UNION AFRICAINE DES DISTRIBUTEURS D'EAU
UNION OF AFRICAN WATER SUPPLIERS
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SEMINAIRE DE LOME

20 - 22 MARS 1990

DOCUMENTATION

TOME 3

(English version of the documents in french of the tomes 1 and 2)

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P R E F A C E

After the Abidjan, Rabat, Libreville and Lome congress the 5th congress of the Union of African Water Suppliers took place in Abidjan (February 5 - 8, 1990). This event was a big success and represents an important step in the life of U.A.W.S. and coincides with the Union's 10th anniversary celebration.

The efforts made by all of us made it possible for our organization to overcome the difficulties inherent to its take-off and prepare us to face the challenges ahead of us up to the year 2000.

These challenges are almost insuperable : the population of Africa will increase by 33% during this decade. Towns will see their inhabitant number increase from 210 up to 340 million. This means to us water suppliers and sanitation officials that we must work harder than our predecessors have ever done.

In order to win the bet we need first of all to assess our action to the end of the International Drinking Water Supply and Sanitation Decade. We also need to prepare a message to convey to the international community of water and sanitation to face the stakes of the new decade. This message will present the points of view of the U.A.W.S. and will be explained in 1990 and especially those of Abidjan in May and New Delhi in September.

Then we have decided to examine these questions among the general managers of companies, members of the U.A.W.S. during a meeting held at Lome during the period March 20 - 22, 1990. The purpose of the present documentation is conceived to provide us with information elements on the context in which the systems of the United Nations, Multi-and-Bilateral Aid Organizations.

To conclude, I would like to thank the French Ministry of Cooperation and Development, and the Economical Cooperation Central Fund for their materiel and moral support to the U.A.W.S. that brought off this event.

Rabat, March 15th, 1990

M. Mohamed Fouad DJERRARI

PRESIDENT OF THE
UNION OF AFRICAN WATER SUPPLIERS

PREAMBLE

The purpose of this document is to provide the participants of the conference with an information package about the International Drinking Water Supply and Sanitation Decade (IDWSSD), its results and the ideas raised in different discussions as to the actions to be undertaken and the methods to use over the next decade (1990-2000).

This document is divided into 4 chapters:

Book I

Chapter 1: The Water Decade, Evaluation, Stakes.

Chapter 2: The Collaborative Council of Financial Backers.

Book II

Chapter 3: The United Nations.

Chapter 4: Bilateral Programs of Cooperation.

CHAPTER 1: THE WATER DECADE, EVALUATION, STAKES

This chapter includes:

- an extract from an internal document of the Economic Cooperation Central Fund (ECCF) which describes the institutional organization of IDWSSD and the role played by the various organisms established over the last decade. This extract allows one to foresee what is to be expected from the regional meeting in Abidjan (May 7-11, 1990) and the New Delhi meeting (September 1990).

- The first assessment of the achievements of IDWSSD drawn by the World Health Organization (WHO)

- A report presented by the World Bank (C. Rietveld) at the meeting of the Collaborative Council in The Hague in November 1988 about the supply of water in urban areas (perspectives for the year 2000 and later).

CHAPTER 2: THE COLLABORATIVE COUNCIL OF FINANCIAL BACKERS

This chapter includes:

- The official account of the October 1987 Interlaken meeting which approved the evaluation of IDWSSD up to the end of 1987 and proposed the organization (the Collaborative Council) to be set up for the 1990's.

- various documents presented at the November 1989 Sophia Antipolis meeting of the Collaborative Council:

  - speech of the French Minister of Cooperation

  - statement of the President of the Collaborative Council

  - 5 technical reports about the problems of management of water resources, its distribution and sanitation (in rural areas, urban areas, water resources, environment and financing).

  - a document proposing a strategy for the 1990's

These six working documents have been discussed in committee work and in a plenary session during the Sophia Antipolis meeting. The conclusions of these debates and the suggested amendments will appear in the proceedings of the Sophia Antiopolis meeting to be published in the near future.

CHAPTER 3: THE UNITED NATIONS

This chapter includes:

- the account of the follow-up meeting of the Action Plan of the Mar Del Plata held in January 1987 in New York. This document reflects the various viewpoints on how to promote IDWSSD within the United Nations system.

- a reaction of the French authorities to these conclusions: in a few pages they reiterate the technical and economic principles that should guide water service and sanitation.

- the WHO suggestions for the strategy to be adopted in the 1990's in the field of improvement of health and environment.

CHAPTER 4: BILATERAL PROGRAMS OF COOPERATION

- French cooperation: various notes about French cooperation in the field of hydraulics

- German cooperation: guiding principles of German cooperation.

- Dutch cooperation: guiding principles.

CHAPTER 1

THE WATER DECADE-EVALUATION STAKES

Economic Cooperation

Central Fund

November 16, 1989.

THE WATER DECADE

The March 1977 Mar Del Plata Conference decided to declare the 1980-1990 decade as the International Drinking Water Supply and Sanitation[1] Decade (IDWSSD), the aim of which would be to provide water for all in 1990. Just a year before this decade one should evaluate the achievements and assess the role that French cooperation has played in IDWSSD?

Before tackling this question a brief historical overview of events since 1977 is in order.

1. History of IDWSSD

A general assembly of the United Nations held in 1977 decided to adopt the recommendations of the Mar Del Plata meeting and to put the WHO (World Health Organization) and the UNDP (United Nations Development Program) in charge of the application of the decisions that were taken.

Two meetings held in Geneva in 1978 and 1980 decided upon the international follow-up personnel of IDWSSD:

- Creation of a specialised unit at the WHO to undertake the necessary studies for IDWSSD and to provide secretarial services on behalf of the United Nations. This unit has been placed under the authority of Dr. Kreisel, Director of the Department of Hygiene and Environment,

- Detachment of a UNDP agent at the WHO to be in charge of the coordination with the WHO, this position is now held by Mr. Rotival,

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[1] Sanitation in this context should be construed not only as evacuation and processing of used water (after drinking water has been consumed) but also evacuation and processing of industrial waters, rain water, ... and in the rural areas latrines...

- Coordination of the action undertaken through international aid within the framework of IDWSSD by the resident UNDP representatives

These undertakings made it possible to reach a number of aims especially in terms of studies and projects undertaken on behalf of governments and institutions. Nevertheless, this has not been capable of ensuring international coordination between aid institutions and recipient areas.

At the initiative of the FRG a meeting of the European financial backers and some multilateral institutions was held in 1984 in Koeningswinter to assess the work undertaken in the decade and to find ways to improve coordination.

As a result of this meeting the following propositions were made:

- create a WHO computer program (CESI) to oversee all the projects of water conveying and sanitation in developing countries (DC). This data base is now functional, and is being established throughout the world and it is available at the Economic Cooperation Central Fund also.

- request from the three regional banks of development to organise meetings to evaluate the impact of IDWSSD. These meetings were held in Manilla (September 1985), Abidjan (November 1985) and Washington D.C. and they allowed the establishment of a preliminary evaluation of the achievements of IDWSSD, of its strengths and its weaknesses and of the new actions to be undertaken, especially in the domain of the coordination of aid.

In parallel, the Aid Committee of the OCDE organised a follow-up meeting of IDWSSD in May 1985 in Paris. This meeting reached similar conclusions and made suggestions as to the various possible ways of improving communication amongst the financial backers.

The conclusions of all these meetings were discussed in Interlaken, Switzerland in October 1987 during another meeting of the multi- and bi-lateral financial backers of water supply and sanitation programs. During this meeting the following decisions were taken:

- approval of a first evaluation of the achievements of IDWSSD

- agreement on the structures to be put under way to improve coordination amongst the financial backers over the last years of the decade and beyond.

2. Evaluation of IDWSSD up to the end of 1987

Even if from a quantitative point of view (providing water for all by 1990) IDWSSD does not seem to have been a great success as the rate of growth of the population provided with water has hardly increased, this decade should not be taken as total failure.

In fact, this decade has made it possible for the governments and financial backers to realize that the success of water supply and sanitation programs are subject to behavioral changes which concern us all.

Thus it seems quite universally admitted that the concept of "Water, God's gift, should be provided for free" is no longer valid. In fact it has to be processed before it is consumed, it needs to be transported to the consumer and then retransported toward purification stations before it is let back in nature clean: these operations are costly.

Amongst the six constraints listed in the document approved in Interlaken are these behavioral changes which need to be encouraged or discouraged in order to ensure the success of water supply and sanitation programs .

The six constraints are as follows:

- The institutions in charge of the water supply and sanitation sector in the DC are frequently inefficient and financially weak.

- The recovering of costs is not always accomplished.

- Discrepency between the rate of water supply and sanitation on the one hand and between urban, suburban and rural areas on the other hand.

- Insufficient attention given to the maintainance and rehabilitation operations,

- The community participation and sanitary education of the population are frequently inadequate.

- Insufficient coordination and cooperation amongst aid agencies, between aid agencies and national organizations and amongst national organizations. This has resulted into important waste of resources because of conflicts between new recommendations and earlier achievements.

These meetings have also made it possible to realize that tomorrow's major problem is that of water supply and sanitation in the urban and suburban (rather than rural) areas as can be witnessed by the numbers in the following tables:

POPULATION OF THE DC (in millions)

	1980	2000	2025
urban	965	1900	3800
rural	2350	2950	2950

POPULATION OF AFRICA (in millions)

	1980	2000	2025
urban	130	340	900
rural	350	530	720

source: Rietveld-IBRD report

Even the World Bank estimates suggest that for the period between 1991-2000 annual investment for water and sanitation should be $ 1.4 billion for rural areas and $ 14 billion for cities.

3. What to be done in the coming years:

It is obvious that the political and economic stability of the developing world cannot be insured if the inhabitants of the increasingly larger agglomerations do not have access to the first basic necessity of life, i.e. drinking water. This stability cannot be insured either if these population live in deplorable hygiene conditions because of lack of evacuation of rain waters or used waters. The figures in the above tables show clearly that these needs cannot be satisfied without a major effort of coordination of aid is not undertaken.

In November 1988 a meeting of all the financial backers of water held in The Hague decided to set itself up into a Collaborative Council and to be the central point of coordination of aid. Because of the size of this institution (more than 60 participants at The Hague) it was agreed to have the end of IDWSSD prepared by the "1990 Committee", a committee that is made up of 20 members and whose first meetings took place in Paris in December 1988 and in Geneva in June 1989. This committee decided the following:

a) request from the resident representatives of the UNDP to provide a report on the state of IDWSSD in their countries,

b) request from the Regional Banks of Development (Asian, African...) to assess the work of IDWSSD in their region. Several meetings have already taken place,

c) back up the Indian Government which has offered to host a conference of all the DC to assess the work done during this decade and to prepare the work to be done in the after-decade in September 1990 in New Delhi,

d) to prepare this conference in a meeting of the Collaborative Council to be held in Sophia Antipolis in November 1989,

e) to promote the importance of local coordination between aid agencies and the recipient countries.

4. The Role of France

The active participation of France in all the meetings mentioned above and our increasing involvement in this programme show the interest of the French authorities in these concerns.

Under the initiative of the Ministry of Cooperation and the Economic Cooperation Central Fund and in application of the recommendation of the meeting of the Board of Directors of the OCDE in May 1985, a consultation meeting of the Financial backers for Burkina-Faso was held in June 1986.

This meeting is often given as an example because it is not frequent to see the recommendations of an international conference so quickly put into effect. But it also has to be admitted that this meeting had no major consequences: the written account of the meeting makes it clear why communication between financial backers themselves and between the latter and the countries is extremely difficult.

In 1987 the realization of the decline of the French involvement on the international scene of water (especially outside the field) made different officials in administrations and firms think that some order had to be established at home first. This led to the creation of a work group associating all the French institutions involved in water (this is called the Chichillianne group after the name of the Alps village where a brainstorming meeting was held in July 1988).

The creation of this work group shows once more that France is willing to be active at the international level, as that is further witnessed by the following decisions:

- the writing up of a document to make the other countries aware of the capabilities of France in the field,

- the hosting in Paris of the first meeting of the 1990 Committee and the hosting in France of the next meeting of the Collaborative Council

- the organization of a major water exhibit in La Villette in 1990

- the active participation of France in the various functions of the Regional Banks of Development.

CHAPTER II

THE COLLABORATIVE COUNCIL

COLLABORATIVE COUNCIL MEETING

Sophia Antipolis (France)
November 28 - December 1st, 1989

OPENING SPEECH DELIVERED BY
THE MINISTER OF DEVELOPMENT AND OVERSEAS SERVICE
FOR THE DIEPA CONSULTING COMMITTEE MEETING

Sophia Antipolis,
November 28, 1989.

OPENING SPEECH
DELIVERED BY THE MINISTER
OF DEVELOPMENT AND OVERSEAS SERVICE
FOR THE DIEPA CONSULTING COMMITTEE MEETING

SOPHIA ANTIPOLIS
NOVEMBER 28, 1989

Ladies and Gentlemen :

It is a great pleasure for me to welcome you to France for this meeting. For nine years now, we have been partners in this ambitious adventure of the International Drinking Water and Sanitation Decade, a generous idea born in Mar del Plata, in 1977.

The time has thus come to look back with lucidity and draw lessons from past experiences to trace future perspectives. DIEPA was launched in the dramatic context of the Sahel drought, at a time when water distribution to the people was unfortunately not a major priority. Grand industrial schemes, vast irrigation and public works projects were then prime objectives of friendly states and lending institutions.

DIEPA's great accomplishment certainly has been to point out the acuity of water needs, and particularly drinking water, as well as to have underscored the importance of balanced development. The resulting international solidarity made it possible to face the most drastic situations in a surprisingly short time. Several thousand drillings, about 50,000, were financed, set up and realized in less in 9 years in the Sahel alone. French aid contributed to more than 15% of this effort.

A sustained innovative effort made these exploits possible. For production as for water distribution, hydraulics is now clearly in the modern era. A considerable effort was also given to training and transfer of technology. Let me mention only the CEFIGRE who offers us hospitality today, one of DIEPA's bases since the Mar del Plata meeting.

If emergency conditions initially required an essentially technical approach, we became rapidly conscious of the need for implementing water policy, on a national level as well, and, moreover, on the level of major drainage basins. The problem of water is not restricted to rural areas which, because of their drastic situation, first drew our attention. Today, we are confronted with the immense problems of urban areas, their drinking water supply and sanitation.

The problem of water is not only a technical problem; it cannot be treated sectorially, or fragmented. It requires a holistic approach, on a relatively wide geographic level, taking into account the various political, sociological,

economic, in sum, human aspects. In this spirit, we support the development of national institutions in charge of these problems and of the environment in general. This global view must then involve highly decentralized projects, which take the environment into consideration and are appropriate for the target population.

This conception does not apply solely to water problems. It guides our Ministry with respect to all environmental questions which today are finding their just and fundamental place. Environmental protection cannot be dissociated from problems of development with regard to water, forestry, mastery of urban growth or waste. All these problems must be integrated into holistic approaches ; impact studies must be multiplied, the better to understand the consequences of development projects on the environment.

Furthermore, we are beginning to become aware of the obstacle to development represented by environmental threats, and more generally the type of ecological imbalance we have been fighting thoughout this decade. Insufficient water resources bring a stop to development ; its absence or poor quality are killing the Third World.

Proper management of the environment is neither a luxury, nor guilt feelings on the part of the industrialized nations ; it is a long-term condition of development. It is absolutely essential that the environmental dimension be included in the programmes and adjustment plans regulating the South's economic life today. We are working towards sharing this approach with our international partners and mobilizing all existing institutions, including the NGO, whose sensitivity is precious in this area.

In this respect, I am proud to see how dynamically French local communities have committed themselves to the "Solidarity-Water" programme, a fine example of what North-South partnership can do for the environment and for development. 400 hundred communities have brought their aid to 120 projects, with the participation of 25 development associations.

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Your meeting has brought together most of the agencies for the aid to development. It also includes some of the most eminent representatives of the Southern countries, to whom I wish to give a special salute. I ask you to deliver this call for international mobilization to your governments.

In the context I have just described, what does the next decade hold in store for us in matters of water ? I have already said how essential I feel it is to go beyond the strictly sectorial dimension, to place it within a developmental context, to orient international cooperation towards supporting the formulation of policy, giving priority to training.

1) You know France has taken the initiative in the latest meeting of the World Bank Development Committee to suggest the launching of a great worlwide environmental programme. I believe this programme could quite naturally include

the water and sanitation sectors, integrating them into a holistic approach aiming at sustainable development. I invite you to study this hypothesis in the course of your work. I believe it is in step with the ambitions of the next decade.

2) This worldwide effort should not lead us to relax our efforts at the regional and national levels, in which each of us is involved. France has undertaken to pursue its vigorous action on the European level in renegotiating the Lomé Convention so the future Convention gives water problems and sanitation the priority they deserve. Our efforts are notably oriented in two directions : the urban sector, on one hand, and training, on the other.

3) With respect to training, I would like to take this occasion to announce that France has started to internationalize the CEFIGRE. The centre is already very actively collaborating with many bilateral and multilateral institutions of cooperation ; its Scientific Council is a model of internationalization.

France has decided to formalize the CEFIGRE's international character. We have opened discussions with the German Federal Republic, one of the centre's most active partners, to bring representatives of German cooperation officially into the CEFIGRE. We later expect to extend this internationalization to all those of our partners, European in particular, who so desire. We also believe this new style CEFIGRE could give an extra boost to the international training network, one of the results of this closing decade.

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A consequence of opulence in the North, environmental degradation in the South is the product of poverty and of the population explosion. A great deal of solidarity is needed and the DIEFA has risen to the challenge. We must be at the service of the men and women of the South, aware of their particular problems without impatiently imposing our own solutions.

We have been too self-assured too impatient and unable to understand early enough that development and the environment were a "odd", but inseparable couple. Today, we must turn to a new type of sustainable development built around Man himself. We must acknowledge the environmental factor while remaining humble in our approach of the problems and determined to find solutions. This is truly the challenge of the next decade.

COLLABORATIVE COUNCIL MEETING

Sophia Antipolis (France)
November 28 - December 1st, 1989

THE CHAIRMAN'S STATEMENT

Mr.A.ROTIVAL,
Chairman of the
Collaborative Council

THE CHAIRMAN'S STATEMENT

1. Twelve months have elapsed since our inaugural meeting in The Hague, Netherlands, on 2-4 November, 1988. It is worth noting that our present consultation at Sophia Antipolis, France, is the fifth international consultation among ESAs since Königswinter, Federal Republic of Germany, in 1984. Compared to attendance at The Hague, it would appear, at this writing, that we may double the level of attendance. Of particular importance, while still far from satisfactory, we will have broadened the representation of ESAs.

