get only about 4% of the estimated total annual external funding of \$3,000 million whilst governments' firm commitment to such projects is indicated by a 6-fold increase since 1980.
- ▶ In global terms, there is an insufficiency of trained professional and sub-professional personnel within the sector, among developing countries.

The major constraints to the water and sanitation programme, as identified by developing countries' governments, for the four main geographic regions are:

- Africa: Funding limitation, inadequate cost recovery, poor operation and maintenance, and lack of trained professional personnel -- in that order.
- Latin America & the Caribbean: This region gave the same constraints, in the same order, as for Africa.
- Asia & the Pacific: Insufficient trained professionals, funding limitations, lack of cost recovery, and inadequate operation and maintenance -- in that order. In addition, several countries, particularly small island nations, underscored the difficulties associated with basic shortages of water resources.
- Middle East: Funding limitations, lack of trained manpower both professional and sub-professional, and poor operation and maintenance -- in that order. It is noteworthy that in this grouping of some of the world's wealthiest nations, funding limitation is still considered the main constraint. This perhaps indicates inadequate allocation of funds, particularly to rural areas of the sector.

### **3. DEVELOPMENTAL FRAMEWORK FOR 1990s**

#### ***3.1 General Global Requirements***

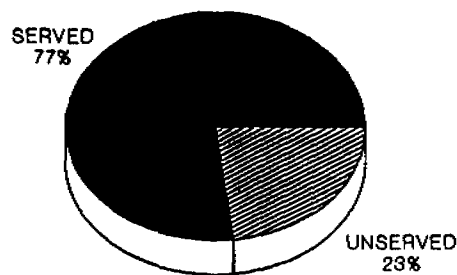
**Water and sanitation programmes are national responsibilities thus, strategies and planned activities of the United Nations Agencies and the rest of the external support community should strengthen and reflect national priorities and, additionally, complement national endeavours in such a manner as to enhance overall effectiveness.**

**It is clear that if developing countries' water and sanitation programme delivery continues in the 1990s, in the same vain, at the same rate, as in the 1980s, the global service coverage in the year 2000 will fall well short of 100%. Figures 13, 14, 15 and 16 indicate the projected percentage coverage at the year 2000, for water and sanitation in both urban and rural areas, based on the implementation rates of the 1980s.**

**Against the foregoing background, the broad requirements of the water and sanitation sector, in developing countries, for the 1990s, include the following:**

- ▶ **Re-formulation of national coverage goals to achieve widespread access to water and sanitation by the year 2000. This long-term goal should be sub-divided into expected annual coverage so as to facilitate annual monitoring.**
- ▶ **Re-invigoration and re-application of the concepts and approaches of the International Drinking Water Supply and Sanitation Decade of the 1980s (as outlined under Section 2.1).**
- ▶ **Rationalization in the use of sector funds. Total annual funding, globally, for the sector, among developing countries, during the 1980s was about US\$10,000 million. The External Support Agencies provided approximately US\$3,000 million of this total. Estimated funding needs for the 1990s are US\$36,000 million annually based on 100% coverage by the year 2000. As funding in this order of magnitude is unlikely under the prevailing economic conditions, greater cost efficiency and effectiveness, even with the existing funding level, is required to accelerate the coverage rate.**
- ▶ **Intensification of measures to control the population growth rate and to curtail urbanization.**
- ▶ **Priority to be given to personnel needs, via human resources development for the strengthening of national institutional structures.**
- ▶ **More vigorous promotion and application of low-cost technology programmes, with**

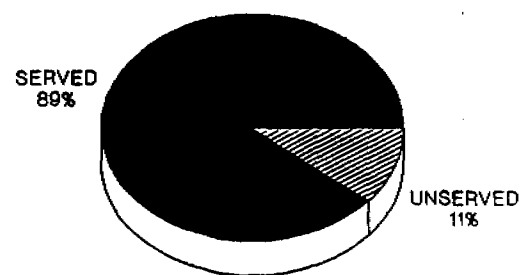
**Fig. 13 PROJECTED % COVERAGE - YEAR 2000  
GIVEN 1980s' IMPLEMENTATION RATES**



URBAN WATER

**Unservd Population 445.5 M.**

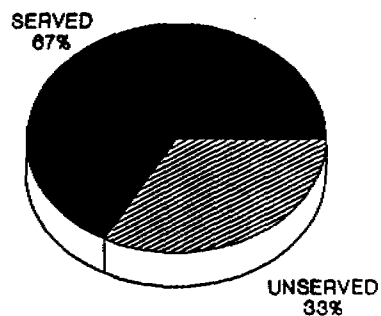
**Fig. 14 PROJECTED % COVERAGE - YEAR 2000  
GIVEN 1980s' IMPLEMENTATION RATES**



RURAL WATER

**Unservd Population 321.3 M.**

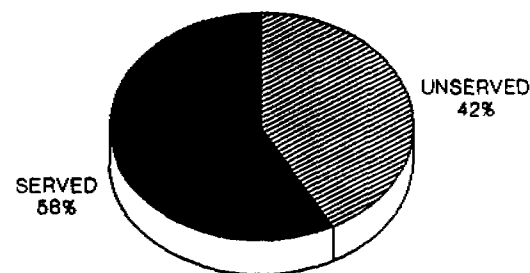
**Fig. 15 PROJECTED % COVERAGE - YEAR 2000  
GIVEN 1980s' IMPLEMENTATION RATES**



URBAN SANITATION

**Unservd Population 632.7 M.**

**Fig. 16 PROJECTED % COVERAGE - YEAR 2000  
GIVEN 1980s' IMPLEMENTATION RATES**



RURAL SANITATION

**Unservd Population 1241.8 M**

emphasis on technical cooperation among developing countries (TCDC), and dissemination and exchange of information amongst the scientific community in developing countries.