2. I will try and outline some of the highlights and issues of the past twelve months from your Chairman's perspective utilizing the Framework endorsed at The Hague Consultation involving cooperation at the following three levels: Country-level cooperation, Intercountry cooperation and Global cooperation.

COUNTRY-LEVEL COOPERATION

3. As stated in The Hague report, "the major focus of the Framework will be on coordinated sector support at the country-level...". At our plenary session on Thursday morning, 30 November, the UNDP/World Bank Programme and CWS/WHO will make a presentation of work accomplished, goals still to be reached and objectives for the future. Strides have been made in 1989. Notably, the Regional Water and Sanitation Groups (RWSGs) of the UNDP/World Bank Programme have strengthened teams of a multi-disciplinary composition in Abidjan (Côte d'Ivoire) and Nairobi (Kenya). New RWSGs have been established in New Delhi (India) for South Asia and in Singapore for East Asia. The impressive level of support in financing and secondment of staff by bilateral ESAs raises the question whether the title "Joint UNDP/World Bank Programme" is not a misnomer!

4. A recent breakthrough of particular significance, which will be reported on separately, is the agreement between the Pan American Health Organisation (PAHO/WHO) and the UNDP/World Bank Water and Sanitation Programme, in collaboration with the Regional Bureau for Latin America and the Caribbean, UNDP, to enter into a cooperative arrangement in that region.

5. Consultations between the UNDP/World Bank Programme and a major bilateral ESA continue on the establishment of a RWSG for the Arab States region. This could involve the participation of a regional financing institution. In the same region, the close operational cooperation in waste management between the UNDP/World Bank Programme, EMRO/WHO and FAO should be highlighted. The increasingly close cooperation between WHO and

the UNDP/World Bank Programme, in this as well as in other developing regions, is a particularly positive development.

6. During 1989, Decade Consultative Meetings (DCM's) have been held in Thailand in March and for the South Pacific island countries in late June and early July, with WHO Regional offices (SEARO and WPRO) taking the lead and with financing from GTZ of the Federal Republic of Germany in Thailand and UNDP for the South Pacific. At the instigation of the UNDP Resident Representatives and with the support of the Africa Region Office (AFRO) of WHO, UNICEF and the RWSG of Abidjan, extensive preparatory activities have been undertaken for the organization of DCM's in Congo (Brazzaville) and Mauritania in 1990. In the latter country, the Department of Technical Cooperation for Development (DTCD) of the United Nations has played a key role. Senegal is also expected to organize a DCM in 1990 which, to date, involves the support of the RWSG in Abidjan and AFRO/WHO. The DCM's in the above-mentioned sub-saharan African countries are excellent examples of the new and necessary policy to make DCM's an integral part of a continuum of activities related to the preparation of a sector strategy and action plan (SSAP) rather than a free-standing event with less than optimal results. These countries are also encouraging examples of bringing together, on a coordinated basis, the resources of the U.N. Development system in support of Governments.

7. The contributions being made by the UNDP/World Bank Water Supply and Sanitation Sector Development Team in Asia should be underlined both with respect to country-level support and to inter-country cooperation, notably with the Asian Development Bank.

8. While the RWSGs have been recognized by ESAs "...as a primary vehicle for coordinated support to country-level sector development", and the co-financing by bilateral ESAs is a testimony to this growing partnership, actual or real collaboration at the country-level in support of the Governments of developing countries needs much further strengthening. The issues will be presented and discussed during our review of country-level activities. I believe that in our deliberations, we must directly focus on these issues as well as the opportunities and define mechanisms for increased collaboration at the country-level by ESAs while strictly respecting the primacy of the role of governments of developing countries. The 1990 Committee, at its meeting in Geneva on 31 May to 2 June 1989, assigned specific tasks to the Chairman and the Secretariat. Objectively, the accomplishments to date have been uneven, and we should identify the causes.

9. In a related vein, The Hague Consultation and the subsequent meetings of the 1990 Committee stressed the role of the UNDP Resident Representatives in "national-level support". You have available to you the "Distillation of Issues..." report mandated by the 1990 Committee. As of this writing, approximately three

quarters of the UNDP Resident Representatives have responded to my letter of 21 December, 1988 and an ongoing dialogue is maintained with a significant number of Resident Representatives who have identified problems or opportunities. In addition to close interaction on follow-up with the RWSGs and the SDT for the Asia region, ESAs have been alerted, on an individual basis, on potential cooperation activities at a developing country-level. ESAs have also received a compendium of the responses of UNDP Resident Representatives. The feedback, with some notable exceptions, has been somewhat disappointing. We should identify the reasons.

10. Criticisms have been levelled by ESAs, including International Organizations, on the effectiveness and, indeed, motivation of the UNDP Resident Representatives as Decade focal points at the country-level. Proposals have been made to modify the present focal point arrangements for the Beyond the Decade into the 1990s period.

11. While I concur that there are glaring examples of lack of performance by UNDP Resident Representatives, I sense, at the risk of being accused of lack of objectivity (!), that since the beginning of 1989, a sea change is in process which can and will only be accelerated by the responsibilities that the UNDP Resident Representatives will have in relation to the Global Consultation at New Delhi in 1990. In any discussions on focal point arrangements at country-level for the 1990s, the Council might wish to take into consideration the integrated development cooperation responsibilities of UNDP Resident Representatives and their official contacts at a policy level on a Government-wide basis including Ministries of Finance. The further integration of our sector approach in the 1990s would seem to make this particularly relevant.

12. At the 1990 Committee meeting in Paris (France) on 7-8 December 1988, the Committee directed me, in the context of coordinated country-level sector support, to address letters to the Presidents of the Inter-American, Asian and African Development Banks and the Kuwait Fund, requesting their support for "...the organization of informal regional working groups to undertake a rapid assessment of ways in which country-level sector support may be made more effective, and to recommend activities which can be undertaken rapidly to match Government needs". Perhaps inevitably, the dialogue established with the regional development financing institutions resulted in the identification of cooperation going beyond the mandate quoted above and corresponding more closely to the thrust of intercountry cooperation as elaborated in the report of The Hague Consultation. The report on status is included, therefore, under the following section.

INTERCOUNTRY COOPERATION

13. The Asian Development Bank, following an informal get-

together of ESAs at Bank Headquarters on 16-17 March has agreed to host a regional consultation of developing countries in Manila on 4-8 June 1990, entitled Water Supply and Sanitation - Beyond the Decade. The report of the 1990 Committee meeting in Geneva from 31 May to 2 June (paras. 3.2 to 3.7) provides background on the Consultation. Furthermore, the Asian Bank has written to ESAs in the past months inviting them to attend the Consultation. Mr. Ranjith Wiransinha of the Asian Development Bank will present to the Council a status report. The "topic-specific" orientation of this meeting reflecting issues of particular relevance to the Asia region responds well to an emphasis identified at The Hague Consultation.

14. The WHO/UNDP Water and Supply and Sanitation Consultation Meeting of Pacific Island Countries, held at Suva, Fiji, from 29 June to 1 July 1989, while being stricto senso a DCM, addressed issues and strategies for the 1990s from the specificity of small island developing countries. Some 35 countries participated in the Consultation, which was held in parallel with a seminar on water resources, including Caribbean and Indian Ocean developing countries, thereby giving it an inter-regional character and introducing an element of technical cooperation among developing countries (TCDC), including information exchanges. This successful meeting, attended by ESAs active in the South Pacific, made specific proposals to be brought to the attention of the Asia Regional Consultation to be held in June 1990. The close cooperation in the organisation and implementation of this consultation between the West Pacific Regional Office of WHO (WPRO) and UNDP, in close cooperation with the Department of Technical Cooperation for Development of the United Nations (DTCD) and the Commonwealth Science Council, who were the organizers of the seminar on water resources, was notable.

15. The Latin America and Caribbean region has been the object of two regional consultations focusing on strategies for the 1990s. The Round Table Meeting of Managers of Water Supply and Sanitation Agencies of Latin America, held in Washington, D.C., on 10-12 May 1989 and organized by the Pan American Health Organization (PAHO/WHO) in collaboration with the UNDP/World Bank Programme and the Inter-American Development Bank (IDB) is described in the report of the May-June meeting of the 1990 Committee. The detailed report of the Round Table is available to Council members.

16. A special meeting for Water Supply and Sanitation in the Caribbean Beyond 1990, held in St.Kitts on 1-3 November 1989, was co-sponsored by PAHO/WHO, UNDP and the Caribbean Development Bank (CDB) and attended by ESAs. This meeting was organized in conjunction with the 18th Annual Conference of Caribbean Water Engineers. Principal objectives were to examine water and sanitation sector achievements during the Decade, including an analysis of sector support activities, and to recommend an action programme for improving sector effectiveness at a country and regional level during the 1990s involving ESAs as well as the developing countries themselves. I am particularly pleased that

Mr. John Calixte, General Manager, Water and Sewerage Authority of St.Lucia will be addressing the Council on behalf of the Caribbean Consultation. Appreciation is expressed to CIDA/Canada and the Caribbean Development Bank for sponsoring Mr. Calixte's participation. In addition, and of particular significance for the future, the joint sponsorship of the Caribbean meeting with the CDB has opened up prospects for close cooperation with the Bank under the Framework.

17. With respect to the Africa region, an interim report was made to the May-June 1989 meeting of the 1990 Committee (paras. 3.13-3.16). Considerable progress has been made since last June thanks to extensive consultations between the Central Projects Department of the African Development Bank and the Africa Technical Department, Infrastructure Division, World Bank in collaboration with the UNDP/World Bank Water and Sanitation Programme. These consultations, with the support of the UNDP Regional Bureau for Africa, have resulted in the decision to hold a Rural Water Supply and Sanitation Workshops and Donor Conference in Abidjan, Côte d'Ivoire, on 23-27 April 1990. ESA members of the Collaborative Council have received, under cover of my letter of 13 November, the detailed Project Document on the Workshops and Donor Conference. As indicated in my letter, ESA support is sought to fund the major portion of the Workshops and Donor Conference costs, particularly the attendance of developing country participants estimated at US$ 266,000. This is in addition to financing already pledged by the World Bank, the African Development Bank and UNDP. It is a matter of critical importance that indications of the level of support that can be expected from ESA members of the Council be identified at our meeting. A joint presentation by the African Development Bank and the World Bank will be made to the Council meeting.

18. Since my visit to Kuwait last May, consultations continue with the Arab Fund for Economic and Social Development (AFESD) and the UNDP Regional Bureau for Arab States and Europe (RBASE), on the organization of a sector meeting of Arab States to review sector issues and define a region-specific strategy for the 1990s. While these consultations are proceeding positively, it would be premature, at this stage, to make any prognosis on results. A proposal for a Water Supply and Sanitation in the Nineties: A Colloquium of Arab States can be made available to interested ESAs.

19. The preceding paragraphs on intercountry cooperation demonstrate, I believe, that significant progress is being made under this element of the Framework. Regional consultations have taken place, are planned or are under active negotiation in all four developing regions. In addition to their intrinsic importance in providing fora for developing countries, in conjunction with ESAs, to define the issues and priorities and to arrive at a strategy formulation which is region specific, these consultations are designed to provide a major input to and a mobilization of support by developing countries for the Global Consultation to be held in New Delhi in 1990. In addition, there

has been an enhancement of the role of the regional development financing institutions in the activities of the Council, which will contribute, inter alia, to reinforcing sector support at a country-level.

GLOBAL COOPERATION

20. The report of The Hague Consultation stated: "...the main theatre for sector development activities is the individual country. There are, however, important issues and constraints that need to be dealt with at the global level". These issues are identified on page 5 of The Hague Report; have been addressed at the Paris and Geneva meetings of the 1990 Committee, and figure prominently in the agenda of our present meeting. I will address some of these issues in the paragraphs that follow.

21. The WHO Secretariat transmitted on 28 September the final report of the Temporary Working Group on Applied Research which was set-up, as mandated by The Hague Consultation, in early 1989 under the leadership of WASH/USAID. The Secretariat's transmittal letter also included a memorandum containing the comments of Mr. John Kalbermatten, Senior Advisor to the Chairman. I endorse the considerations and views expressed by Mr. Kalbermatten.

22. Manifestly, there has been insufficient time to take follow-up action on the proposals contained in the TWG Report including those formulated by Mr. Kalbermatten. Mr. Craig Hafner of WASH/USAID will be making a brief presentation of the report. The Council will wish to consider actions that should be taken to carry forward the considerable work accomplished by the TWG. Consideration should be given to measures that could be taken allowing, for instance, the tabling of a report on Applied Research, as a contribution of the Collaborative Council, to the Global Consultation in New Delhi. Such a report could, perhaps, be usefully submitted, on a prior basis, to the proposed Scientific Forum directly preceding the New Delhi consultation.

23. With respect to the establishment of a Temporary Working Group on Environmental Pollution, I would anticipate that Working Group 4 - Environmental Issues of Water Supply and Sanitation - will make its recommendations to the full Council. In the same vein, all five Working Groups will have to address the issue of Institutional Development, and we should expect to receive recommendations on the proposal for setting up a TWG. I would suggest that any recommendation to set up such Working Groups take into consideration the fact that all reports would have to be available no later than the meeting of the 1990 Committee in June 1990.

24. On the TWG Communication of Information, Mr. Hans Van Damme, Director of IRC and Chairman of the TWG, will briefly report to the Council. This report will include Public Information

Promotion (PIP). The Council will have noted, however, the detailed proposals on PIP covered under the Global Consultation in New Delhi. The Council may, therefore, prefer to consider the issue of "promotion of the sector" during discussions on the Global Consultation. A related issue concerns the proposal for sector "Ambassadors". Preliminary contacts with an internationally renown Elder Statesman have elicited his potential interest in acting in this capacity. Furthermore, consultations are continuing with La Cité des Sciences et de l'Industrie, La Villette (Paris, France) on possible participation in the EXPO 'Water and life' in 1990. Proposals are being elaborated on contributions that could be made by members of the Collaborative Council.

25. The Hague Consultation flagged the importance of resource mobilization for the sector during the 1990s. Working Group 5 - Financial Resource Generation will address this issue and can be expected to submit its recommendations to the Council.

26. The 1990 Committee, at its May-June Geneva meeting requested the preparation of a "think piece" by "recognized experts and/or prestigious research institutions from outside the ESA community". Initial contacts by your Chairman and the Senior Advisor with WORLDWATCH did not, unfortunately, arrive at an agreement. Discussions with the United States National Academy of Sciences have been, on the other hand, very promising. In view of the participation of Dr. McDonald Dow of NAS in our deliberations, this matter could be usefully pursued.

27. Further to the above, your Chairman was requested by the Geneva meeting of the 1990 Committee "...to develop a list of issues and concerns..." and "...to present outline recommendations of the strategy for the 1990s...". The document "Strategies for the 1990s" responds to this request. It should be underlined that this document, like the 'Beyond the Decade' paper at the Interlaken Consultation, has the function of being provocative and stimulating, thereby focusing attention on issues and possible options. It is not intended to preempt discussion in Working Groups or plenary!

28. The expanded role of Non-Governmental Organisations (NGOs) in the Collaborative Council has been the object of sustained discussions with WATERAID and CARE. A prominent role for international and developing country NGOs has been established for the Global Consultation at New Delhi in 1990.

29. The issue of expanding the participation of additional bilateral and multilateral ESAs in the activities of the Council has been, justifiably, a matter of considerable concern. Your Chairman has assumed this responsibility and, while encouraged by some breakthroughs, is not at all satisfied with the tangible results. This being said, this is a building block process taking effort and time. I sense a greater awareness among ESAs

of the role and relevance of the Collaborative Council and the importance for the 1990s of the Framework. The further integration of the sector into water resources and into environmental and health benefits aspects of water, sanitation and waste management will enhance our relevancy to the external donor community still "missing" from our deliberations.

30. A matter of considerable satisfaction is the quantum leap in developing country participation in the activities of the Collaborative Council, initially in the TWG's on Applied Research and Communication of Information and now at our Council meeting itself. ESA financing, notably from France and the Federal Republic of Germany, which have made this level of participation possible, is highly appreciated. More significant than mere numbers is the key role that our distinguished colleagues and senior sector specialists from developing countries will play in our deliberations. We are on the way to making the Collaborative Council a forum where sector professionals from ESAs and developing countries can meet and contribute on a basis of partnership to the formulation of a strategy for the Framework for Global Cooperation.

31. The report of The Hague Consultation stated that "the first two years of the Collaborative Council's existence will be seen as a transition period. The end of the IDWSSD and the launch of a programme Beyond the Decade represent an appropriate milestone at which the Council's initial operation can be reviewed and the need for more permanent structures considered."

32. I would like to suggest that the Council consider the holding of its next meeting following both the Global Consultation at New Delhi in September 1990 and the subsequent session of the United Nations General Assembly on the Decade in November 1990. Such a meeting of the Collaborative Council could be contemplated for either late 1990 or early 1991. Such a timing would be optimal for taking stock and deciding for the future.

33. I am grateful to the members of the Collaborative Council for having, after due consultation, signified their concurrence to my assuming the Council Chairmanship. The past eleven months have been stimulating professionally and personally rewarding. I would like to register with profound appreciation the constant support and constructive counsel that I have received from members of the Council. Progress, I believe, has been made, which is the result of a team effort, but so much more remains to be accomplished!

Alexander H. Rotival
UNDP/WHO Coordinator IDWSSD
Chairman of the Collaborative Council

23 November 1989

COLLABORATIVE COUNCIL MEETING

Sophia Antipolis (France)
November 28 - December 1st, 1989

SUSTAINABLE WATER SUPPLY AND SANITATION IN URBAN AREAS

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SUSTAINABLE WATER SUPPLY AND SANITATION COVERAGE IN URBAN AREA

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In the last two decades of this century, the urban population in developing countries is expected to double from less than one billion in 1980 to two billion by the year 2000. By the turn of the century, 3 out of every 4 Latin Americans, 2 out of every 5 Africans and one in every 3 Asians will be living in cities. How can we cater to the basic water supply and sanitation needs of this large population on a sustainable basis ? In particular, how do we met the needs of those in low income settlements and those in outlying fringes of urban areas ?

ONE CITY BUT TWO WORLDS

When talking of urban areas we know we are talking of two worlds - the world of the well-to-do and the world of the poor. The former depend on centralised systems. The probleme faced in meeting their needs are more in the nature of management and system problems. But what about the poor ?

Many of the people living today in our city-slums are migrants from rural areas. They live in congested degraded environments because they cannot afford legal housing. They bring with them the cultural practices and prejudices of the place that they continue to call home even though they have lived away from it for ten or twenty years. They continue to have family or economic ties with rural areas. They mostly reside in group tied by kinship, casts or religion. In planning for them, the rural-urban continuum has to be recognised.