- ▶ **Meaningful linkage of the water and sanitation sector with other sectors, especially health, education, women, communications, and nutrition (via home-gardening).**
- ▶ **Execution of all programmes as integral components of overall water resources management and environmental health.**
- ▶ **Strengthening and broadening the coordination and cooperation among national governments and the External Support Agencies.**
- ▶ **Establishment of policy and strategies to make extensive and systematic use of social communications for global and community-based mobilization of people and resources.**

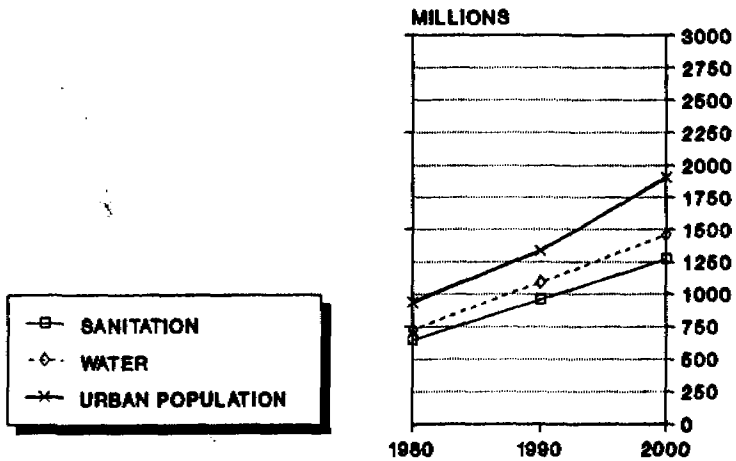
The foregoing broad needs are high-lighted, in essence, to provide the basis for accelerating the coverage rate, in a sustainable manner, to achieve widespread access to water and sanitation by the target year, 2000. Figures 17 and 18 show the projected absolute population served with water and sanitation facilities at the year 2000, based on the trend of the 1980s. The gap shown between the total population and those covered by services, is enormous. Calculations indicate that 1980s implementation rates for urban water and for rural water, would have to increase about 2.5 and 1.5 times, respectively, whilst urban sanitation and rural sanitation would have to increase 3 and 4 times, respectively, during the 1990s, if universal access to these facilities is to be achieved by the year 2000.

### ***3.2 Priority Actions***

Though there are a plethora of activities to be implemented in the 1990s, priority attention should be given to the implementation of the concept of management by objectives, with respect to the water and sanitation sector, at both the country and the global level. Regular, perhaps annual or more frequent, monitoring of the sector's performance should form the basis for its management. To give effect to this concept, the following should be pursued:

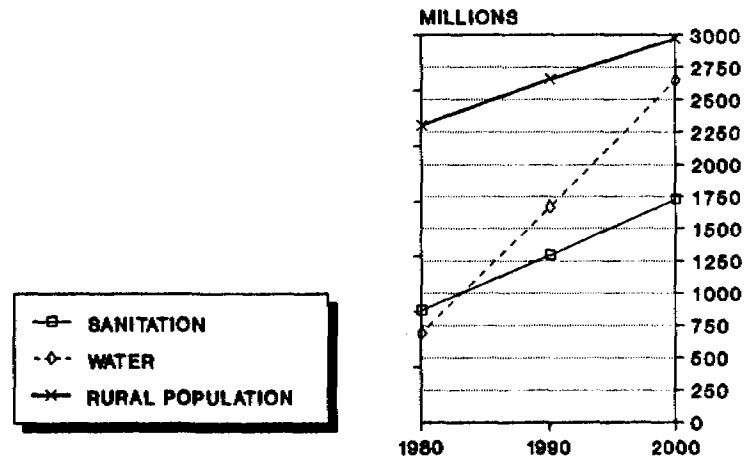
- **Execution of a review of each country's status regarding water and sanitation coverage as of 1990 and a realistic estimate of coverage to be achieved by the year 2000; and the types of assistance required.**
- **Establishment of an action plan – just a framework – for the 1990s based on the review of the country's status and its goal.**

**Fig. 17 PROJECTED COVERAGE FOR YEAR 2000  
GIVEN 1980s' IMPLEMENTATION RATES**



**WATER AND SANITATION - URBAN AREAS**

**Fig. 18 PROJECTED COVERAGE FOR YEAR 2000  
GIVEN 1980s' IMPLEMENTATION RATES**



**WATER AND SANITATION - RURAL AREAS**

- Establishment of a national monitoring unit by Government, at the country level, with assistance, if necessary, from the External Support Agencies. The unit will monitor the sector performance and apprise the country-level management (co-ordination) body of its findings. Actions are to be taken based on these findings.
- At the global level, a management/coordination entity, comprising members from the developing countries and the External Support Agencies, should be formed to perform a largely advocacy role on behalf of the sector, with respect to findings from global monitoring.

#### ***4. CAPITAL COST OF COMPLETE COVERAGE***

##### ***4.1 Elements Influencing the Costing Model***

A costing model, with respect to capital investments only, is devised to provide an estimated cost of completely serving the unserved, among developing countries, with water supply and sanitation, by the year 2000. Recurrent costs though highly essential for operation and maintenance, especially, are not included in the model. Costs are based on 1990 values. The model can be considered a preliminary one with the possibility for further refinement.

The total population among developing countries, in 1990, is estimated at 4,000 million, with urban and rural sharing 1,332 million and 2,668 million, respectively. Figures 9,10,11 and 12 indicate the proportion and number of unserved persons as of 1990. The total population among developing countries, by the year 2000, is approximated at 4,810 million, with urban and rural areas, respectively, having 1,902 and 2,908 million.

China, India, Pakistan, Bangladesh, Indonesia, and Vietnam in Asia; Nigeria and Egypt in Africa; and Brazil and Mexico in Latin America account for approximately 75% of the current developing countries' population, and it is likely that this picture will not change significantly over the forthcoming decade. What happens in these countries will therefore dictate the overall outcome in costs and coverage by the year 2000.

The 1980s witnessed for the first time in history a concerted effort to provide needy (poor) people in urban and rural areas with water and sanitation services on a large scale. one of the outcomes of this effort was the emergence of an array of low-cost approaches and technologies which have effected significant cost reductions as they were transferred from their research and developmental phase into large scale implementation programmes.

In UNICEF-assisted projects, Nigeria, the average unit cost of a handpump-equipped borehole was reduced from over US\$20,000.00 in 1982, to under US\$ 4,000.00 by 1989 largely through the use of appropriate technologies. A similar trend has been observed in



the Sudan where more efficient resource management has reduced the unit cost of handpump-equipped boreholes from US\$9,500 in 1987 to US\$2,800 in 1989.

While progress has been made in cost reduction via low-cost technologies it is undeniable that, as urban centres grow and more distant and/or deeper additional water sources have to be identified and developed, the cost of service delivery may increase.

This principle is not limited to urban areas; when the more distant and isolated populations in rural areas have to be reached, the scarcity of adequate infrastructures tends to raise developmental costs substantially.

A few UNICEF-assisted water and sanitation projects have derived quite accurate costs for low-cost water and sanitation service delivery. The applicability of these on large scale cost projections is however, limited because of several factors:

- ▶ UNICEF-provided hardware (capital goods) enter countries duty free and are therefore much cheaper than private sector equivalents found in the developing countries;
- ▶ Depreciation of capital goods are usually linear and do not take into account payment of loans or interest rates because all equipment is granted to the countries.
- ▶ UNICEF is, in absolute financial terms, but a small partner in the sector. It contributes less than 1% of the sector's global total annual investment (but its impact on coverage is significant because of its emphasis on low-cost technologies and approaches).

The above mentioned facts make "UNICEF costs" low, on the cost spectrum for water and sanitation service delivery, and render them somewhat inapplicable to global cost projections. However, UNICEF's low-cost and cost reduction approaches are good pointers regarding the direction in which cost efficient water and sanitation programmes should be developed.

## ***4.2 The Model***

The several, and at times opposing, forces which influence water and sanitation service delivery costs were taken into account for the costing model applied herein.

World Bank and UNDP water and sanitation colleagues were consulted and several "technology categories" with respective costs were determined.

For the costing model, the unserved population over the next ten years, up to the year 2000, is divided into three broad geographic groups representing what, in reality, is

much less well defined. These are urban, peri-urban, and rural. Specific "technology categories" are then assigned to the geographic groupings.

By knowing the number of unserved persons per geographic group, and also the unit cost for water supply and for sanitation facilities for the assigned technology category, the total cost of having 100% coverage among the unserved by the year 2000, can be estimated.

The model assumes that low-cost technologies will be applied to the entire rural areas; that 50% of the urban areas will have high-cost technologies; the remaining half of the urban areas will be equally divided into low-cost (25%) and intermediate cost (25%).

| The geographic groups with their corresponding Technology categories and unit costs are as follows: |                              |
|---|------------------------------|
| TECHNOLOGY CATEGORY   | COST PER CAPITA<br>(in US\$) |
| <b>HIGH-COST TECHNOLOGY</b>   |                              |
| • Urban Water Supply  | 200                          |
| • Urban Sanitation  | 350                          |
| <b>INTERMEDIATE TECHNOLOGY</b>  |                              |
| • Peri-urban Water Supply   | 100                          |
| • Peri-urban Sanitation   | 25                           |
| <b>LOW-COST TECHNOLOGY</b>  |                              |
| • Rural Water Supply  | 30                           |
| • Rural Sanitation  | 20                           |

**High Cost Technology** applies to the urban-type system with elaborate pumping stations, water and sewerage treatment plants, complete distribution systems and individual household connections for both water supply and sewerage.