Development of water supply and sanitation in such area cannot be seen in isolation. One has to strive for convergence of services-sanitation, water supply, waste water and garbage disposal, education, preventive health services, child care, improvement of the environment and shelter upgradation. It has to be conceived of as a total package. my experience in various Sites and Services and Slum Improvement projects in Madras shows that where there is an overall improvement of the habitat, provision of certain minimum basic services and security of tenure, the residents gets a greater sense of pride and ownership. This proves to be agreat motivating factor for community self-reliance and in maintaining the services on a continuing basis by community participation. The UCD programme in Hyderabad also indicates how an integrated approach and close

interaction between the municipal body and the community can lead to a sustainable programme.

We need to recognize that for successful maintenance of the system, the users themselves must take responsibility and this would need upgrading their technical and managerial capabilities. In rural wastes and sanitation programmes, the need to involve women is seen as an important factor. So also in urban management of these basic services. Yet if, today, women are not involved in planning, implementation, operation and maintenance, it is because there is a general feeling that women cannot cope with "technical" issues. NGOs have an important role to play in catalysing community action, particularly in involving women in the programme.

Voluntary groups working in the slums of Bombay find that women are particularly anxious to get toilets. They defecates after sunset and have to look around for isolated spots - just the places that leave them open to rape and molestation. The lack of water supply also affects women most. In the slums of Madras a woman has to get up at 2.00 a.m. to put her pot in the "queue". The average time for fetchning water is about 2 hours. Women must therefore be the logical entry point for implementing anay sustainable water supply or sanitation programmes.

Unfortunately most institutions in urban water supply and sanitation are staffed by engineers and bureaucrates who are not sensitive to the needs of the urban poor. They send to work in water-tight compartments and concentrate on technological issues.

We need to strenghten these institutions. I feel that we need a special cadre of people with a basic degree in the social sciences, social work or habitat planning who are then given specialised technical training in public health engineering. Skills can be learnt, sensitivity cannot. This young eager brigads which has been trained to not only see people'needs in terms of their physical surroundings, but which can also be sensitive to the human needs, strengths and weaknesses of the people they are servicing, may change the texture of service that is now being given to urban slums.

As important as forming a cadre is that the officer heading these institutions has a missionary seal and commitment to low cost technology and community participation and sensitivity to the urban poor. This should be a tenured post, lasting at least three to five years.

As far as technologies are concerned, today there is a clear demarcation "high cost" technology for the rich but "low cost" for the poor. This status difference has led to engineers not taking in interest in low cost technologies. Unless we can get away from this distinction and unless technology choice becomes dicated by location factors and not just income factors, we will not be in a position to give the necessary "status" to programmes for low income settlements and make them sustainable.

Evolving strategies for integrating the community bases systems with the piped systems and drawing-up city plans on an optimal basis for harmonious development of the two different systems become essential.

The main issues that need to be addressed, are :

- sensitising policy makers and technologists to the needs and problems of the urban poor

- instituting regular mechanisms for involving the community at every stage,

- choosing technology that :
a) reflects the community preferences;
b) is in keeping with the socio-cultural environment of the community;
c) is within the capacity of the community to operate and maintain;

d) is low in capital cost but at the same time easy on operation and maintenance;
e) has flexibility for later upgradation or expansion.

SUSTAINABILITY ON FOUR FRONTS

When talking of sustainability, we need to consider :

- Sustainability of Sources
- Sustainabiliy of Technologies
- Sustainability of Operations
- Sustainability of Finances

SUSTAINABILITY OF SOURCES

We must recognise the symbiotic relationship that must exist between rural and urban programmes. One cannot view urban water supply and sanitation in isolation of this relationship. For example, in a study made using satellite picures of 9 major cities in india, it was found that over a 10 to 15 year period the forest cover in a 100 kms, radius of these cities has reduced substancially - ranging from 25% to as high as 64%. What is the impact of this deforestation on rainfall patterns and the recharge of water supply sources ? No one has an idea, but we have experienced, in the last decade or so, erratic and inadequate rainfall around many of these cities. There is a need to take a holistic view of urbanisation, water supply, sanitation and the environment

As cities are expanding not only is the demand for water increasing, but at the same time existing water sources are getting polluted because we have not paid adequate attention to sanitation and waste water disposal facilities. An integrated approach to water supply and sanitation is needed. The case of the river Ganga is illustrative of what can happen through neglect of such an integrated approach. Out of the 226 towns with a population of over 100 thousands in India, 48 are located on the banks of the river Ganga. Most of these cities were discharging their sewage and waste water into the river and what was a clean source of perennial water supply is no longer available. A massive, capital-intensive programme for cleaning up the Ganga has been launched. We are now rectifying past omissions and paying the price for it !

Simple solutions for augmenting water sources are often overlooked. We look around for new sources of water supply for a city without considering measures for augmenting old traditional sources. In Madras and Bangalore, for example, a series of rainfed tanks used to provide the water source. The urbanisation process has swallowed up many of these tanks and even those which exist are getting silted up because of neglect. An analysis was carried out on the run off to the sea during the monsoons at Madras. It was established that with proper rehabilitation of the existing water tanks, excavation of two more tanks and networking of these, water supply of Madras city for the year 2000 could be met. Unfortunately, this projetc did not get any political support, since the solution looked too simple and was therefore suspect. The costlier alternative of bringing water from river Krishna over 100 kms, away has been approved instead. Harvesting of rain water either through a system of large tanks or individual storage facilities, wherever possible, would increase water availability at a much lower cost.

In some cities where there is scarcity of water and ground water levels are falling due to over-exploitation, there may be urgent need to bring in suitable legislation or regulatory measures for controlling the use of such ground water. Implementing such controls is no doubt very difficult as has been our experience in Madras. Exchange of experience among countries in this regard may help in evolving realistic strategies for such controls.

It is only in the past couple or years that an awareness is being created in developing countries of the extent of leakages in existing water supply systems. In many cities more than 40% of the water is lost. We would first have to bridge the data gap. For this a concerted programme is needed for training technical personnel in leak detection methods and to set up, at least in the major cities, appropriate equipment for continued surveillance. This should be the first phase of a long term programme for rehabilitation of the system to reduce the losses. The programme taken up in a few Latin American countries in this regard can be of guidance.

In Calcutta, for example, the water supply sysem dates back to 1865. There is more than 30% wastage in the distribution system. A programme for refurbishing of the mains was drawn up. But considering the narrow congested roads of the city and a multiple number of utility services underground this is indeed a challenging task. So while rehabilitation of existing systems is known to be an important component, implementation of such programmes would need considerable technical assistance input and transfer of technology.

Developing countries, with their constraint in resources, cannot afford the luxury of wasteful use of water. Conservation can be achieved through supply restrictions or through regressively graded tariffs. While some RAD has been done in developing water conserving technologies, for example, flushing cisterns which use substancially less water there is a need for much more applied research in this area. A massive public education programme would also be needed. But even more important is the need to put all individual connections on to metered supply. In calcutta, till recently, most categories of consumers got free water. So, it was also water rates were introduced. But even now, out of 1 500 000 house-holds having water connections, only 35 000 pay water fees. Switching to total metered supply coupled with regressive tariffs can definitely promote conservation.

So far recycling systems have not been adopted on any large scale in any developing country. But with the increase in demand for water, this would have to be an option that would not need serious consideration in developing countries. At the Okhla Sewage Plant, at Delhi, some years back a biodigester was established on a pilot basis. This is now able to supply cooking gas to about 5 000 households. While recovery of energy from human waste has been successful, recycling of water from this has not been attempted. The main constraint has been high capital cost. What is needed is further applied research in this field to develop cheaper waste-water and garbage recycling and resource recovery systems appropriate for developing countries.

SUSTAINABILITY OF TECHNOLOGIES

A technology in the long term will be sustainable only if capability for production of that system is buit up indigenously. Time and again we come across cases where technologies have been imported and commissioned without paying attention to building up self reliance. Water supply systems fail and lie in disuse for extended periods waiting for spare parts and help from outside. Building up self reliance in production of such system should be an important component in our thrust for the next decade. In large countries like India, such self-reliance will have to be thought-of-even on a State or a regional basis. Where countries are small and may not be able to justify individual production facilities, factories to be set up as a joint venture by a couple of participating countries should be thought of. ESA's should be in position to support such joint ventures.

One problem that is faced by institutions engaged in urban water supply and sanitation in developing countries is that they need to develop expertise in handling a wide range of technologies. Most training programmes do not expose them to the whole host of

technology options. Engineers in these institutionss, not being geared to handle community-based systems tend to leave this out when considering options.

It is rather unfortunate that "low cost" technologies are invariably associated with low income groups. The argument is that since the poor cannot afford to pay, let us give them "low cost". Most of these so called "low cost" systems are low in capital costs no doubt, but high in maintenance costs. In the name of lowering costs quality is sacrificed. Often these systems are cumbersome to maintain and hence in a short time fall into disrepair thereby bringing discredit to the system itself. When we say "appropriate", it should apply equally to the rich or to the poor. We must optimise total costs (not merely capital costs). The appropriateness of the technology will be dictated by the need of the end user and the specific local conditions and not necessarily by income group. Ease of maintenance using local skills should be an important deciding factor in choice of technology. It must also be added that there is a need to do considerable research in order to make these so-called "low cost" technologies easy to set up and maintain.

There is another consequence of the association of "low cost" with low income. These technologies are considered to be of inferior grade and looked down upon by engineers generally. So unless they are forces they would shy away from such technologies. What is needed is for ESA's and member governments to give a special thrust to the promotion of such indigenoius appropriate technology. This would endow the technology and the programme a certain status. This we clearly see in India on the rural water supply side with the launching of the Technology mission in 1986.

SUSTAINABILITY OF OPERATIONS

The IDWSSD did bring about increase capital funding for water supply and sanitation projects. But due to the general constraint on public spending in most countries, this increased capital funding led to expenditure on operation and maintenance being drastically reduced.

The level of operations and maintenance is particularly important to sustain infrastructure investment in water supply and sewerage. The reductions in outlays on O&M are affecting the rate of return of investments and landing to deterioration in quality of services. Perhaps international lending agencies and member countries should look at the viability of the project over the life period of the project and lend moneys not only for capital but also for O&M expenses at least for some period of time.

But the lack of finances is not the only cause for assets deterioration. There are in many cases no clear demarcation of responsabilities for the O&M function. The organisations executing the project often do not consult with the urban local body or other institutions which xould ultimately be responsible for its operation and maintenance. The involvement of the municipal bodies right from the planning stage would resolve many difficulties faced at present. The municipal bodies have to be assigned their legitimate responsibility for providing and maintaining these basic services.

Engineers and technicians do not normally consider an O&M posting to be a good one and would prefer to be involved with new construction. Thus, the O&M divisions are generally poorly staffed. Government should evolve suitable inventive systems to attract better talent into this field.

There is also a need for upgrading the skills, particularly of the lower level technical staff, in the areas of operations and preventive maintenance.

These institutions will have to be pushed to draw up a systematic plan for regular and preventive maintenance of the whole system. Adequate budgetary allocations to support this should be made and the performance of the institution watched closely in this regard.

This increased thrust towards O&M would not be readily achieved in the normal course and the ESA's have a significant role to play to influence member governments and through them the various organisations to take up systematic programmes of preventive maintenance.

In the case of community-based systems, it is quite clear that where the community, particularly women are not involved right from the beginning, the systems can quickly fall into disuse. Where the community has been fully involved, and have a sense of "ownership", voluntary help is often forthcoming to operate and maintain the systems. However, in the case of community owned sanitation facilities, the system of voluntary community help for maintenance does not work satisfactorily. Therefore one needs to think either of individual toilets or community toilets which are maintained by workers from the community not on a voluntary basis but on a paid basis. The "Pay and Use" toilets set up in various public places and slums of Delhi, Madras and other cities in India are able to meet their normal operation and maintenance expensesn from the small "fees" that are charged from each user.

SUSTAINABILITY OF FINANCES

Considering the expanding needs of this sector, all efforts are needed to mobilise additional resources from donor agencies and multilateral lending institutions. At the government level, there is a need to set up special funding agencies, like a special Urban Infrastructure Development Bank, which would mobilise additional resources for this sector. Through the regis of such a specialised funding institution, it may also be possible to bring about a greater extent of financial discipline among the implementing agencies and the municipal bodies.

The experiment of setting up a Municipal Urban Development Fund under the World Bank assisted Tamilnadu Urban Development Project is worth mentioning here. With the setting up of this Fund municipal bodies who were earlier getting ad-hoc grants from the Government have been forced to draw up 3-year operating and financial plans. The Fund provides for flexibility in terms of lending, depending on the type of local body and type of project, and is able to use the lending as a leverage for more viable tariff and taxation policies. At the Government of India level, an Urban Infrastructure Lending Institution is expected to be set up shortly, as a subsidiary of the Housing and Urban Development Corporation.

Not with standing these efforts and the continued support for the programme by Governments, it is unlikely that there will be a substancial step up in the resources available for this sector since in developing countries, there are many other sectors which may be crying for greater priority. Hence in the long term only a "stand on your own feet" philosophy will help. We must move towards full cost recovery at the earliest. But how do we do this ? The first stage would need to be the establishment of proper costing and accounting systems so that the subsidy comitments to different income groups are highlighted. Tne next stage is to clearly bring to the notice of policy makers the ill effects and distortions caused by the subsidy and the effect of these on the long term sustainability of the programme. Proposals calling for full cost recovery have a greater chance of meeting the approval of political policy makers. If they are backed by data and an analysis of the long term impact of existing subsidies.

Proposals for full cost recovery coupled with the setting-up of some form of revolving fund from the receipts in the programme would receive more favourable attention since

increases funding for the sector gets assured, and there is a direct link between better recoveries and expanded programmes in the sector.

Of course full cost recovery does not imply that everyone pays at delivered cost of services. Social equity considerations would not doubt dictate lower tariffs for the economically water sections. But even for these groups, the services should not be given free. The common experience is that "free" services are not valued and hence not maintained. The experience of "Pay and Use" toilets of Sulabh International has also clearly demonstrated that where such basic services are maintained well, even the poor are prepared to pay for the services.

In the case of community-based systems innovative revenue recovery mechanisms can be worked out right at the beginning of the project in consultation with the community. The collection system has also to be flexible to suit their needs. While doing a review of charges from alun tenements in Madras, it was found that revenue collectors were going to houses between 11 a.m when everyone was at work. Simple changes in these timings improved collections. Collections on a daily or weekly basis may be better in such areas instead of monthly collections. The system developed would have to allow for such flexibility.

What is needed is a change of attitude on the part of policy makers at the highest level. This may come about only slowly but "persuasive" powers of ESA's or donor agenciers could sometimes force these decisions at the initial stage. At the same time ESAs must realise the political implications of advice given by them. Ultimately political will is necessary for change. Sometimes partial beginninggs and slow building up may be adviseable. We must be sensitive to political realities.

MOVING FORWARD

They have no doubt been shortfalls in meeting the Decade's targets. But we need not feel opologetic. We need not spend too much time cataloging the reasons for failure. What is important is that the Decade has given a great new thrust to water supply and sanitation programme resulting in substantial increase in funding for the sector. What is even more important is that there has been a change of attitude. In different parts in almost every country, new innovations approaches are being tried out. Several low cost technologies have been developed and promoted and are slowly gaining acceptance among the people and the engineers. In the coming decade, we must build upon these gains and move forward.

COLLABORATIVE COUNCIL MEETING

Sophia Antipolis (France)
November 28 - December 1st, 1989

SUSTAINABLE WATER SUPPLY AND SANITATION IN RURAL AREAS

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SUSTAINABLE WATER SUPPLY AND SANITATION

IN RURAL AREAS

1. INTRODUCTION

The paper is based on the experiences gained by both the Governments of Kenya and Finland through their development co–operation which favors Rural Water Development. Health and Sanitation is one of the major sector concentrations. In accordance with this policy, an agreement was reached in 1981 to start the Western Water Supply Program. The program is implemented by KEFINCO, a Finnish Consulting Agency in collaboration with the Ministry of Water Development.

1.1 Rural Water Supply and Sanitation in Kenya

The rural population generally has limited access to improved water supplies, despite Government efforts to improve the situation. The majority of the rural population carries water over considerable distances from natural sources which are often polluted, insufficient or unreliable. A small number of people have individual connections and the balance draw water from communal water points, kiosks, protected springs or wells. Water usage in the rural areas ranges from 50 lcd for individual connections to about 10 lcd for wells and protected springs.

It is the aim of the Government of Kenya to provide safe water to all areas of the country by the year 2000. But due to the scarcity of resources and increase in population, the coverage has not made any impact. Although piped water has been preferred, in urban centers, it has been recognized that low cost locally sustainable solutions have to be adopted in rural areas. In line with this policy, the communities have to be involved at all the stages of developing their own water supplies.

1.2 The Western Water Program

The Western Water Supply Development Program covers an area of 4,850 sq. km. Administratively it covers 4 Districts: Bungoma, Kakamega, Busia and parts of Siaya District. The average annual rainfall in the area is 1,100 mm resulting in reasonable water resources, both surface and ground water. The program aims at reaching the National targets by developing ground water resources and to provide point source supplies such as dug wells, boreholes and protected springs.

The total population within the program area is 1.5 million people with a growth of 3.5% per annum. With an increase of 100,000 persons served per year, the estimated service coverage by the year 2000 will be 79%.

The objective of the Program is to improve the Health of the people in the area through increased provision of safe water supply to be used for both domestic and livestock requirements. The second objective is to consolidate the existing water facilities and provide more sustainable water systems which meet the needs of local communities. In order to ensure that the water supplies are sustainable, the Program, together with the Ministry of Water Development and other relevant Agencies ensures that the beneficiaries are involved in the Planning, Construction and later the Operation and Maintenance of their own water supplies.

2. DECENTRALIZED SUPPORT STRUCTURES WHICH ASSIST COMMUNITIES MANAGE THEIR OWN WATER SUPPLY AND SANITATION PROGRAMS

For a program to support and assist communities understand and later manage their own Water Supply and Sanitation programs, a well designed Community Development and Training component must be established.

Historically, the Program started without the support from the community, during the period (1981-1983). The Ministry's Community Section was established in 1984, which meant a lot in terms of working backwards to set up structures which could deal with specific issues which were important to the beneficiaries. These included, Land Legalization, Siting, Construction, Operation, Maintenance and actual Ownership of the Water Points. The Program has worked systematically to establish structures and mechanisms through which the communities can be supported.

2.1 District Development Committee

The main structure which represent the community's interest is the District Development Committee which ensures that the responsibility for Planning and Implementation is given to the local communities. Under the Government's District Focus Strategy, the communities through the Sub-local, Local, Division and District Development Committees are able to send their priorities about where they require the water facilities within their villages to a Planning Meeting. In the same meeting, the programs annual budget for each District is discussed and target areas agreed upon. Once this is done, a Socio-Economic survey of given locations is undertaken so as to map out both the economic activities and social patterns of a given community. The same committees act as a monitoring and evaluation instrument on the distribution and allocation of water points to the respective communities.

2.2 Community Mobilization

The main objective is to discuss the concrete issues to do with the proposed water point. The mobilization is done through public meetings, seminars etc. The issues discussed include the role of the community in the management of the supply, construction, maintenance, collection of funds and the duties of the water committee and pump attendants. The following activities do take place:

2.2.1 Well Siting

The community is involved in the siting through several meetings which take place, from the local, sub-local and village levels. Program staff, the local leaders and the community members participate. This is also a forum where the land legality is dealt with and the Water Committee formed to take care of the future maintenance.

2.2.2 Committee Formation and Registration

During the preparatory stages of siting and construction of the water points, the affected community elects a water committee which represents them in all issues of management and operation of the water supply. Usually members of the committee are one half women and the other half men. The total number is 10-14 people. The duties of the water committee include collection of funds for operation and maintenance, organizing labor and materials for construction, development at well site, cleanliness and health education. Once formed, the water committee registers with the Ministry of Culture and Social Services as a Self Help Group. It is my belief that the water committee's role should be strengthened so as to supervise the construction and make all decisions concerning their water point with minimal interference from the Program. At the moment, the Program pays the contractors who construct the water points.

2.2.3 Contribution by Communities

With an organized, trained committee, the construction is done in partnership with the community members. For shallow wells they dig the well up to the water level, for springs they collect the material needed for construction and for drilling they clear the route for the heavy drilling machines to pass. Their contribution to construction is important as they learn to accept the water point when completed as theirs.

2.3 Maintenance Structure

The Program has gone through different maintenance structures before achieving the village level maintenance system which gives the users a sense of local ownership. At the initial inception of the Program, mobile teams (2 landrovers and project staff) went round the program area to repair and maintain the water points. This system proved expensive, unreliable and non-sustainable.

The second step was to train local repairmen from the locations. After training they went back to their Districts to be hired by the water committees whenever the maintenance needs arose. This system was found reliable, and later on the Program started training Women Pump Attendants to take care of the shallow wells which were fitted with a Direct Action Pump, Nira AF 85 which is light and easy to repair and maintain.

The training of women has brought better results, because they are involved and concerned about their water points. Local Repairmen have continued to repair the deeper wells with India Mark II pumps. They have also been used for installation of pumps and as instructors during the training of women pump care takers. The lessons learnt from this development have shown that women need to be involved in all decisions affecting their water supply as they are residents in the village unlike the men who go to cities and towns in search of employment.

The Program hopes to involve more community members so as to take care of all kinds of maintenance. For example the local contractors are being equipped with both construction and maintenance skills so that the community can hire their services locally and cheaply.

2.4 Extension Services

The Extension Services offered to the communities are for community mobilization, training, maintenance and follow up. The program favors the integrated approach where all the relevant Agencies participate. For example, Ministry of Water Development seconds staff to work in the program, and also the respective district engineers attach water inspectors to monitor and evaluate the Program activities. The Ministry of Culture and Social Services provides community assistants who work within the locations while the Ministry of Health assists with public health technicians who participate in the siting and follow up the water points. In locations where the extension personnel are not available, the Program assists the affected community by hiring extension staff. The community does the selection and the supervision. The remuneration is given by the Program. The staff live within the community and are able to give back-up services.

2.5 Women's Involvement in the Program Activities

In the early development of the Program (1981-1983) women's involvement was not an integral part of the Program activities, and therefore decisions made concerning the siting of the facilities did not include women's views. This has been rectified and women are being involved at all stages of the development. Apart from being members of the water committee, they are the Pump/Spring Attendants. They have been trained in simple repair and maintenance routines.

They have also formed women's groups to undertake health education and economic activities within their communities. For example, the Program is supporting a sand filter project run by the pump attendants. Women pump attendants have been trained by the Program and employed as mechanics. The involvement of women brings more success for the Program activities and gives the women the benefits accrued from the Program, and this later brings more economic benefits to the community.

2.6 Handing Over of A Water Point To The Community

In recognition of the efforts the community has made in participating in the construction and operation of their water supply, a handing over ceremony is organized. The main purpose here is to ensure that the structure being handed over is sustainable. This means that the construction must have been done up to the accepted Ministry of Water Development standards, the community is taking care of the facility and future operation and maintenance is arranged through trained community members. Although this is a new area for the project (only 100 water points have been handed over) it is an area which needs to be developed further.

3. PUBLIC INFORMATION AND TRAINING NEEDS AT ALL LEVELS

The main objective of training the communities within the project area is to create awareness within the consumers of better water usage and maintenance of the different types of technologies. Therefore, training is geared towards improving health, sanitation and introducing proper hygiene practices.

3.1 Training At Community Level

The training of water committees in understanding their role is very important because it is the body which oversees the community water supplies. The community is given training in Bookkeeping, Leadership Skills, Fund Raising Techniques, Operation and Maintenance, Development at Well Surrounding, Health Education etc.

3.1.1 Training Pump Attendants

This has had a tremendous impact on the water points. Each water point group selects 2 Pump Attendants (women) who receive 2 weeks training on all aspects of pump maintenance, health education and hygienic standards, cleanliness at well site etc. At the end of training, the Pump Attendants go back to the village and practice what they have been taught. The results are effective management of the water supply.

3.1.2 Training of Repairmen and Local Contractors

The training needs of this target group are assessed and then they are selected by the communities and trained by the program in pump repair, installation, well construction, slab construction, etc., at the end of their training, the Repairmen/Contractors go back to their villages and they are hired by the local communities to perform those duties. This training is essential because the transfer of technology can be done from the project to the local communities after the program ends.

3.1.3 Training of Women

Women are the best managers for both sanitation and rural water supplies. The main objective of training them is to give them skills which enable them to operate and maintain water points effectively. Apart from the training of Pump Attendants, women's groups are given lessons on Health Education and Sanitation. They are also trained in management of their income generating activities.

3.1.4 Training of Community Leaders

The main objectives of training community leaders is to equip them with sources. At the end of the 5 days seminar, the leaders through different forums are able to pass the same information to the consumers. The topics covered here include: Water borne diseases and health education.

3.1.5 Training of Extension Staff

The Program undertakes training sessions to equip the extension staff with relevant skills. The training includes communication skills, techniques of community mobilization, district focus for rural development strategy, entry into the community, report writing, etc.

3.1.6 Health Education

Health Education is geared towards the consumers and is planned and implemented in cooperation with the Primary Health Care Program. Emphasis is placed on water borne diseases, home hygiene, care of water vessels, and personal hygiene.

4. COLLABORATION AMONG EXISTING ORGANIZATIONS

The issues of water, health and sanitation cannot be left entirely to one agency. There is need to collaborate with different organizations to maximize the scarce resources.

4.1 Collaboration with Government Ministries

Although the Ministry of Water Development has the overall responsibility on water development, catchment protection and water quality control and operates and maintains about 300 piped schemes, it is finding it necessary to collaborate with other agencies such as the Ministry of Culture and Social Services which assists the project in mobilization of communities and through the CDAs and women group programs. The other collaboration is through the Ministry of Lands and Settlement when legality of land is dealt with, Ministry of Agriculture, Office of the President and Ministry of Information and Broadcasting educate the beneficiaries through Radio, Television and Newsprint. As mentioned earlier, the DDC plays a major role in the prioritizing of water and sanitation activities.

4.2 Collaboration with Non-Governmental Agencies

Within the program area, several non-governmental agencies exist, such as CARE Kenya, Action Aid, IFARD, Partnership for Productivity, KANU Maendeleo Organization. In most cases, the NGOs have requested the project to assist them in training their staff in well construction and on job training has been given. In other areas, the NGOs have made use of the Extension Agents trained by the program in reaching the communities. In other cases, the NGOs have requested water on behalf of the communities they serve, so as to promote their programs, e.g. KENGO (Kenya Energy Non-Governmental Organization).

4.3 Collaboration With Donor Agencies

Collaboration between the two Finnida funded programs (Kenya Finland Primary Health Care Program) has been essential. Usually the water program supplies water to areas where the Primary Health Care Program is operating, while the Primary Health Program provides expert advice during siting of water points, health education and sanitation. The two programs operate within the same areas, and compliment each other. The other donor operating within the same area is NORAD, mainly in Bungoma, and joint training programs for Bungoma leaders have been undertaken.

5. RAISING AND MANAGING FUNDS

5.1 Raising Funds

The whole concept of fund raising for future operation and maintenance of community operated water schemes is very important. The community participation section encourages the water committees to set up income generating projects by use of spill water.

The funds raised for the maintenance of water resources have not followed a particular pattern. Some communities have raised funds whenever the facilities broke down and they needed to pay the repairmen, others have contributed monthly with funds saved in the Post Office or a Bank. In some cases funds have been raised and kept in the house of the Chairmen of the Water Committees.

Fund collection and usage has been one major subject addressed during seminars and organized community meetings (Barazas), etc. During the same meetings, mini-fund raising is organized and funds raised. The other source is through the commercial projects being undertaken by the water committees. These include fish farming, tree nurseries, vegetable gardening, brick making, block making etc. As you can see, there are very few sources of funds available to the communities and others need to be found.

5.2 Managing Funds

The funds raised usually range from Kshs. 300–1,500. The management of such funds is usually left to the water committee with the assistance of the Program. On the management and usage of funds, the committee is assisted to record all funds collected from the consumers and also to issue receipts. Also a register of all the consumers is kept to monitor all those who are contributing and how the funds are used.

It would be difficult for the Program to deal with issues to do with funds in isolation from the existing Kenyan System, so the program has encouraged Water committees to register as Self Help Projects within their own localities to generate and manage their own activities in line with government procedures and regulations. The next step is to encourage them to open Bank/Postal Accounts so when they want to borrow, it is easier when they are already customers.

The concept of involving the committees in the banking area is still slow as most banks are found in the urban areas. The Post Office is now being tried and it seems to be popular with the local communities.

6. THE LESSONS LEARNED FROM THIS PROGRAM ARE AS FOLLOWS:

1. This is one of the biggest Rural Water and Sanitation Programs in the country, and it has had a tremendous impact on the lives of rural communities.

2. The omission of community participation at the inception of the Program has meant spending more field extension time on reactivation of water committees and consumers in general.

3. The speed at which the construction has moved does not give enough time for community involvement, therefore there is need to slow down the construction to effectively involve the communities.

From the foregoing, I would like to propose the following recommendations to be considered further:

7. RECOMMENDATIONS

1. It is proposed that Governments in Developing Countries should support the appropriate technologies suitable for communities in line with the communities' socio economic status. Many piped schemes centrally designed by the Governments have proved too complicated for the beneficiaries.

2. Community Participation and Hygiene Education should be a priority in all Water and Sanitation Projects in rural areas. More funds should be allocated for the promotion of community participation (CP) activities. The present budget which emphasizes hardware should be reversed so CP and hygiene education receive more attention.

3. Projects should hire and train staff to promote the CP activities at all levels. There is always a bias for technical staff, and therefore technical issues are given fair consideration. Governments and Donor Agencies should ensure that for every rural water and sanitation project, sociologists, anthropologists, economists, etc. are involved.

4. The development support of the private sector such as Well Contractors, Pump Repairmen, Masons, etc. should be encouraged so that we ensure continuity and sustainability of the water systems when the project ends.

5. Women should be involved in both decision making and implementation of the water related activities. Women field extension workers are more effective when mobilizing rural communities.

6. Support to income generating activities: to enable the communities to run their water supplies effectively, they should be assisted to set up and manage pilot income generating projects. Contracts should be entered between the projects and the members of the communities for supply of required local materials such as stones, bricks, and sand without going through middlemen.

7. Provision of credit facilities to local community organizations. The Water Committees should be strengthened through training and they should be encouraged to form Water Associations. In addition, the Water Associations should be assisted to develop business ventures which could generate incomes to be used for future operation and maintenance. The Governments with the assistance of Donor Agencies should try out a credit pilot scheme, which could be operated on a revolving loan basis. Local banks should be encouraged to participate. When the pilot scheme proves successful, it should be replicated elsewhere.

8. Water Associations should play a leading role in the construction of their water supplies. They should be trained on how to enter contracts, to supervise the work and to operate and maintain the completed supplies. The Government and the programs should give back-up services and encourage the communities to acquire all the required skills.

9. Local manufacture of pumps and spare parts: It should be the duty of every program to support the local production of the needed technology. Local investors should be encouraged to play a leading role.

10. Selection and training of local experts. Most rural projects suffer from a shortage of trained manpower. The majority of local trained staff prefer to live and work in urban areas.

11. It is recommended that the Water and Sanitation programs should be managed by local personnel. Only in fields where the recipient government is short of skilled personnel should the donor assist in recruiting such personnel.

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COLLABORATIVE COUNCIL MEETING

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WATER MANAGEMENT ISSUES OF WATER SUPPLY AND SANITATION

SOME ASPECTS OF THE ADMINISTRATION OF WATER RESOURCES IN THE FIELD OF DRINKING WATER SUPPLY AND SANITATION

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SOME ASPECTS OF THE ADMINISTRATION OF WATER RESOURCES IN THE FIELD OF DRINKING WATER SUPPLY AND SANITATION

1. INTRODUCTION

1.1 The planning, allocation and pricing; the regulation and control, are the essential aspects of the administration of the water resources of a country. Its principle objective is to achieve the most efficient utilization of available resources in the presence of an increasing demand.

1.2 The purpose of the following analysis is to encourage a discussion leading to the establishment of guidelines for strategic action to improve the efficient use of water resources in the provision of drinking water supply and sanitation services. Of special interest is how to extend the coverage of these services in the developing countries and thus to fulfill the urgent needs of the low income populations residing in the urban peripheral and rural zones.

1.3 The general approach and the proposed specific actions, are based on the author's personal experiences in Mexico, and on the lessons left to the Latin American countries by programs growing out of the "Carta de Punta del Este" (1961) and the scheme of actions endorsed by the Santiago de Chile Health Ministers conference (1973) and, more recently, by the efforts that result from the implementation of the International Drinking Water Supply and Sanitation Decade 1981–1990.

2. WATER RESOURCES, WATER SUPPLY AND SANITATION

2.1 Water supply and sanitation are a part of and are tied to problems of water resource development and allocation. Water supply activities compete with other users: agriculture and industry primarily. When water resources are scarce or are unevenly distributed for geographical or climatological reasons, increasing demands of different users can pose serious conflicts and generate economic, social and political problems.

2.2 Aggravating these problems are scarcity, waste and inefficiency in the urban, industrial and agricultural water use, the contamination which damages its quality and the frequent absence of sound pricing policies.

2.3 The disposal of urban wastewater poses a special problem in the developing countries, where it is given a much lower priority than drinking water supply. The relationship which ties both services together is not observed with the result that wastewater infrastructure is lagging far behind the provision of water supply. In cities that have this service at their disposal, the wastewater is usually discharged without sufficient treatment, negatively affecting the receiving bodies. Often, wastewater is used carelessly in irrigation, with risks to the health of workers and the consumers of the agricultural products.

2.4 Administratively, water resources are often, indeed usually, not allocated to specific sectors within the structures of national or local government. Drinking water and sanitation have frequently encountered problems of sector identification. Traditionally, they are often linked to the health sector, but frequently are also part of other sectors: urban development, agriculture, public works. Occasionally, water and sanitation are located in different agencies. More recently, with environment and ecology a worldwide concern, water supply and wastewater disposal is viewed from a much broader perspective.

3. PLANNING THE USE OF NATIONAL WATER RESOURCES

3.1 It is necessary to remember: planning is an indispensable instrument for the management of water resources; that is to say, to allocate available resources to the growing demand of a developing country. This allocation depends on knowledge of available resources but includes regulatory activities responding to the needs of different water users (population centers, industry, agriculture, etc.) and among these and the hydrological systems.

3.2 The basic unit of planning is the river basin. Regional plans can take in several basins and as a whole these regional plans represent the national water resources plan.

3.3. Planning acquires great importance in arid and semi arid countries where the resource is scarce or is badly distributed, the demand is growing, the remaining available sources of supply are more and more distant from the point of use, necessary infrastructure is costly and investment funds are scarce. Such is the case in Mexico; a country of 85 million inhabitants, with 75% of its territory in arid climates.

3.4 Mexico has a long tradition in planning hydraulic resources (410 million cubic meters per year of renewable surface water). Initial efforts in the modern era began at the end of the 1940's at river basin level to foster integrated socioeconomic development and to prevent floods (Tepalcatepec, Papaloapan and El Fuerte). In some river basins, the first activities concerned themselves only with research (Valle de Mexico, Lerma–Chapala and Panuco); others were grouped by regions (Northeast, Central, etc.) were extensive infrastructure works were implemented (hydro–agricultural, hydroelectric and drinking water).

3.5 In 1975 the first version of the "Plan Nacional Hidraulico" (PNH) was produced. In 1981 the second revision of this National Water Resources Plan appeared, containing additional technical and juridical recommendations, complemented with development schemes for each state. The fact that the same experts who prepared the PNH are now the ones responsible to implement the programs, has ensured consistency and continuity of actions.

3.6 The PNH contains well defined policies and strategies which in great measure are the same proposed later on in this paper and are in the very spirit of this reunion: balance the projects of infrastructure enlargement with an increase of the efficiency in the use of water, and stimulate the quantitative and qualitative conservation of the resource, including the reuse of wastewaters.

3.7 In its widest context, the PNH aims to support the great national priorities such as food production and self sustaining urban-industrial development within a scheme of economic modernization. Objectives of PNH include improving living conditions and productivity, elevating social well being and protecting the environment, preserving natural resources and supporting human health.

3.8 This planning has had a positive impact in the development of the hydraulic resources. It ended previous anarchy in assigning resources and offered a way to solve conflicts between the user sectors; it has increased the efficiency of investments programs and established priorities based on cost-benefit ratios. This places the implementation of a water works on a sounder financial basis. Furthermore, administrative, operational and juridicial structures have been strengthened, and decentralization and deconcentration has been implemented.

4. A STRATEGY FOR THE FUTURE

4.1 The realities of the Latin American countries define the policies of improvement in the management and efficient use of water resources according to three strategic considerations:

- The adoption of the hydrologic basin, as a basic geographic criteria to plan, regulate and benefit from the water resource, preserving as much as possible the regional and a local economic interests. In any case, links must be maintained between the local focus of these projects and those of the national water resource policies.