**Intermediate Technology**, applicable to peri-urban areas essentially, comprises pipeborne water supply (no allowance for elaborate treatment) leading to public standposts, and "on-site" sanitation including technologies such as pour-flush and ventilated improved pit latrines.

**Low-cost Technology**, targeted to rural areas essentially, includes handpump-equipped boreholes or handdug wells, rainwater Harvesting systems and pipe-borne gravity-fed Systems with public standposts, for water supply. Sanitation technologies are the same as those allocated to the "intermediate technology" category with a slight cost reduction allowing for the use of locally available construction materials for the building of Latrine super-structures.

### 4.3 Population to be Served

In order to raise the service coverage from the 1990 levels of 82% for urban water, 63% for rural water, 72% for urban sanitation, and 49% for rural sanitation to 100% for all four sub-components by the year 2000, several millions of unserved people must be

| Region/sector                          | 1980       |            |            |              | 1990       |            |            |              |
|--|------------|------------|------------|--------------|------------|------------|------------|--------------|
|  | Population | % coverage | Nb. served | Nb. unserved | Population | % coverage | Nb. served | Nb. unserved |
| <u>Africa</u>                          |            |            |            |              |            |            |            |              |
| Urban Water                            | 119.77     | 83         | 99.41      | 20.36        | 202.54     | 87         | 176.21     | 26.33        |
| Rural Water                            | 332.83     | 33         | 109.83     | 223.00       | 409.64     | 42         | 172.05     | 237.59       |
| Urban Sanitation                       | 119.77     | 65         | 77.85      | 41.92        | 202.54     | 79         | 160.01     | 42.53        |
| Rural Sanitation                       | 332.83     | 18         | 59.91      | 272.92       | 409.64     | 26         | 106.51     | 303.13       |
| <u>Latin America and the Caribbean</u> |            |            |            |              |            |            |            |              |
| Urban Water                            | 236.72     | 82         | 194.11     | 42.61        | 324.08     | 87         | 281.95     | 42.13        |
| Rural Water                            | 124.91     | 47         | 58.71      | 66.20        | 123.87     | 62         | 76.80      | 47.07        |
| Urban Sanitation                       | 236.72     | 78         | 184.64     | 52.08        | 324.08     | 79         | 256.02     | 68.06        |
| Rural Sanitation                       | 124.91     | 22         | 27.48      | 97.43        | 123.87     | 37         | 45.83      | 78.04        |
| <u>Asia and the Pacific</u>            |            |            |            |              |            |            |            |              |
| Urban Water                            | 549.44     | 73         | 401.09     | 148.35       | 761.18     | 77         | 586.11     | 175.07       |
| Rural Water                            | 1823.30    | 28         | 510.52     | 1312.78      | 2099.40    | 67         | 1406.60    | 692.80       |
| Urban Sanitation                       | 549.44     | 65         | 357.14     | 192.30       | 761.18     | 65         | 494.77     | 266.41       |
| Rural Sanitation                       | 1823.30    | 42         | 765.79     | 1057.51      | 2099.40    | 54         | 1133.68    | 965.72       |
| <u>Western Asia (Middle East)</u>      |            |            |            |              |            |            |            |              |
| Urban Water                            | 27.54      | 95         | 26.16      | 1.38         | 44.42      | 100        | 44.25      | 0.17         |
| Rural Water                            | 21.95      | 51         | 11.19      | 10.76        | 25.60      | 56         | 14.34      | 11.26        |
| Urban Sanitation                       | 27.54      | 79         | 21.76      | 5.78         | 44.42      | 100        | 44.42      | 0.00         |
| Rural Sanitation                       | 21.95      | 34         | 7.46       | 14.49        | 25.60      | 34         | 8.70       | 16.90        |
| <u>Global totals</u>                   |            |            |            |              |            |            |            |              |
| Urban Water                            | 933.47     | 77         | 720.77     | 212.70       | 1332.22    | 82         | 1088.52    | 243.70       |
| Rural Water                            | 2302.99    | 30         | 690.25     | 1612.74      | 2658.51    | 63         | 1669.79    | 988.72       |
| Urban Sanitation                       | 933.47     | 69         | 641.39     | 292.08       | 1332.23    | 72         | 955.22     | 377.00       |
| Rural Sanitation                       | 2302.99    | 37         | 860.64     | 1442.35      | 2658.51    | 49         | 1294.72    | 1363.79      |

provided water and sanitation facilities at an accelerated rate. Consequently, in absolute terms, 813 million people in urban areas and 1,301 million people in rural areas will require water supply, and 947 million urban and 1,676 million rural people will need sanitation services (if full coverage is envisaged by the year 2000). Tables 2 and 3 provide a breakdown of these statistics.

#### **4.4 Investment Cost**

A total cost of approximately US\$357,000 million (US\$357 billion) was derived to attain a water and sanitation service coverage of 100% by the year 2000 based on the following distribution of technology categories:

US\$247 billion for high-cost in urban areas,

US\$26 billion for intermediate technologies in mainly periurban areas,

US\$11 billion for low-cost in (the remaining) peri-urban areas, and

US\$73 billion for low-cost in rural areas.

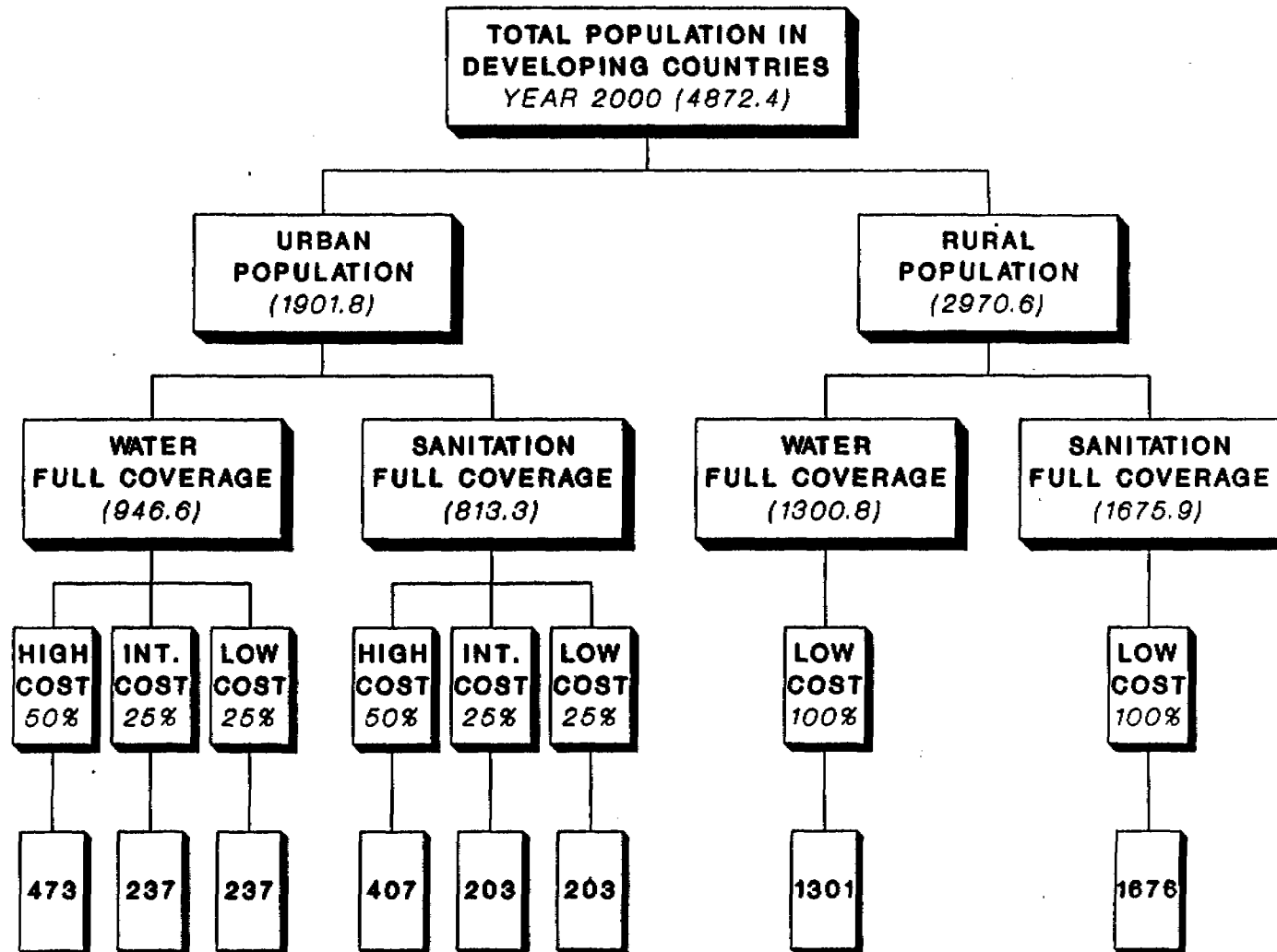
Figure 19 indicates the funding required per technology type, namely, high-cost (\$247 billion), intermediate (\$26 billion), and low-cost (\$84 billion). Figures 20, 21, 22 and 23 provide further details regarding the costs for water supply and for sanitation, within the framework of the technology types. All costs are based on 1990 values.

The 10-year capital investment cost of US\$357 billion, when apportioned, allows for US\$147 billion for water supply and US\$210 for sanitation. These estimates imply an investment of about US\$36 billion per year over a 10 year period (1991-2000), with US\$15.0 billion for water supply and US\$21.0 billion for sanitation. The cost derived is equivalent to about three and one-half times the average annual investment into the sector during the 1980s. (Developing countries spend about US\$200 billion annually on the military.)