- Quantitatively, balance water availability with criteria of maximum efficiency in the use of water (domestic, industrial and agricultural). In this sense, priority must be given: 1) to the conservation of the resource; 2) to the rational use of water through a systems of water saving and of prices better adjusted to the real cost of its production; and 3) to the reuse of wastewater principally in industry and in agriculture.

- From the qualitative point of view, the impact of wastewater discharge must be minimized. For this purpose, it is necessary: to check/reduce the allotment and production of contaminating substances (pesticides, herbicides), above all in arid zones; encourage the substitution of treated wastewater to replace fresh water used in industrial or agricultural processes where a high degree of quality is not required; and encourage treated wastewater infiltration to increase aquifer capacity. To protect receiving water quality, it is advisable to adopt a system of payments (effluent discharge permits) which reflect the quality of the discharge.

  Other complementary strategies are:

  - The creation/strengthening of a single national authority for the establishment of policies, the monitoring of their implementation, and the enforcement of quality control and resource allocation legislation.

- The establishment of centers of demonstration where methods and technologies can be tested.

- The preparation of the necessary human resources and the encouragement of water technology investigation.

- Cases were these problems have been solved should also be studied to benefit from the lessons learned.

- Encouraging the participation of the beneficiary community and of other social and private sectors. (Universities, consulting firms, supporting groups or clubs, etc.)

5. RECOMMENDATIONS

5.1. Establish a system of development, administration and allocation of water resources based on river basins, from the perspective of drinking water and sanitation.

5.1.1 Riverbasin Model

- It is recommended that studies and evaluations be performed of cases where various aspects of the water problems are represented, such as uncoordinated and inefficient use of limited and scarce resource; increasing unsatisfied demand for urban industrial and agricultural needs; high levels of contamination from discharges of wastewater and other uncontrolled waste discharges (toxic wastes included). The purpose of such a study is to develop a system or model of river basin water resource management emphasizing water supply and wastewater disposal impacts and needs. The model should permit evaluating trade-offs of different actions of different degrees of complexity suitable for various local conditions to enable decision makers to evaluate the impact of alternative actions. Existing models should be evaluated and adopted.

5.1.2 Testing of Model

- The resulting model should be tested in interested countries, by local authorities, with participation of national and external support organizations. A representative case is the Lerma-Chapala basin in Mexico, where serious problems affecting the population of five states are confronted and where studies and activities have been performed which are now formally integrated in a program of water supply and sanitation for the basin. After this testing, the model should be ready for routine application elsewhere with only modifications to reflect local conditions.

5.2 Support the following specific actions, with the intent to strengthen the management of hydraulic resources, with special reference to drinking wter and sanitation services.

5.2.1 Planning

- Integrate water resource and general development planning for better coordination with other sectors (urban development, public works, ecology, health and agriculture);

- Integrate drinking water and sanitation with national and local plans for hydraulic resources, with special attention to primary health care, tourism, etc.; and

- Avoid the common practice of the "first phase" that implements major works (treatment, transmission, trunk sewers, etc.) but rarely extends to building distribution or collection systems for the poor in low income and urban peripheral areas.

5.2.2 Judicial and Institutional Structure

- Establish the concept of water as a resource belonging to the nation to facilitate its utilization and allocation through government authorities, which also establishes that there must not be the freedom to contaminate it;

- Analyze the advantages of a sole authority that would establish rules, criteria, policies and enforce their implementation;

- Establish priorities for water uses and rational pricing (payments) policies, giving due preference to domestic use;

- Strengthen the organic and functional structures of the administration of water;

- Develop institutional systems for semi-urban areas;

- Study the decentralization of institutions to local communities; and

- Promote the participation of social and private organized groups, such as universities, trade and professional associations and private operating and maintenance organizations.

5.2.3 Financial System

- Analyze the causes that have prevented the achievement of financial self sufficiency of water services (urban, rural, agricultural, commercial, industrial);

- Rationalize the allocation of costs and recuperation of investments;

- Whenever a subsidy policy is deemed necessary, verify that it favors the economically weak, and in any case ensures that user payments cover operating and maintenance costs. Establish cost recovery policies which are just, reflect the real cost of the service provided and include the cost of the discharge of the wastewaters;

- Give more attention to the metering, billing and collecting system. (Avoid administrative leaks.) Regardless of the scarcity of capital, its high cost and the inflationary pressures developing countries face, encourage a greater contribution from public funds and private financial resources (user tax, credits from major industrial beneficiaries);

- Evaluate the feasibility of establishing revolving funds; improve the efficiency of application of external credits and loans and use national development banks as intermediaries.

5.2.4 Human Resources and Technologies

- Encourage greater coordination between training institutions and the organization providing water supply and sanitation services;

- Complement training with practical field demonstrations;

- Maintain programs of continuing education, make use of students in social services (not just technicians) and evaluate the professional support of those trained;

- Promote the development, transfer and effective application of appropriate technologies;

- Improve/expand the provision of laboratory services;

- Support applied research and investigations by universities and scientific organizations, including evaluation of administration and financing of social anthropology, of environmental risk assessment focusing on human health impact of water use;

- Encourage in all these activities the practices and technologies of water saving.

5.2.5 Community Participation

- Establish systematic and permanent information transfer schemes for communities;

- Compile census data and information from sample surveys;

- Modernize information and data retrieval using appropriate equipment and properly trained staff;

- Use international information systems such as REPIDISCO and CESI and provide them with country and local information.

- Give priority to the provision of water supply and sanitation services to schools and establish "teaching units" about water supply and sanitation to be incorporated into the curriculum;

- Implement a system of information transfer to local authorities which includes periodic updating;

- Develop appropriate communications between different organizational levels of public administration (related to the sector).

- Provide the resources necessary to permit the participation of the population in the planning process, using the help of community organizations and local leaders;

- Promote the provision of materials and labor by the community as a contribution towards construction of facilities;

- Promote the principle of payment for services by the user; encourage the participation of the private sector, such as organizations of operators, manufacturers, trade associations.

5.2.5 International Cooperation

- Promote the integration of the above described activities to avoid/eliminate dispersion or duplication of efforts;

- Avoid the vertical, top down approach;

- Both donor and recipient country should agree on priorities for the assisted country;

- Increase the capacity and knowledge of national counterpart staff and protect intellectual property;

- Encourage cooperation between countries (TCDC), between institutions and between professionals facing similar problems and conditions.

5.3 Summary Recommendation

Many steps must be taken to improve the effectiveness of the water supply and sanitation sector within overall water resources management. Some have been listed and discussed above. Fundamentally, what is required is a broadening of our vision of the sector. In short, we must create a new **"Water Culture"** which is based on a working together of beneficiaries and service providers (at every level) for the common good.

COLLABORATIVE COUNCIL MEETING

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ENVIRONMENTAL ISSUES IN WATER SUPPLY AND WASTE DISPOSAL

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ENVIRONMENTAL ISSUES IN WATER SUPPLY AND WASTE DISPOSAL

1. WATER SUPPLY, SANITATION, ENVIRONMENT, AND SUSTAINABLE DEVELOPMENT

1.01 Water supply and sanitation (WSS) have had a long history. Those who enjoy the convenience take it for granted. Those without it consider it a dream still yet to come true. In China, for example, there are 40 million still drinking high fluoride water, 60 million still drinking alkaline water and about 500 million still living without piped water.

1.02 Water supply and sanitation is only one of the important facets of today's many environment related issues; however, it affects our daily life most directly, particularly everyone's health, because most of the commonly known diseases are water related. It has been estimated that even with the added efforts made during the International Drinking Water Supply and Sanitation Decade we were only able to satisfy about 20% of the unprivileged.

1.03 Due to rapid industrialization and population growth, the water environment deteriorates rapidly and the increased demand on water supply and sanitation also exert pressure on water intake source and receiving water body.

1.04 The prospects of improving WSS are becoming even gloomier when we take the impacts of environmental pressure on WSS. The many WSS related environmental issues include industrial pollution, urbanization, nonpoint source pollution, over extraction of surface and ground water, over abundance of water in some cases and deforestation etc. These problems are extremely expensive to cure. The challenge is almost beyond comprehension considering the present economic circumstance.

1.05 Confronted by the present economic situation in most developing countries, we feel helpless – the conflict of protecting the environment and economic development is becoming inevitable. In China, it has been estimated that environmental control cost could surpass 40 billion RMB (USD 1 = RMB 3.7). This represents 5.0% of our GNP as of 1982, would create negative growth of our overall economy, which is obviously unacceptable. If every developing country does a similar calculation, I suspect it will be seen that the experience of China is commonplace.

1.06 It was said that restoring the River Thames took nearly one hundred years. That shows the slowness of environmental recovery. The sense of gradualism should therefore be built into all aspects of our system design.

1.07 Amid the many inextricable conflicts, a concept has emerged which looks beyond just protection of environment: **sustainable development**, an idea calling for the creation of a benign cycle that would satisfy mankind's ambition and preserves the environment. In "Our Common Future", **sustainable development** is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Realizing the intricate relationship of WSS with its surrounding environment and all the difficulties we experienced during the past decade, it is a must for us to take a new approach. A new attitude must be taken for the start of the Decade of the 90's if we wish to achieve anything meaningful.

2. SECTOR APPROACH vs. INTERDISCIPLINARY APPROACH

2.01 Water Supply and Sanitation is treated as a sector, while environment runs across many sectors. A new approach of WSS embodied in the realm of the concept of environmentally sustainable development means a challenge since we will be involved in other fields such as transport and transformation of substances in the geosphere and biosphere, modeling of river basin systems, treatment of wastes that would impact upon the ecosystem, decision making models based on risk analysis and many more that were never entered before by sanitary engineers. The new perspective for sanitary engineesr is a challenge; however, it is also an opportunity since a **scientific and technological reorientation of WSS will eventually lead to a social restructuring** that should bring about the ultimate change leading to a much more optimistic estimate of resolving the very large gap of satisfying the demand for WSS which is almost inconceivable under today's management.

2.02 Talking about the different approach between the traditional WSS and the more contemporary environmental field, it can best be described as follows: WSS has always taken a sector approach in dealing with her issues, while environment, not necessarily considered so independent a sector, has always taken a multidisciplinary or interdisciplinary approach toward her issues. Because of the difference, in many places the municipal water supply and sanitation department is considered conservative while the environmental agency has shown to be more outgoing and innovative.

2.03 WSS using a sector approach really has little room for stretching and this is true for any sector with a long history: a small inch of advance of the frontier often takes a long time to accomplish. WSS taken from an environmental perspective, by broadening its scope, will find a wider field for maneuvering. Environment being an interdisciplinary subject focus on cross breeding of existing accomplishments derived from among related fields. As a result, it is not only good in capturing blind spots often neglected by independent sectors, but also effective in promoting dialogue which eventually leads to changes in institutions, technology and economics.

2.04 In fact, treating WSS issues with environmental considerations is ubiquitous in recent years. Much of the works carried out by the Decade Programme are basically done along this line. Taking the Integrated Resource Recovery Project as an example, the traditional WSS approach would never have considered aquaculture, use of aquatic plants and methane gas utilization from sanitary landfill as standard practice in their programs. Social aspects such as community participation, involvement of women, and hygiene education and even community financing as financial consideration were never set up as standard practice in the conventional sense in water supply and sanitation practice.

2.05 Realizing the very large gap of supply and demand still existing in WSS in most developing countries, and with the understanding that WSS when expanded with environmental perspective means opportunity, large strides can be made. It is clear that in the upcoming decade of the 1990s efforts should be made in exploring potential areas of emerging environmental programs so that WSS would be presented in an environmental perspective at all levels, including science, technology, education, economics, planning, finance, social work, culture, and international collaboration.

3. PLANNING

3.01 The Maya civilization vanished because it destroyed the ecological balance and finally the local resource base was no longer able to support it. Modern civilization is able to stretch its natural resource base much farther; however, that is also where the danger lies, because we are so conceited of our ability to exploit these resources without limitations. Recent findings in many fields have shown how ignorant we had been in many once considered great achievements which in reality, are roots of future danger. Cautious planning with better understanding of risks involved is probably the best tool we possess so far in dealing with many environmental issues.

3.02 First, control of urban population is absolutely the priority. No one thus far knows how to cope with a city with a population of more than 20 million. Taking Shanghai, a city of 10 million, as an example, thousands of industries big and small plus household discharges pollute its main drinking water source, the Huang-pu River. For the sake of the health of people, today there is no other choice but constructing a water transmission main, moving the present water intake upstream at a cost of 1.8 billion RMB (USD 450 million), while how to solve the pollution problem in Shanghai still remains an enigma.

3.03 The Shanghai case merely points out the importance of planning, especially for a super size city. It is absolutely necessary today to control the size of the city, which is particularly true for developing countries, because we do not want the once suburban wastewater treatment plants now located inside the city that spread bacteria through aerosol and affluent discharges, thousands of open dump garbage piles and clogged drains because of inadequate collection systems. Probably the worst of all, the need to find alternative waste discharge and water intake points along the river.

3.04 Once a city has grown too large many presently available planning tools will lose power. In fact, many of the planning tools already developed require substantial modifications to be suitable for use in developing countries. One such modification needed is how to deal with the problem of lacking national infrastructure in LDCs. Generally speaking, communities, towns, villages and even cities in developing countries are quite independent in terms of its resource bases. Thus, they can only manipulate to a lesser degree in the planning; to use a popular saying, "poor people always have less room for stretching".

3.05 Sometimes quite appropriate planning methods such as river basin management, or similar regionalization approaches practiced in Western Europe, find it difficult to obtain acceptance in LDCs. A familiar term in China "Five Dragons Control the Water", shows how the five departments namely urban construction, industry, agriculture, hydraulics and environment can never reach an agreement on a unified water management program. It demonstrates how interdisciplinary action is very susceptible to resistance. Coordination of such issues requires organizing a high level commission headed by a mayor, governor or even premier, someone who possess the authority of coordination. A sector leader will usually not be suitable for the job.

3.06 A few general principles in planning include:

- protecting drinking water sources;
- zoning for industry, commerce, and residential;
- completing sewage network in order to avoid diffused and uncontrolled discharge;
- centralizing treatment, whenever possible.

When water becomes scarce and danger of pollution increases a few more general principles established lately include:

- multiple uses of water for irrigation;
- building wastewater reuse plants;
- internal reuse of water in large installation;
- pretreatment of certain cancer inducing pollutants, in particular priority pollutants;
- recovery of resources from wastes and wastes exchange among industries;
- wastes minimization within industries;
- integrated treatment of compatible wastes;
- creating pollution control services.

3.06 It is equally important to establish guidelines that provide rapid assessment or help determine whether the principles have been followed or not. Some typical phenomena, which could be called trouble shooting in planning, are the following:

(1) When city waste stream has a low BOD, say around or less than 100 ppm which is not uncommon, then we should check heavy industrial users, mostly cooling water wasting or poor plant water consumption practice,

(2) When COD of a municipal waste stream is high in relation to BOD, then we must have too many synthetic industries in the area and probably some pretreatment is needed,

(3) When a seemingly clean river is found to be high in coliforms, mostly coming from manure, probably there are uncontrolled discharge from scattered communities upstream,

(4) When artisian wells are drying, aquifer water level decreasing rapidly, then some drastic water resource conservation measures have to be taken immediately.

(5) When significant varieties of priority pollutants are detected in the drinking water source, then those polluters should be heavily fined and forced to relocate.

This list could be expanded significantly. The point is that there is the need of developing guidelines designed for often inexperienced planners which help identify the trouble spots.

3.07 With the help of the computer, we should be able to develop an expert system for WSS and environmental's related issue planning. It should be tailored for or have the built in flexibility to make modifications for developing countries as well for different levels of community WSS planning.

3.08 Much of the planning is based on monitoring information. But monitoring has always been a problem in many developing countries. It is advisable that some regional monitoring networks should be created with the assistance of international agencies.

4. MANAGEMENT AND INSTITUTION

4.01 All good wishes shown in planning should not just remain on paper. Unfortunately, one commonplace of all developing countries is: implementation always falls behind planning. As a result, treatment plants are overloaded, service delivery capacity is exceeded, population explosion is getting so far ahead of our capacity to accommodate it that our best efforts of catching up fail and everyone blames a lack of finance for the problems. In reality, it is less the lack of finance but our failure to address fundamental issues which cause the problems. Some of these issues are discussed below.

Pollution prevention pays.

4.02 Environmental impact assessment (EIA) has been proven to be an effective preventive measure in controlling new industrial development; however, there is little known of its use in infrastructure development such as town planning, new sewer outfalls, road construction and solid waste disposal.

4.03 All new development must be strictly controlled and should follow the most stringent standards. First of all, in terms of controlling pollution, all new industries, new residential developments should implement designs and processes which prevent the creation of environmental problems. Equally important, any demand for new water resources should justify additional extraction by demonstrating that a lower grade resource (reuse etc.) could not satisfy the demand.

Control of existing pollution.

4.03 It has been found in most Chinese studies, that a significant amount of the so called pollution really comes from wasting industrial raw materials. Poor plant management is responsible for about 30 to 40 percent of the pollution. Many would probably argue it is also due to old industrial process used in LDCs, but our study specifically looked at the various contributions and found ill management is the main culprit.

4.04 An equally important study shows that recycling of industrial use of water is less than 20% on the average in China, for both national and local plants. Data from some developed countries show about 70% industrial recycling rates.

4.05 Some industrial plants are found to be too small, too inefficient if any cost effective treatment is to be employed. In such circumstances it is necessary to renovate, often accompanied by plant expansion, the present facility in order to meet minimum efficiency requirements.

4.06 Water reuse in water scarce rural areas should be on the agenda. In the past, stabilization ponds were considered the standard facility. A recent innovation is wetland treatment which has many advantages over some previously known systems under specific application. Effluent produced is excellent and hygienic requirements are satisfied. The system also presents good possibilities of direct water reuse, higher water yield and production of valuable economic crop.

Promotion of water conservation is only the first step toward a water balanced, self contained society.

4.07 The traditional sector approach of WSS is basically an extraction and discharge linear operation. This sort of water management system is no longer affordable to those places in serious water shortage, and it is also unacceptable

environmentally to downstream cities when there is little assimilative capacity of the river. In many cases, the cost of either saving water or reuse water is significantly lower than the cost of exploring additional water supplies. Managing water resource according to the various clients and uses such as for household, municipality, industry, agriculture, recreation, aquaculture and afforestation should all be taken into consideration, so that it forms a water cycle within an area. The end result from an environmental perspective would be the achievement of a regional water balance benefitting both the WSS sector and the environment.

4.08 Studies should be carried out to test and demonstrate the validity of this "water balanced society" under different conditions.

Costs sharing of water.