However, as sector funding in this order of magnitude, \$36 billion annually, is not forthcoming, in the current economic climate, restructuring the use of existing sector funds in terms of efficiency and effectiveness must be pursued parallel to mobilizing for additional funds.

Therefore, if one were to focus on the provision of services to the needy (poor), herein categorized as the total rural population plus 50% of the urban population (essentially peri-urban), it is clear that *with only 30% (US\$110 billion) of the total investment (US\$357 billion), over 2 billion needy people could be reached with sanitation and 1.6 billion with water supply.*

Table 2: BREAKDOWN UNSERVED POPULATION  
(YEAR 2000) INTO SERVICE TYPES



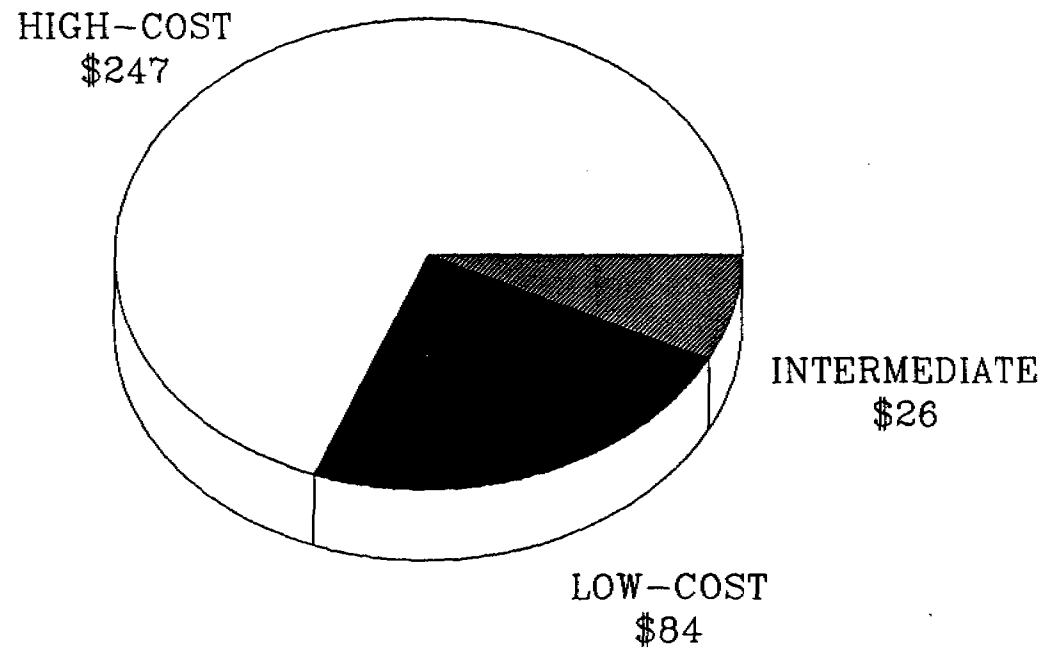
ALL POPULATION FIGURES IN MILLIONS

**TABLE 3:  
ESTIMATED FINANCIAL REQUIREMENTS TO PROVIDE SERVICES TO 100%  
OF THE UNSERVED POPULATION BY THE YEAR 2000.**

| (ALL POPULATION FIGURES IN MILLIONS)  | POP BY YEAR 2000 | REQUIRED SERVICE COVERAGE TO ATTAIN 100% COVERAGE | HIGH-COST TECHNOLOGY  |                        |                              | INTERMEDIATE TECHNOLOGY                                    |                        |                              | LOW-COST TECHNOLOGY   |                        |                              |
|---|------------------|---|---|------------------------|------------------------------|--|------------------------|------------------------------|---|------------------------|------------------------------|
|   |                  |   | POP SERVED WITH HIGH COST   | COST PER CAPITA (US\$) | SUBTOTAL IN MILLIONS OF US\$ | POP. SERVED WITH INTERMED.                                 | COST PER CAPITA (US\$) | SUBTOTAL IN MILLIONS OF US\$ | POP. SERVED WITH LOW-COST   | COST PER CAPITA (US\$) | SUBTOTAL IN MILLIONS OF US\$ |
| Urban water   | 1901.80          | 813.28  | 406.64  | 200.00                 | 81,328                       | 203.32   | 100.00                 | 20,332                       | 203.32  | 30.00                  | 6,100                        |
| Rural water   | 2970.60          | 1300.81   |   |                        |                              |  |                        |                              | 1,300.81  | 30.00                  | 39,024                       |
| Urban sanit   | 1901.80          | 946.58  | 473.20  | 350.00                 | 165,652                      | 236.65   | 25.00                  | 5,916                        | 236.65  | 20.00                  | 4,733                        |
| Rural sanit   | 2970.60          | 1675.88   |   |                        |                              |  |                        |                              | 1,675.88  | 20.00                  | 33,518                       |
|   |                  |   | SUBTOTAL URBAN HIGH-COST TECHNOLOGY: 246,980                        |                        |                              | SUBTOTAL URBAN INTERMEDIATE TECHNOLOGY: 26,248             |                        |                              | SUBTOTAL URBAN LOW-COST TECHNOLOGY: 10,833  |                        |                              |
|   |                  |   | TOTAL HIGH-COST TECHNOLOGY: 246,980                                 |                        |                              | TOTAL URBAN: 284,060                                       |                        |                              | SUBTOTAL RURAL LOW-COST TECHNOLOGY: 72,542  |                        |                              |
|   |                  |   | AVERAGE ANNUAL INVESTMENT REQUIRED FOR HIGH-COST TECHNOLOGY: 24,698 |                        |                              | AVERAGE ANNUAL INVESTMENT REQUIRED FOR URBAN AREAS: 28,406 |                        |                              | TOTAL RURAL: 72,542   |                        |                              |
| A) COVERAGE OF UNSERVED RURAL POPULATION WITH LOW COST WATER AND SANITATION TECHNOLOGIES BY YEAR 2000 REQUIRES A TOTAL CAPITAL INVESTMENT OF \$72.5 BILLION OR AN ANNUAL INVESTMENT OF \$7.3 BILLION FOR RURAL AREAS.   |                  |   |   |                        |                              |  |                        |                              | AVERAGE ANNUAL INVESTMENT REQUIRED FOR RURAL AREAS: 7,254                           |                        |                              |
| B) COVERAGE OF UNSERVED URBAN POOR (MAINLY PERI-URBAN DWELLERS WITH A MIXTURE OF LOW-COST (\$10.8 BILLION) AND INTERMEDIATE TECHNOLOGIES (\$26.3 BILLION) BY THE YEAR 2000 REQUIRES A TOTAL INVESTMENT OF \$37 BILLION, OR AN ANNUAL INVESTMENT OF \$3.7 BILLION. |                  |   |   |                        |                              |  |                        |                              | TOTAL LOW-COST AND INTERMEDIATE TECHNOLOGY: 109,623                                 |                        |                              |
| C) COVERAGE OF THE REMAINING URBAN POPULATION (ECONOMICALLY ABLE) WITH HIGH-COST WATER AND SANITATION TECHNOLOGIES BY THE YEAR 2000, REQUIRES A TOTAL INVESTMENT OF \$246.9 BILLION OR AN ANNUAL CAPITAL INVESTMENT OF \$24.7 BILLION.                            |                  |   |   |                        |                              |  |                        |                              | AVERAGE ANNUAL INVESTMENT REQUIRED FOR LOW-COST AND INTERMEDIATE TECHNOLOGY: 10,962 |                        |                              |
| D) TOTAL COVERAGE OF THE UNSERVED BY THE YEAR 2000, WITH A MIXTURE OF WATSAN TECHNOLOGIES BY YEAR 2000 REQUIRES A TOTAL CAPITAL INVESTMENT OF \$357 BILLION OR AN ANNUAL INVESTMENT OF \$36 BILLION.  |                  |   |   |                        |                              |  |                        |                              | TOTAL GLOBAL: 356,602   |                        |                              |
|   |                  |   |   |                        |                              |  |                        |                              | AVERAGE ANNUAL INVESTMENT REQUIRED TO ATTAIN GLOBAL COVERAGE OF 90% 35,660          |                        |                              |

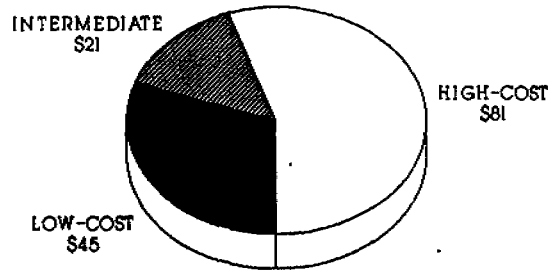
From this costing analysis, unrefined as it is, the indication is that over the next ten years, by the use of essentially low-cost technologies (and a few intermediate ones), about 80% of the unserved population, among developing countries, can annually be served with water and sanitation facilities at 30% (US\$11 billion) of the total annual cost (US\$36 billion) of providing such facilities to all of the unserved. In other words, *30% of the total cost can service 80% of the unserved, if the low-cost option is emphasized.*