4.08 In the past, water has always been regarded free for everyone. It is still very much underpriced in many countries today. As a result, inefficient use of water, leaks and waste, drilling wells without license and lack of metering are ubiquitous. Municipal governments can hardly recover the cost for routine maintenance and it is even more difficult to extend services to the poor. If the present situation is to be improved, then there is an urgent need in institutional strengthening at all levels of government.

Fragmentation of water management was and is still prevalent worldwide.

4.10 Institutional matters concern organization and legislation. Objectives of institutional strengthening are promoting the efficient use of water, recovering cost for further development and making sure environmentally sustainable development is also achieved.

4.11 Water is a common resource shared by many sectors, it is thus necessary to create a high level commission with the authority of reaching concerted decision on overlapping issues, such as deciding the function of water bodies, quantity for extraction, water quality standards, charges for water use and wastewater discharges. A different approach of organization which is practiced in some Western European countries is called the water basin management or regionalization method. In this case, all functional uses of water are treated as an independent sector. It has been shown that this integration of water supply, waste water collection, disposal of wastewater and other functional uses of water can achieve substantial improvements in terms of economy and efficiency.

4.12 This proven success of basin management in the West should be more carefully examined regarding its applicability to the LDCs.

The bottom up institutional approach.

4.13 In comparison to the top down approach, the bottom up approach is relatively less well understood. Water supply and sanitation are pertaining to the social life, culture and indigenous to local circumstance. These aspects need more attention if services are to be implemented properly in rural and underprivileged urban fringe areas. Instead of working with big national institutions, choosing a proper NGO could be useful with the bottom up approach. Local community organizations play the decisive role in the success or failure of most natural resource management projects. **Grass–roots nongovernmental organizations have emerged throughout the developing countries over the past decade as a spontaneous response to deepening economic and environmental troubles.** NGOs have helped communities organize to design, implement, and monitor natural resource–based development projects. Since community participation in such projects cannot be sporadic, smaller and steadier flows of funding to these grass–roots organizations are more effective than larger, one–time investments.

Progressive improvements.

4.14 When it comes to drawing up regulations, efforts should not be too ambitious. When the USEPA first set her targets in 1972, it required all wastewater be treated to secondary standard by 1976, ambitious even for the United States. Many good systems, practices and experience from the developed countries are often good for developing countries also, but some modification are always needed, which is also true when experiences are transferred among developing countries. Institutionally, it is seen valuable to have a particular system put in place, but one should not be striving for reaching a preconceived perfection as a first step. Taking pollution discharge fees as an example, it is said that the rate of charge should be high enough so that industry deems that to have treatment is cheaper than paying pollution fee. This approach could be quite wrong under certain circumstances in developing countries, as it could very well mean retarding economic development which is unacceptable. Step by step improvements may be more in keeping with economic realities.

To have a system in place is better than no system at all.

4.15 The objective of collecting discharge fees, even at an agreed lower initial rate, could be a method of creating a pool of funds used for treatment planned under an integrated program. This integrated program could take many related issues into consideration, such as priority for water supply and sanitation, controlling priority pollutants, the polluter pays principle, the various water conservation and reuse measures, industrial discharge standards and etc.

The collection rate is central to the polluter pays principle, and should be justified based on economic development.

5.0 ECONOMICS AND FINANCE

5.01 There are still more than 2000 million people without safe drinking water. The provision of water supply and sanitation is an important component of people's living standard, which can be enhanced only gradually. The lowest level is carrying water from pond or river. Fetching water from well or pumping from a hand pump in one's own yard is a significant improvement. Piped water represents a breakthrough. First, community standpipes, then a single tap per family, and then multiple taps per family with uses for bathing and toilet flushing. As far as the economics are concerned, purchasing water from a vendor or carrying water from river or pond would be deemed most expensive economically. For many the cost effectiveness is improved significantly when standpipes or one family per tap are introduced. Cost will increase again when each family demands more taps for multiple uses.

5.02 Common sense shows that any good that is free or obtained without putting in much effort will have but little value or it will not be consciously appreciated. Seeing so much water wasted today simply demonstrates that this supposed common sense has not been followed. If financing of water supply would be matched by the required sense of appreciation, we would have an easier time with, among other issues, water conservation. In poor areas, cost of supplying water may have to be shared by the central government, local government. Most important of all, however, the local community must contribute. It is also important to invite participation from local people during planning and implementation. With local participation and knowing the cost they are paying for and the associated service getting, the sense of appreciation is developed. Finally, it is important that routine maintenance be carried out by the local people and every user pay. By doing so, investment efficiency could be improved.

5.03 The same rational also applies to city and industry, but an added factor should be considered: when the cost of water is low relative to other goods, then wasting it is unavoidable. Therefore, different rates should be established for city dweller and industry, based on factors such as number of people in a family, property cost, infrastructure occupied, profit margin etc. There is an urgent need of raising water prices on industrial use.

5.04 Development is possible only when there is a profit. When the water industry shows a good profit margin, then there is a real opportunity for innovation and continued development. When WSS and environment is treated as an integral unit, there are many new approaches which could be tried in terms of institutional arrangements, technology, education and more, but they all have to be financed through some means, preferably the selling of water and the provision of waste disposal services.

6. APPROPRIATE TECHNOLOGY, RESEARCH AND DEVELOPMENT

6.01 Research and technological innovation is probably one of the most effective vehicles that can help reduce investment costs. Relative to the total amount of investment in the field, R & D is almost invisible in terms of financial requirements.

6.02 Some technologies have not been applied simply because of a lack of information. Typical examples are the deep set hand pumps and proper well sealing techniques. They were not fully known to China until the introduction of the Rural Water Supply Project of the UNDP/WB Decade Program.

6.03 A fairly large portion of investments in the LDCs are spent on inappropriate technology; being inappropriate because they are either too advanced or just a total misfit. It is well known to all that most of the presently known technologies were designed originally for use in the developed countries, not for LDCs. In most aid agency projects, the end result has always been a technology developed for the West transferred to the LDC. One hardly finds an instrument, equipment or process design that is truly tailored for LDC's needs. Interestingly enough, even in some LDCs, their own scientists and engineers do research mainly to catch up with the most advanced technologies of the West rather than to serve the need of their own people.

6.04 Because of wide economic differences between the LDCs and the DCs, it is important to give special consideration to LDC research and development program needs, mainly in the area of standards, quality control support, maintenance support technology, approach to intermediate technology, planning methodology under different social context, technology assessment, etc.

6.05 **Appropriate technology comes from appropriate standards.** Standards are the bottleneck of any program. Controlling pollution is possible only when set targets are achievable. Setting appropriate standards with special objectives may very well mean a different approach to pollution treatment technology. The conventional 30/30 standard (30 mg/liter for BOD, 30 mg/liter for SS) is primarily based on secondary treatment operating at relatively low organic loading rates. Suppose the standard is changed to 50/15, what is going to be the consequence for our process design approach? The idea of having 50 mg/liter BOD means the possibility of employing a much higher rate biological process, probably 500 percent more efficient in terms of volumetric loading; the more stringent 15 mg/liter SS means we should be more conscious of the long term effect of sediment which also has serious consequence on water supply.

6.06 In most LDCs, we find a strong dependence on instrumentation and equipment from the developed countries. In fact, to achieve the level of pollution abatement in most LDCs today, it would be possible to manufacture their own if properly pursued.

6.07 Low labor costs are still an advantage in many of the LDCs. Aforestation programs in conjunction with pollution control systems result in high tree survival and environmental improvements. Protection of water sources, removal of sludge from stabilization ponds, canal dredging, water diversion are other examples of effective labor intensive programs.

6.08 In some LDCs, there are still vast and inexpensive land areas around cities and villages. It is advisable to keep these lands in the hands of the public. In recent years, more and more signs have shown the value and effectiveness of land treatment in terms of removal of refractory compounds, nutrients, suspended solids, savings in operation and maintenance, good reuse potential, utilization of vegetation and even provision of more green belts for city residents.

7. RECOMMENDATIONS

7.01 In the earlier statements above, much has been said about the potential of deploying interdisciplinary approaches to the issue of WSS. There are two big areas for this opportunity. One is in technology cross breeding in the development of new technology, and the other is in resource recovery. A set of tentative projects or ideas for the future are listed in the following:

- development of planning tools for environmentally sustainable WSS services, especially tailored for rural communities;
- risk assessment of environmental issues in water supply and sanitation;
- special study on the risk of health coming from environmental related WSS problems, including the understanding of the position of health in the developing countries;
- determination of pollutants abatement priorities reflecting health implications that connect with the development of appropriate technology;
- integrated rescue schemes such as hydraulic washing of coal ash combined with city sewage, resulting in: absorption of dissolved pollutant from wastewater; water reuse for industry; settled solids used for brick production at the sewer end point; and supernatant used for irrigation or other purpose;
- a thorough evaluation of the pros and cons of the present practice of conversion of human waste to liquid, then reconvertion to solid state;

- placing more emphasis on suspended solid removal in order to avoid the long term effect of sedimentation which is nearly irreversible;
- direct utilization of nightsoil for the production of feedstock;
- wastewater aquaculture;
- manure deodorizing;
- joint treatment of nightsoil, activated sludge and garbage in sanitary landfills;
- land treatment of wastewater, especially wetland treatment which can also be used for growing commercial crops, with resultant high quality effluent;
- study of different types of natural lining material for sanitary landfill, land treatment sites etc.;
- high loading biological treatment (> 5 kg/ cm/day);
- gray water reuse recirculation for large buildings or small communities;
- water reuse standards for industries;
- intermediate technology policy;
- technology assessment;
- bottom up program in institution building, with special consideration to the role of NGOs.

7.02 To implement these recommendations, to establish priorities, to design specific programs or policies, requires a great deal of information and knowledge. Some of the questions the working group may wish to consider in formulation of work program suggestions are

Q 1: What is the average annual spending on WSS for different groupings of less developed countries (LDC), what percentage does that represent in terms of GNP.

Q 2: What is the spending on all water environment related issues such as industrial pollution, rural non-point source dis charge, municipal waste disposal, medical service etc. (meanly end of the pipe treatment) for different groupings of LDC.

Q 3: Generalize the sort of works done in the past in WSS that were tackled from an environmental dimension.

Q 4: Describe the environmental education program in the universities of your own country, do you find it truly interdisciplinary.

Q 5: How widely is the basin management concept adopted in developing countries, what are some of the obstacles.

Q 6: How are the LDCs meeting the demand of the monitoring needs. What are some of the problems in producing high quality data.

Q 7: Elaborate on the experience of countries with or without legislation on the issue of zoning and land use planning.

Q 8: What measures and guidance are used in the development and control of rural or township enterprise that is experienced in many developing countries.

Q 9: How widely has risk management been applied in developing countries. Do a risk assessment on urbanization.

Q 10: List the priority in pollution abatement.

Q 11: What are some of the steps in pollution abatement and water conservation as a whole.

Q 12: Have systems such as pollution trading, discharge licensing been practiced in some developing countries.

Q 13: Do costs increase of WSS in rural areas with respect to rate coverage always follow a linear relation. What are factors other than cost that play predominant role in the provision of WSS in rural areas.

Q 14: Establish a water rate system for industry, city dweller, agriculture and rural dweller.

Q 15: Establish a wastewater rate system for industry, city dweller, agriculture and rural dweller.

COLLABORATIVE COUNCIL MEETING

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FINANCING WATER SUPPLY AND SANITATION SERVICES

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FINANCING WATER SUPPLY AND SANITATION SERVICES

I. Introduction

This paper is about financing water supply and sanitation services and is based on on-going analysis of financial issues being undertaken in the Water Supply and Sanitation Division of the World Bank (which includes the UNDP-World Bank Decade Program). The paper will summarize some key elements and initial conclusions from the analysis.

Because the subject is complex, it is useful to start with some basic understandings of the issue. We should distinguish between two different kinds of financing requirements: (1) recurrent financing of already incurred obligations and (2) financing of the investment in new systems and expansions of old systems.

Financing incurred obligations means generating sufficient cash flow to pay monetary costs of operations and maintenance, depreciation of existing facilities and interest on unpaid loans. Accomplishing this on a regular and sustained basis depends upon the supply institution[1] having adequate and reliable revenue sources.

Financing investment in new systems and expansion of old systems, in general, requires the use of funds other than those generated solely from cash surpluses of the supply institution. Sectoral investments usually have two key characteristics which distinguish them from recurrent costs: (1) the required financing is large (investments are "lumpy") and (2) they need to be paid out for construction over a much shorter time period than the expected useful life of the assets.

These characteristics of investment are classic reasons for borrowing to spread the financing costs over time periods more consistent with the longevity of the assets and the benefits to be derived from them. Investments funds need not necessarily be borrowed. They may be financed, also, by grants (from internal or external sources).

The link between the two categories of finance is the future burden on cash flow which the supply institution incurs at the time of the investment. The exact definition of these financial burdens varies with the types of investment financing, of course; but it is rare that the supply institution can avoid these burdens altogether. The nature (and reality) of the future

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[1] Throughout this paper, I use the term "supply institution" to mean those responsible for delivering water supply and sanitation services to users of the service. The possibilities range from purely self-provision (where the household is, in effect, both the provider and the consumer) to formally structured public or private utilities. Although most of the principles discussed apply to all types, where their implications differ significantly across types an effort is made to indicate this in the text.

burden of borrowing is often more clearly understood than is the future burden of grants. With grant financing the supply institution incurs a burden on its cash flow for the operation and maintenance of the assets, at a minimum, and prudence would dictate recognition of the burden represented by depreciation.

The essence of the financial matter is the ability of the supply institution to meet, from its on-going revenues, its financial obligations on a regular and consistent basis. To understand the financial issues in the sector, we need to examine the factors that help and hinder supply institutions in doing this.

This definition of the financial problem points us in a number of useful directions. The first is to consider the role of current and potential users of the services. The second is to consider the ways in which the performance of the supply institutions themselves helps or hinders. The third is the role of governments, both as providers of finance and as shapers of the performance of supply institutions. The fourth is the role of other sources of finance (private in-country sources and external sources) in facilitating or hindering effective performance while providing loan or grant funds.

II. USERS OF SECTOR SERVICES

It is difficult to overestimate the importance of user payment for services in providing a regular source of revenue for the sector. One of the most promising features of the Water Supply and Sanitation Decade has been the much broader recognition by governments and external support agencies alike, that both effective provision of services and financial realities imply that users should pay for the services they receive. However, it is unrealistic to expect users to pay for services that they do not value as highly as the level of payment which they are expected to make. This implies that the supply institution must recognize, in making its operational and investment choices and its financial planning, user willingness to pay. The supply institution has the responsibility to choose appropriate standards and levels of services and to reduce unnecessary operations and maintenance costs. This might appear self-evident if one were not aware of the virulence of the international debates around the subject of cost recovery from users.

In some cases, less than full cost recovery from user charges may be justified. Even in such cases, knowledge of user willingness to pay is crucial for estimating expected revenues. If expected revenue from users is accurately estimated, supply institutions and their other financial supporters will be better able to realistically assess the feasibility of meeting financial burdens assumed by the institution on a sustainable basis.

In addition to providing a basis for revenue estimation, user willingness to pay represents at least a minimum estimate of the benefits perceived by users. Supply institutions should be reluctant to take on new financial obligations (and sources of finance reluctant to press them to do so) unless there is a strong indication that the benefits equal or exceed the new obligations. A perhaps more provocative way to say this is that the availability of financial resources is no guarantee that the activities which result in new financial obligations are sensible to undertake.

The willingness of users to pay for sector services depends on the perceived benefits, income, and the price of services, primarily. Willingness to pay (and, therefore, supply institution revenues) increases with larger perceived benefits and income and declines with increased prices. The scope for generating additional resources from users depends on the direction and magnitude of change in these variables. The major conclusions we have reached regarding these variables are these:

- o Perceived Benefits: The degree to which users perceive benefits from improved sectoral services is more problematic than sectoral proponents may have believed and is a constraint in sectoral financing and expansion of coverage. The improvements must be seen to be significantly better than previously used water sources and sanitation practices (e.g. in terms of reliability, convenience, and safe use) or they will not be used or paid for. Although this is true to some extent for all sectoral services, it appears to be especially true for sanitation services in both urban and rural areas and, to a somewhat lesser extent, for water supply in rural areas. This conclusion strongly supports efforts to develop and more broadly disseminate benefit information and suggests that explicit marketing of services may be a cost-effective mechanism for revenue generation. Recent World Bank research on willingness to pay for water supply in rural areas suggests that it is probably higher than expected by many sector professionals and frequently adequate to pay for well-designed improvements. They also show, however that perceived benefits and willingness to pay are conditioned by important factors which have often been given too little attention by sector professionals--users must perceive a significant improvement over previously used sources, and the method of payment, as well as to whom the payments are made, matter a great deal when user charges are expected to finance services.

- o Income: Income growth is weak in most developing countries. The decade of the 1980's has been particularly difficult. The 15 years from 1965 to 1980 were generally positive. Nine out of ten developing countries had positive growth in per capita income and most of them had growth in excess of 1.5 percent a year. The years of the Water Supply and Sanitation Decade have been disastrous on the income side. Over half of the developing countries experienced negative growth in per capita income and more than 80 percent of these declined by more than 1.5 percent a year. (See Tables I and II for details). Although detailed information on distribution of income is not available, it is nearly certain that low income groups gained relatively less in the growth years and lost more in the declining years than other groups. The consequence must be a reduction in willingness to pay of affected groups, particularly the low income groups already experiencing the lowest rates of coverage. Current projections are for more rapid growth in the final years of the Decade and into the 1990's. If this occurs, additional revenue generation from users can be expected; but it is unlikely to be large unless

more attention is given to system designs and operations which are perceived to be more beneficial by users and at reasonable prices.

- Price: Partly as a result of trying to meet past financial burdens assumed by supply institutions, as well as increases in the real cost of providing services; the cost of service provision is rising. Evidence from World Bank projects in the sector is that these increases, many of which are unavoidable, are very substantial, at least in urban areas. The key factors increasing real costs are inconsistent sector policies, poor managerial practices, and reduced availability and quality of water resources due to current usage practices and inadequate treatment of wastes; (as well as intense competition for available water for agricultural, industrial, and domestic uses.) To the extent that user charges reflect these cost increases -- which they must to help ensure financial viability -- user prices are going up. The only major factor working against this trend is the possibility of using a wider range of standards and levels of service through intermediate and low cost technological options than have been conventional. It has been a major contribution to the sector of the WSS Decade to focus attention on these kinds of options. Although it is clear that their adoption, where more consistent with effective demand than conventional solutions, can reduce costs; their rate of adoption may not be sufficient to achieve net price reductions for sector services, given other factors increasing costs. It is important also to notice that subsidization of the price of services relative to their cost for some or all users does not reduce the overall financial burden of provision of services. Someone must bear these costs; whether it is the supply institution, the government or other internal financial sources, or external financial sources. The view that the costs can somehow be avoided by subsidizing user charges can only be described as a much too partial view of the financial issues. It is more realistic to expect that the service prices that users will be expected to pay will rise as costs increase. This adds urgency to the need for supply institutions to reduce unnecessary costs, for governments to come to grips with the water resource use and allocation issues which are increasing costs and give a renewed emphasis to adopting lower cost options.