Fig.19: TECHNOLOGY TYPES & FUNDS NEEDED  
FOR 100% COVERAGE BY YEAR 2000



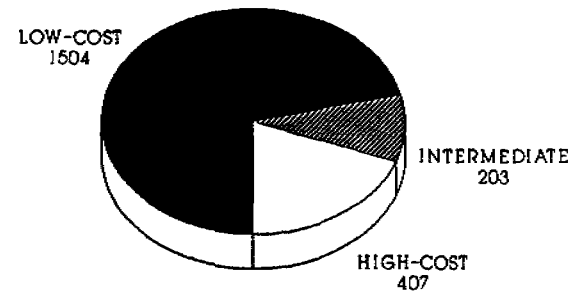
IN BILLIONS OF US\$

**Fig. 20: REQUIRED INVESTMENT PER TECHNOLOGY FOR WATER SUPPLY BY YEAR 2000**



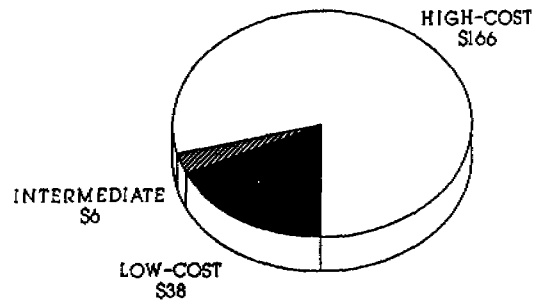
IN BILLIONS OF US\$

**Fig. 21: POPULATION SERVED PER TECHNOLOGY FOR WATER SUPPLY BY YEAR 2000**



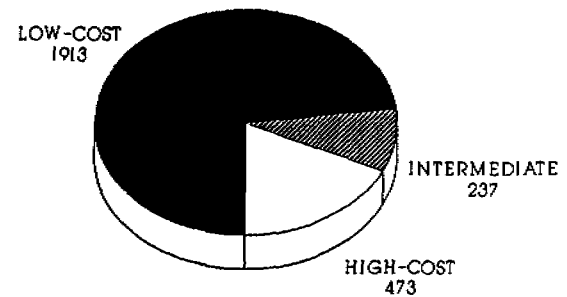
IN MILLIONS OF PEOPLE

**Fig. 22: REQUIRED INVESTMENT PER TECHNOLOGY FOR SANITATION BY YEAR 2000**



IN BILLIONS OF US\$

**Fig. 23: POPULATION SERVED PER TECHNOLOGY FOR SANITATION BY YEAR 2000**



IN MILLIONS OF PEOPLE



The rural and peri-urban areas are together more amenable to low-cost technologies, and jointly they cater for the majority of the population amongst developing countries. Consequently, to significantly enhance coverage, a greater proportion of resources, than presently, should be allocated to these areas.

Estimates indicate that the current allocation of funds to high-cost and low-cost technology is in the order of 80% and 20%, respectively. A shift in this ratio of a few percentage points, in favour of low-cost technology, could make a positive contribution to the unserved poor, without negatively impacting the more economically able among the unserved population. Thus, a re-structuring of funds allocated to high-cost and low-cost technology is an imperative, if coverage rates are to be enhanced.

Based on the foregoing analysis, a shift of US\$1 million from the high-cost to the low-cost/intermediate technology category, would provide coverage to an additional 18,000 needy people (rural and peri-urban areas) at the cost of 2,000 economically able people (urban areas per se). Consequently, the transfer of sector funds from high-cost to low-cost/intermediate technology has a multiplier effect, upon service coverage, of a factor of nine. One is not recommending the abandonment of investment in strictly urban areas - only a more equitable division of available resources.

On the other hand, in developing countries, the more privileged urban population should pay for the full cost of high-cost services where this has not yet been achieved. Additionally, cost-sharing and/or cost-recovery mechanisms should be implemented among the needy. In principle, ample evidence exists that the poor are willing to participate in such efforts. Expansion and proliferation of self-help projects is but one of the means to attain the necessary acceleration of service coverage at affordable costs.

One may conclude that it is morally unacceptable to continue depriving the poor of basic water and sanitation services, particularly when it is clear that with an annual investment of only 30% of the total annual capital investment cost, over 80% of the poor could be provided with essentially low-cost water and sanitation.

## ***5. THE BENEFITS OF WIDESPREAD SERVICE COVERAGE***

One of UNICEF's goals for the year 2000 is 1125 per cent reduction of the diarrhoea incidence rate\*. This goal can be realistically attained only if water and sanitation service coverage is substantially raised. Several studies undertaken during the 1980s have pointed out that, on average, the expected reduction of diarrhoeal morbidity incidence, attributable to water and sanitation interventions, is significant, with improvements in water availability and in excreta disposal achieving, respectively, about 25% and 22% reductions.

The benefits of accessible water and sanitation would have a positive impact on the estimated 200 million people who are victims of schistosomiasis and the 20 million people annually at risk of Guinea worm infections, among other preventable diseases.

The nutritional status of women and children particularly - as the main drawers of domestic water - would be substantially enhanced through accessible water, as this would provide substantial energy and time saving.

The economic benefits of having access to water and sanitation have not been fully evaluated, but available experience indicates that significant benefits can be derived.

An estimate based on a rice growing area of Nigeria, which is also endemic to Guinea worm disease, indicated that amongst a population of 1.6 million, US\$20 million per year would be generated from increased rice sales exclusively, if the disease were to be eliminated.

Examples of positive economic impact are not limited exclusively to rural populations actively involved in agricultural production. Peri-urban areas would also gain enormously in welfare. In the "barrios marginales" of Tegucigalpa, Honduras, households spend up to 40% of their income on domestic water supply provided by vendors. The provision of safe and reliable water supply under such circumstances has an immediate impact upon family welfare.

These apparently isolated and small scale examples may not be extrapolated globally but they are an indication that water and sanitation investments can derive tangible economic returns.

## **6. CONCLUSION**

If the water and sanitation sector were to build on its experiences of the 1980s, and guide the 1990s with an approach based on management by monitoring, it would have found a way of making a significant difference with respect to accelerating coverage in a sustainable manner.

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