III. SUPPLY INSTITUTIONS

The financial performance of many, if not most, of the supply institutions in developing countries is precarious at best. On almost any recognized financial criterion performance is very low.

To illustrate the problems it will be sufficient to cite selected findings from a review of completed World Bank-supported projects initiated between 1965 and 1980, since I expect reviews of projects by others would show similar performance. Internal financial rates of return (i.e. rates of return based on discounted net revenues rather than net benefits) have often been

negative, have rarely approached reasonable estimates of the opportunity cost of capital, and have been, on average, about half of the rate of return expected at appraisal. Six years after project initiation, only slightly more than ten percent of the projects were able to fully cover operation and maintenance costs plus depreciation and interest from their revenues. In more than 90 percent of the projects, actual cost coverage of these costs was less than anticipated at the time of project appraisal. Somewhat surprisingly, these outcomes were not generally due to average user charges being less than expected. Actual average sales revenue per m3 sold actually met or exceeded expectations in more than 75 percent of the cases. We have to look elsewhere for explanations.

The most glaring deficiencies were the following: (1) high levels of produced water which was not sold (unaccounted-for-water) and a failure to reduce it; (2) lower numbers of customer connections than had been expected; (3) lower sales volumes than expected both in absolute terms and on a per-connection basis; and (4) much larger increases in operations and maintenance costs than had been expected. The direct financial consequences of these results are easy to understand--substantially reduced ability to meet financial obligations from cash flow, the need for unanticipated additional financial assistance, the reduction or elimination of cash flows to cover depreciation or to finance expansion, and pressure to further increase charges to users. What is much more difficult to understand and deal with are the causes of this poor performance.

We have concluded in our own work that the search for these causes and the identification of effective solutions must go well beyond the kinds of considerations which have characterized the debates about direct cost recovery from users. Sector-wide policies, institutional structures, the "rules of the game" under which the institutions operate, the relative roles of the public and private sectors, the tax and transfer mechanisms employed by governments, the roles of financial intermediaries, and the sectoral activities of external support agencies, all have impacts on the operational and financial performance of service providers. In some cases these factors directly affect what supply institutions can and cannot do; while, in other cases, they influence the behavior of supply institutions through the incentives and disincentives they provide for efficient performance. The scope of this paper (as well as the state of analysis of these important linkages) does not permit detailed examination of how all of these factors influence performance. They are flagged here, nevertheless, because we believe that their further analysis and implementation of solutions suggested by the analysis should comprise a substantial part of the future agenda of those interested in the sector.

The direct influences and influences through the "incentive environment" affect the degree of efficiency in investment choice and in management choices:

o Efficient Investment and Demand: A major source of the financial and coverage problems has been overestimation of consumer demand and willingness to pay for service improvement at the time of investment. Neither connection rates (or number of users, for rural systems without household connections) nor per connection consumption have matched expectations. This

implies that perceived benefits were not as great as expected, income levels were lower than expected, and probably that the prices charged to meet the financial obligations were higher than expected. The degree of over-estimation was substantial and has lead to premature or oversized investments in some places and lead to the deferral of other investments elsewhere. In financial terms, an additional project could have been financed from the saving on every five projects had effective demand been more accurately estimated.

- o Inefficient Operations, Maintenance, and Financial Management of Existing Assets: To be sure, a substantial share of the blame for inefficient management can be laid at the door of the institutions themselves. Produced water is lost through leakage. Illegal connections, inadequate metering, and poor financial practices result in lost revenue. Water usage is not properly billed and, if billed, collection rates are low and delinquencies are high. The use of sector institutions as employment services results in both higher personnel costs than necessary and inadequately trained staffs. Effective managers and staff are underpaid and leave the institution too early. Neither management nor staff rewards are linked to efficient performance. Maintenance tends to be neglected when there are cash-flow crunches. Improvements in institutional efficiency have to be viewed as one of the major financial resource generation strategies; both in terms of holding down costs and increasing the revenue from production.

- o Adverse Incentive Environment: The causes of poor investment choices (i.e. those not tailored to effective demand and willingness to pay) and inefficient management can be viewed in two fundamentally different, although not necessarily mutually exclusive, ways. The predominant view suggests that poor performance is the result of management and staff being improperly or inadequately prepared to cope with the advanced technologies frequently employed or otherwise perform in an efficient manner. From this perspective, the problems can be remedied by better technology choices, improved technical assistance, training, improved personnel practices, higher salaries and the like. No doubt these inadequacies contribute to the problem and and can be addressed by these methods.

  The second view, which seems to me to offer a more profound explanation, is that managers and staff in the sector approach their tasks quite rationally and attempt to respond effectively to the "incentive environment" created by the factors described above. This suggests that poor performance can be best corrected by changing the incentive environment and is unlikely to be improved significantly by pleas to perform more efficiently. The signals which most significantly shape the incentive environment originate predominantly from outside the institution--most often from non-user sources of recurrent and investment finance and government authorities who set and enforce the rules for sectoral activity from outside the supply institution itself. To get at

these causes, we must turn to the discussion of government roles and the roles of other providers of finance.

IV. GOVERNMENTS AND EXTERNAL SUPPORT AGENCIES

The water supply and sanitation sector in developing countries is largely a government sector. The private sector has had a very limited role up to now in either the provision of services or in providing finance.[2] The financial perspective on the sector, consequently, is dominated by two concerns: (1) the mobilization of public sector finance (taxes, charges, domestic public sector borrowing, and external borrowing or grants), and (2) public sector expenditure and investment.

The decade of the 1980's has been an extremely difficult one for both domestic resource mobilization and expenditure. It has not been a propitious time for domestic resource mobilization. Nor has it been a good period for increasing external resource mobilization. Extensive external borrowing in previous decades has resulted in large outflows to meet debt obligations. In 1988, heavily indebted countries paid out about 4.7 percent of GDP. From 1986 to 1988, the net outflow from these countries was over $100 billion. A particularly hard-hit region is Sub-Saharan Africa. These countries, while not as heavily indebted in total, have a much larger debt to export ratio and debt to GNP ratio than the seventeen heavily indebted countries.

Macro-economic concern that high levels of public expenditure and investment have a negative influence on private investment and on aggregate growth has had a restraining influence on public sector spending and has caused many countries to reduce or eliminate spending that does not have a direct positive impact on macroeconomic growth. A major unresolved question is the effect of this financial situation on investment in the water supply and sanitation sector.

It is nearly impossible to obtain comprehensive data to answer this question. We have attempted an estimate, however, based on recent public expenditure and public investment reviews conducted by the World Bank. The data is from 21 countries with each of the major regions represented. (See Figure 1). For these countries, the average share of GDP devoted to public expenditure has varied slightly over the 1985 to 1989 period (from 29.5 to 32.3 percent). The five year average is about 31 percent. Comparable figures for total public investment have ranged from 8.3 to 11.1 percent with a five year average of about 9.3 percent.

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[2] It is important to note, however, that the very large number of people who are described as not being covered by safe, adequate water supply and sanitation in our statistics, are essentially providing for their own water and sanitation services in their private capacities (often at greater private expense in time and money for inadequate services than the expenses of those covered). The significance of this for willingness to pay and coverage extension is seldom given the attention it deserves.

Public investment in the water supply and sanitation sector as a share of GDP has been roughly constant at about 0.4 percent. If our sample is taken to be representative of all developing countries, these data suggest sector investment of about $9 billion a year for 1985 to 1988 for all developing countries. (See Figures 2 and 3).

External support agencies, both multilateral and bilateral, have had to adapt to the adverse economic climate of the 1980s as well. They have had to reconsider and adjust their priorities in the face of slow growth, changing patterns of trade, and the debt crisis. Exact estimates of ESA support to the sector are also difficult to obtain. Ingvar Ahman, Co-ordinator of the WHO Country External Support Information System, is reported in the latest issue of "Source" to have estimated current donor spending in the sector to be about $3 billion a year. It was reported also that a survey of OECD countries showed that those countries which responded were allocating about 4 percent of their aid to the sector during the 1985 to 1987 period. This represented a doubling of their share of aid going to the sector since the beginning of the WSS Decade. Within the World Bank, sector lending has varied but on average it has been about $715 million a year or slightly over 4 percent of total Bank lending. Increasingly, Bank loans in the sector are co-financed. In a recent overview of Bank activity in the sector, Alfonso Zavala, the Bank's Senior Water Supply and Sanitation Adviser, noted that 7 of the 10 FY1989 projects were co-financed. In these projects, there was a disturbingly low local participation (only about 15 percent of total project costs) reflecting the financial weakness of the sector in these countries.

There is an important positive feature of these figures. The sector share of GDP did not decline in spite of the enormous financial pressures on governments even though public investment did. There is little doubt that this is partially attributable to the focus on the sector provided by the WSS Decade. If economic growth will be larger in the 1990s, as most economists expect, the magnitude of investment in the sector should be expected to grow.

A much less positive feature of these figures, however, is revealed by comparing investment to population growth. The ratio of sector investment to additional population declines from a high of $122 in 1985 to a low of $110 in 1988. We have estimated that the per capita investment costs in urban areas are $120 for water supply and $150 for sanitation, even with extensive adoption of low cost technologies. Equivalent rural costs are estimated to be $40 for water supply and $20 for sanitation. The clear implication of current investment levels is that the investment is insufficient to cover incremental population growth even without any increase in coverage for those currently unserved.

The financial situation may well be even more severe than these figures suggest since we should expect additional cost increasing pressures over the next decade. The mix of investment may have to shift toward improvements in drainage and sanitation to make up for the relative neglect of these services in the past, and they are relatively more expensive on a per capita basis than water supply services in urban areas. Moreover we should expect a growing recognition that the quantity and quality of water resources available at reasonable cost is becoming a very serious constraint in many developing

countries and sub-national localities in most countries. Quantity and quality constraints on water availability, particularly for use in urban areas are already pushing up costs more rapidly than the wider availability of lower cost technologies is able to hold them down.

The conclusion is that virtually all developing country governments will be forced by financial pressures in the coming decade to substantially rethink their investment and expenditure priorities in the sector. There will not be as much financial leeway for sectoral investments which are not based upon realistic estimates of effective demand and willingness to pay. There will be little financial room for strategies which adopt higher levels of service creating larger financial burdens on users than they will be willing to shoulder, and there will be insufficient financial capacity to support unrealistic commitments on the rate of expansion of coverage. Major policy choices must be made to relate standards and levels of service to effective demand and users expected to pay a larger share of the costs.

Moreover, as suggested in the discussion of supply institutions above, governments and ESA's must not be content simply with providing financial resources to the sector. In particular, governments and ESA's must take more seriously the "incentive environment" which their policies and practices help create in the supply institutions being supported. More cost-effective investment choices can save at least the 20 percent estimated earlier and probably more by use of a wider array of technologies. Quantifying the pay off from more efficient management is very difficult; but reduction of unaccounted-for-water from its currently high levels (an average of 34 percent in Bank-supported projects) to levels achieved in the better systems (15-20 percent) only could have a large impact on sector revenue, provision of additional coverage from existing capacity, and savings from deferred investment.

V. WHERE AND HOW TO LOOK FOR SOLUTIONS

The entire discussion leads to the conclusion that the generation of financial resources for the provision of water supply and sanitation services is now and will remain a significant sectoral constraint. It would be unrealistic to expect that there is some not-yet-discovered mechanism or financial gimmick that will solve the problem. Rather, improving financial resource mobilization will require concerted efforts on a number of fronts simultaneously. In this section, we will try to suggest where such future efforts can best be focused.

Ability to Generate Funds from Users

To increase financial flows to the sector, two distinct groups of people must be persuaded that the benefits of improved water and sanitation services are worth the costs. The first are actual and potential users of the services. The second are government and ESA officials who determine the allocation of financial resources among sectors. In my view, sector advocates have relied too heavily on arguments that suggest that the benefits are self-evidently very large and have implicitly ignored the need for the benefits to

at least equal the costs in making sector investment and operational choices.

Current and potential users of improved services, however, must and do decide on expenditure priorities for themselves out of their available income. It is simply inadequate analysis of the problem to suggest that users will be willing to pay if the charge to them is within some arbitrarily defined share of income which is considered affordable. Moreover, revenue estimates based on such arbitrary criteria have a high probability of not being achieved. To achieve user revenues that cover a larger share of the costs requires far greater attention to the delivery and marketing of services that are perceived by users to be significantly more beneficial to them than the often inadequate and unsafe alternatives they are currently using. Moreover, this requires far greater attention to the elimination of unnecessary costs attributable to inappropriate investment choices and inefficient management of existing facilities.

Willingness to pay is not a fixed amount. Rather it is subject to change as a result of greater awareness of the benefits. Improved documentation of benefits, demonstrations of the benefits through the provision of safe, reliable services and educational and marketing efforts, can and should be considered important elements in financing strategies.

Governments and ESA officials charged with allocating resources among sectors, facing overall financial constraints themselves, are reluctant to put funds into activities which imply a continuing and uncertain subsidy level to sustain. A clearer demonstration that users can and will pay the costs for sector improvement is the best possible argument to ease this concern.

Institutional Efficiency

A major part of the financial problem is that the costs which need to be met are higher than necessary due to inefficient management and operations in the sector. Overstaffing, use of poorly trained managers and staff, tolerance of excessive losses of produced water, inadequate metering, billing, and collecting are endemic in the sector. Although, as suggested earlier, it is important not to oversimplify the causes of these problems, more consistent attention to human resource development, reducing institutional constraints on personnel management and pay scales, and loss reduction programs could help reduce unnecessary costs. The related issue of improving the "incentive environment" for supply institutions will be discussed below.

Efficient Investment Choices

In practice the objectives of universal coverage of the population and of ensuring the sustainability of services (in terms of well maintained assets and financial viability) have been in conflict. Supply institutions have been encouraged to extend coverage without taking full account of the financial consequences of the extensions. The financial difficulties are increased if the extensions of service are made using only high-cost conventional technologies. One of the major benefits of the WSS Decade has been to increase the awareness of sectoral professionals of alternative, lower cost technologies. Progress in the utilization of these technologies, however, has

been slower than might be hoped. An important reason for this has been a general reluctance to face up to the implications of the availability of these alternatives for strategic planning of future investments and their institutional implications. In our own program we are investigating these issues, initially, for extending sanitation coverage in urban areas; but we expect that the general principles will apply to water supply as well and to rural areas as well as urban areas. The key principle to be employed is to link investment choice (level of service, size and timing of investment) to assessments of varying levels of effective demand and willingness to pay. The intent is to undertake investments which impose financial obligations on users which are more consistent with their willingness to pay.

Improving the "Incentive Environment"

There are many possible ways to improve the "incentive environment" for institutional efficiency. The central idea of most of them is to clarify the relative responsibilities of governments and supply institutions and then to hold each to the agreed responsibilities. The aim of the allocation of responsibilities is to contribute to outcomes which reward efficient behavior and penalize inefficient behavior. The underlying model is to seek to introduce market-like incentives within the sector.

One appropriate approach is to decentralize responsibility for investment, operations and financing to levels of government below the central government, to more autonomous public utilities, and, in some cases, to private sector and community-based efforts. This is a step in the right direction because it increases the likelihood that the supply institution will take more fully into account the effective demand of users, the implications of this demand for investment choice, and the ability of the institution to meet financial burdens it more voluntarily incurs. This will work better if it is accompanied by a clarification of the rules of and mechanisms for providing financial resources to supplement, when necessary, direct payments from users. The problem is obviously complicated because this would require clarification in many countries of the tax and transfer systems and to regularize their functioning so that supply institutions would have a better sense of the regularity and size of financial flows which they can expect.

We have argued earlier that the lumpiness of investment in the sector and the longevity of the assets creates a situation where borrowing to meet investment costs is a desirable financing strategy. This suggests that the operation of the financial sector is likely to have a significant impact on the "incentive environment". The use of a larger share of loan funds relative to grant funds to finance investment would have a tendency to encourage supply institutions to take account of the cost burdens which they are capable of accepting and would serve to improve efficiency.

Similarly, basing the receipt of financial support on the presentation of acceptable proposals, rather than on a prior determination to allocate resources to a particular locality would increase competition for funds and encourage better proposal preparation. Clarifying government policies with regard to financial intermediaries is important in the financing strategy of the sector. Many people in the sector believe that governments should

establish financial intermediaries to direct credit to the sector. International experience, on the other hand, has tended to show that proliferation of directed credit activities (especially when accompanied by subsidized interest rates) inhibits the broadening and deepening of the financial sector that is essential to mobilize savings and allocate the mobilized resources to the most efficient uses. Over the long term, the payoff to the sector of fully functioning capital markets as a source of loan funds could be enormous and care should be exercised, in the near term, in establishing financial intermediaries for the sector which work against this aim.

In many developed countries and in a growing number of developing countries, the private sector is encouraged to play more substantial roles in the ownership and operation of water supply and sanitation facilities than is customary in most developing countries. A policy of encouraging private sector activity, if carefully structured to protect the public interest and to encourage competition, could substantially affect the "incentive environment" in positive ways. Promoting greater private sector contracting for operation and maintenance.

Water Resources and The Environment

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 water demand for competing uses of available water -- the only reasonable assumption to make for the 1990's is that the cost of water provision and its environmentally safe collection and disposal will rise dramatically. This is likely to pose two related kinds of problems in the 1990's with which the sector is not now prepared to cope. The first problem is the financial requirement implied if water supply services are to be expanded at the higher costs and, at the same time, the relatively neglected requirement for improved sanitation, waste collection, and its disposal is to be met at even larger costs.

The second problem is that government policy makers will be under increased pressure to devise approaches to ration, allocate, and reallocate the resources which are available among different groups of users. If past history is any guide on such matters, many will recommend costly governmental controls and regulatory rationing and allocation procedures and neglect the allocative role of prices. We need now to investigate the policy options. No policy solution will be costless or free of important distributional consequences in terms of who pays and who benefits. At a minimum, we need to begin now to do the necessary water resource and demand assessment necessary to identify the places where these problems are likely to be most sever; to develop analysis of the impacts of different scenarios on financial and economic costs of supply, and determine the shape of cost-effective and equitable solutions to the policy problem of water resource rationing and allocation.

VI. FUTURE AGENDA

The future financial status of the sector depends upon concerted efforts by supply institutions, governments, and ESA's to address the major sources of financial weakness in the sector. This paper suggests that we need to assist in the following ways:

- Ensure that adequate attention is given to effective demand in the design and implementation of sector improvements. Since the users are the ultimate judge of service benefits, there is an obligation on the sector to attempt to make users aware of benefits, market the services effectively and design to maximize them; while holding costs (and prices) to the lowest levels possible for each level of service provided.

- Assist in improving institutional efficiency and management and operations of service facilities to reduce unnecessary costs and reduce the need to invest in new facilities prematurely.

- Assist in the redesign of policies and financial practices so that they create a favorable "incentive environment". The range of such options include policies affecting institutional responsibilities and opportunities and policies affecting the financial flows and mechanisms to the sector from users, governments, capital markets and external support agencies.

The impact which ESA's and governments will have on these problems will increase as those of us in the sector agree on the major outstanding issues and collaborate in efforts to address them. Financing issues (that go well beyond narrow questions of cost recovery) are clearly among them. This paper has called attention to other major issues which influence the sector's financing but which must be addressed also in their own right. These include the impact of water resource quantity and quality on the supply of sector services and, conversely, the impact of usage practices on the quantity and quality of available water. Closely related is the need to deal more effectively with wastes, waste treatment, and re-use than has been the norm in the sector. We should recognize that providing water creates a cost to return it to water sources in an environmentally sound condition. Finally, we must all confront the issue of how to improve the productivity of sectoral institutions and to identify institutional innovations and elements of the "incentive environment" which will make productivity gain more likely.

Table 1

AVERAGE ANNUAL GROWTH RATE OF GNP PER CAPITA IN SEVENTY THREE COUNTRIES, 1965-1980[1]

ANNUAL GROWTH RATE RANGES						
With less than -1.5%	With -1.5% or less than 0%	With 0% or less than 1.5%	With 1.5% or less than 3.0%	With 3% or less than 4.5%	With more than 4.5%	Avg. All
Chad Niger	Madagascar Somalia * Sudan Uganda	Bangladesh * Benin C.Africa Rep. Ethiopia Haiti India Nepal Sierra Leona * Zaire	Burundi Malawi Pakistan Rwanda Sri Lanka Tanzania	Togo	China *	1.2%
	Ghana Senegal	Congo Honduras Jamaica Nicaragua Peru Zambia Zimbabwe	Bolivia Cameroon Cote d'Ivoire El Salvador Guatemala Liberia Kenya Mauritania Morocco Papua New G. Philippines	Colombia Dominican Rep. Egypt Indonesia Malaysia Nigeria Paraguay Syria Turkey	Ecuador Korea Lesotho Thailand Tunisia	3.8%
		Uruguay	Argentina Chile Mexico South Africa Venezuela	Algeria Costa Rica Panama Trin.&Tobago	Brazil Greece Hungary Libya Portugal Yugoslavia	
3%	8%	23%	30%	19%	17%	
As Percent of Total						

urce: INUWS calculations from: The World Bank: "World Development Report 1982, 1983 and 1989"

[1] The asterisk refers to growth rate for 1965-1981, not 1965-1980.

Table 2

AVERAGE ANNUAL GROWTH RATE OF GNP PER CAPITA IN SEVENTY THREE COUNTRIES, 1980-1987'

GROUP	ANNUAL GROWTH RATE RANGES					
	With less than -1.5%	With -1.5% or less than 0%	With 0% or less than 1.5%	With 1.5% or less than 3.0%	With 3% or less than 4.5%	With more than 4.5%
LOW INCOME	Chad C.Africa Rep. Ethiopia Ghana Liberia Madagascar Malawi Mauritania Niger Nigeria Tanzania Togo Uganda Zaire Zambia	Benin Burundi Sierra Leona * Sudan	Bangladesh * Haiti Kenya Nepal Somalia *	India Lesotho Pakistan Rwanda	Sir Lanka	Indonesia China *
LOWER MIDDLE	Bolivia Chile Costa Rica Cote d'Ivoire El Salvador Guatemala Jamaica Nicaragua Papua New G. Peru South Africa	Honduras Philippines Senegal	Dominican Rep. Ecuador Morocco Tunisia Turkey Zimbabwe	Colombia Mexico Syria Thailand	Egypt Malaysia Paraguay	Cameroon Congo
UPPER MIDDLE	Argentina Greece Libya Trin.&Tobago Venezuela	Portugal	Panama Uruguay Yugoslavia	Brazil Hungary	Algeria	Korea
	42%	11%	19%	14%	7%	7%
	As Percent of Total					

Source: INUWS calculations from: The World Bank,"World Development Report 1982, 1983 and 1989"

' The asterisk refers to growth rate for 1981-1987, not 1980-1987.

COLLABORATIVE COUNCIL MEETING

Sophia Antipolis (France)
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STRATEGIES FOR THE 1990'S

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STRATEGIES FOR THE 1990s

1 Past Developments

1.1 PreDecade Conditions

At the beginning of the International Drinking Water Supply and Sanitation Decade, water supply and sanitation projects supported by External Support Agencies (ESAs) followed more or less the methods and technologies which had been successfully developed and used in industrialized countries. As a result, the population groups in greatest need of support very often did not benefit from these projects because they could not afford to pay the cost of the high service standards provided.

Some organisations, notably Non-Government Organisations (NGOs), had not only realized the limitations of the conventional approach but had begun to develop low cost solutions and community participation methods for project planning and implementation. Funds for these projects and programs were usually provided without repayment obligation by the beneficiary, either because they were raised as donations by NGOs or provided at concessionary rates to recipient governments by bilateral and multilateral organisations.

There existed therefore during the nineteen seventies divergent approaches in the sector. Funders with large amounts of money used the conventional public utility model for financing investments, insisting in user repayment of funds. The consequence was an almost exclusive concentration by these lenders in the urban sector where the low income users were only marginal perticipants in the projects and often did not benefit from them. At the other hand, NGOs and bilateral agencies tended to have more concessionary funding, indeed often did not require repayment of funds, and used more community based approaches and technologies the beneficiary was able to operate and maintain. Their activities were oriented mostly towards rural areas, small towns and periurban areas were the low income populations lives.

During the mid-nineteen seventies, the problem of not reaching the poor with conventional water supply and sanitation approaches had become a topic of general concern and attempts were made to identify solutions able to serve lower income groups at costs they could afford and in a socio-culturally responsive manner. The Decade was to some extent the visible expression of these concerns,

which had also been highlighted by other sectors, and provided the impetus required to carry forward the ideas about appropriate technology, community and women's participation, socio-cultural relevance and integration with other complementary activities such as hygiene education.

1.2 Progress during the Decade

The Decade has resulted in some very significant breakthroughs and at the same time been a disappointment in other areas.

1.2.1 The Failure of reaching quantitative Targets.

The greatest and best known failure is, of course, the fact that the quantitative targets were not achieved. Coverage for all was an attractive slogan but clearly not achievable under the conditions prevailing when the Decade started. The framers of the Decade proposal had suggested that governments should set their own realistic targets, and some did and achieved them, but most were satisfied with the overall objective. The economic downturn which coincided more or less with the Decade quickly put an end to the high hopes of coverage for all. It is interesting to note, nevertheless, that among all the public investment reductions governments were forced to make, water and sanitation was the only sector maintaining its funding levels at predecade percentages of total public sector investments. Undoubtedly, Decade publicity had something to to with this.

1.2.2 Changes in Approach.

It is difficult to select the most important of the many changes the Decade has brought about. All the changes have had positive impacts which place the sector today at a take-off point which could result in unprecedented progress during the nineties. These changes are universally accepted by governments, ESAs and users, albeit not surprisingly not with the same enthusiasm and ability to implement by all the organisations active in the sector. The important point is that there exists a consensus today which did not exist just a few short years ago. The issues on wich there is agreement today are the following :

a) Appropriate Technologies, i.e. technology which is least cost economically, financially affordable and socio-culturally acceptable to the user, have been identified for use in a wide variety of conditions. Engineers are able to design solutions which provide service at different standards to different groups in a community so everyone can benefit.

b) Community Participation, and within it in particular the role of woman as active participants and decisionmakers

rather than simply as beneficiaries, is an accepted feature of rural and periurban water supply and sanitation projects where community management of the facilities is indispensable for sustained success.

c) Complementarity of Inputs such as the inclusion of hygiene education as part of sector investments, is recognised as essential if the full benefits of the investments are to be achieved.The relationship between the provision of water and sanitation is also receiving increased attention even were sanitation cannot be implemented concurrently with water supply.

d) Cost Recovery to ensure longterm sustainability if investments and benefits are to be achieved/maintained is no longer questioned in principle, though details of implementation in poor areas require special consideration.

e) Institutions are recognised as presenting particular problems, particularly the need to make them more responsive to the community and to deconcentrate and eventually decentralise them in rural and large metropolitan areas.

f) Collaboration at the international and national level is one of the distinctive features of Decade progress. Exchange of information and experiences, indeed active participation of multilateral lenders and NGOs in the same project is today accepted practice.

1.2.3 Global Concepts

A direct result of this international collaboration is the common agreement developed, discussed and agreed during regional consultations in which developing country governments and ESAs participated, on "Global Concepts for Water Supply and Sanitation". WHO published these concepts with explanatory notes under the same title with the help of the German Federal Ministry for Economic Cooperation. The Concepts are :

- Institutional Changes
- Cost Recovery
- Balanced Development
- Operation, Maintenance and Rehabilitation
- Community Participation and Hygiene Education
- Coordination and Cooperation.

Given the remarkable agreement on principles for the water supply and sanitation sector achieved during the Decade it is interesting to review the problems remaining and identify why they still persist when such a universal consensus exists.

2 Present Status

2.1 Constraints

During the Decade, constraints to successful implementation of water supply programs have been identified by governmental implementing agencies. The constraints commonly listed are:

- Lack of funds
- Inadequate cost recovery
- Insufficient number of adequately trained staff
- Poor operation and maintenance

It is interesting that all regions named the same constraints,though not necessarily in the same order.Equally interesting is the fact that some of the richer nations listed funding constraints as the principal problem. The "Global Concepts" are a response to these constraints. Because they were developed during the Decade, they are not yet fully or universally implemented. Some examples of the lack of progress are the following :

2.2 Problems in overcoming Project Constraints

a) While some developing country governments have embraced the concepts of appropriate technology, others have not. Similarly, some funding agencies accept the concept but have not systematically implemented it. In general, governments have made much greater strides in this field than funding agencies, with the notable exception of NGOs and some of the bilaterals.

The problem in implementing appropriate technology relates to the lack of knowledge on the topic within organisations and thus the difficulty of assessing such projects during the preparation and implementation phase. By their nature, such projects are multidisciplinary and the organisations in question, or at least the units handling such projects, are not. Another reason is that especially larger lenders find it more efficient to lend large amounts for conventional large projects rather than slowly disbursing multiple small projects. As a consequence, new lending processes/procedures need to be developed. This is just now taking place.

b) Community and especially women's participation is just beginning to become a routine part of project development. Again, the smaller and more rapidly reacting NGO's and bilaterals are leading the parade.

The comments made above on the difficulty of appropriate technology projects apply equally to community participation and women's role in the sector.

c) Complementary investments for water supply and

sanitation activities are still the exception. The user obviously assigns priority to water. Institutional response in a resource scarce environment is to concentrate on water supply. Incorporating such activities as hygiene education into projects is less costly in financial terms but difficult because it requires a multidisciplinary approach few organisations know or are comfortable with.

The problems here range from the obvious difficulty of convincing unwilling users to devote funds to obtain an improvement they do not want (there is no effective demand) to the lack of appreciation by lenders and borrowers of the environmental impact of bringing large volumes of water into a community without provisions for its disposal after use. With activities such as hygiene education outside the competence of the implementing organisation, the difficulty lies in identifying and organising the input of various separate agencies, each with its own, often unrelated priorities.

d) Cost recovery remains a problem less because there is a basic disagreement about its need but because its implementation requires a correct assessment of demand which involves more than simply a response to financial conditions. Project redesign rather than raising tariffs or subsidising the user may be needed.

Predicting actual demand, now referred to as effective demand, has been a so far almost untractable problem even in conventional projects. The difficulty is in the determination of willingness to pay by the prospective beneficiary in the absence of data about the value beneficiaries assign to specific benefits, or indeed the beneficiaries awareness of the benefits the project designer assumes will be derived from the project. Solving this problem will require not only better analytical tools but marketing efforts the sector has so far not employed or deemed necessary.

e) Institutions are usually heavily centralised which makes them unresponsive to local conditions and demands. Community participation complicates their work. For some situations resulting from the unprecedented growth of developing country cities, institutional models do not exist.

The solution to this problem is both better training of staff (which is also true for the application of appropriate technology) and the development of institutional models responsive to the need for decentralised administration and community involvement. It also requires the often lacking institutional autonomy to provide appropriate careers and remuneration to staff. This is true whether the the implementing organisation is handling conventional or multidisciplinary projects.

f) Collaboration has improved very significantly during the Decade, although further progress is needed.

Information exchange should be more routine. The fact that the World Bank is following the lead of many bilaterals and is actively working with NGOs in project implementation is the clearest sign that cooperation is more than a slogan.

To the extent that there are problems with this concept, they are more of implementation and the normal difficulties which must be faced when two organisations with very different approaches to development begin to work together. It is important, therfore, to establish modalities which encourage the implementation of low cost project components by local NGOs as part of major, ESA supported projects.

2.3 Broader Concerns.

There are, of course, other aspects which are of more recent concerns, or of longstanding interest but without attempts to address them. They relate less to the sector itself than to the role and impact of water supply and sanitation on the environment and on water resources, or theirs on water supply and sanitation. There is clearly a need to look at the sector from a broader perspective and redefine its role. If the sector is to contribute to the objective of Health for All by 2000, then defining its function as increasing water supply and sanitation service coverage is clearly inadequate. Improving the human or community environment would be more expressive of its impact and the role the sector must play in the future in a ever more complex environment.

Some of the issues which need to be adressed, or the problems which need to be solved, are :

Environmental Concerns clearly need to be addressed by the sector if human health and environment is to be protected and improved. In industrialized countries, water supply and waste disposal have progressed from simple to complex systems, usually in response to environmental damage caused by the sector itself (dumping of waste into watercourses to improve sanitation,then correcting environmental damage with ever more sophisticated treatment etc.). Population growth does not allow developing countries to go through this trial and error approach. In addition,modern technology has created pollutants which have impacts beyond those imagined when sewerage or waste disposal methods were developed. Solid and toxic waste affect the environment and water supply and must be included in the sectors activities. Waste reduction, recycling/reuse need to be further developed to protect the environment. Project designers must evaluate impacts of their proposed actions on the environment, not just on the community in question or its neighbours. Similarly, potential or actual environmental degradation must be evaluated in terms of the impact on the proposed investments. And all this must be assessed within the context of sustainable development, i.e. technologies and methods must be in keeping with a communities

ability to finance, operate and maintain the facilities provided.

Water Resources are a increasingly scarce commodity. Many countries already suffer from a deficiency of available water. At the same time, usually in the water scarce area itself, water is wasted by the use of inappropriate technologies or methods of use. Of course, the water sector uses a relatively small quantity of water and much greater watersavings can be accomplished by more efficient irrigation, for example. However, waste of water is inefficient economically and financially. The water industry in many countries routinely wastes up to 50% of the water produced. No other industry could survive this kind of waste. In the water sector the result is higher tariffs and, consequently, lower or no service to the poor who cannot afford it. Excess consumption, even if the user pays for the water, is equally inefficient from the investment point of view. Not only is more water provided than necessary, requiring greater investments, but waste water disposal costs are higher as well because the water imported must also be disposed off. Finally, discharge of wastewater into watercourses is usually causing environmental problems while reuse for irrigation would reduce overall water resource development cost and protect the environment.

Technologies for the Future need to be identified and evaluated for the many urban areas in developing countries which do not yet have central sewerage. It is clear that the systems used in industrialized countries are not necessarily the most efficient method of supplying water and sanitation. They are a result of historic developments and step by step improvements over time. Industrialized cities with major investments in these systems are obviously not in a position to invest in totally different technologies. Improving the existing ones is less costly. However, another look is in order for all those communities which have not so far such massive sunk investments.

Today, appliances are available which require very little water. Their consequent use would not only reduce water requirements but reduce, even eliminate centralized wastewater disposal systems.At a minimum,they may permit multiple decentralized systems with effluent used for park or greenbelt watering for an improved urban environment. Greywater may be recirculated as is already done in some instances, after on site treatment. New highrise buildings may be equipped with "spaceage" technologies rather than connected to central systems. Disposal should be assessed from a different perspective : reuse and recycling. There is increasing evidence that a substantial part of disposal costs is recoverable through innovative commercial enterprise, such as aquaculture or specialized highly intensive agriculture. What is required is less scientific research but the design of systems less bound to the past and more to the innovative application of recent technical developments to find the environmentally, socially and economically most efficient solution.

3 Strategies for the Future

3.1 Context

The problems identified as slowing down progress in the water and sanitation sector are the result of a variety of limitations and constraints, some more easily correctable than others. The most hopeful sign is that progress is being made on almost all of them. Some are not amenable to corrective action by the sector, or at least only indirectly. For example, the scarcity of funds is unlikely to be completely overcome by any action the sector may take or recommend. Strategies must therefore be realistic and emphasize actions subject to the power of the sector to implement them. In the case of financial support, that means to first achieve efficiency in the financial management of the sector, reduce cost to the maximum possible and implement systems that are sustainable with user generated income. Only then will the sector become an attractive vehicle for investment and steps may be undertaken to attract private capital, one of the most promising sources for future funding.

Access to financial resources other than governement and ESA funds is essential if the sector is to overcome the chronic underinvestment in its infrastructure. In order to do so, the sector institutions need to become more efficient, have reasonably autonomy to set and implement tariffs, in short, adopt some of the methods and approaches of other infrastructure sectors. Privatisation of some portions of the sector may be one alternative. These measures should lead the sector to become an attractive object for investment, for example of insurance funds where a capital market does not yet exist.

3.2 Sector Objective

One of the pricipal conclusions of experience during the Decade is the realisation that to provide effective service to those in need of them requires a multidisciplinary approach. Many projects have failed because they concentrated on technology. One of the reasons is that objectives are customarily defined as so many connections, watertaps, latrines etc per project. Of course,these are objectives which are easy to implement and monitor. The real objective, however, for which the taps and latrines are merely the means, is the

> **Improvement of human health and productivity**
> and betterment of the environment in which
> people live.

This definition requires a different project or program approach,starting with a more comprehensive definition of the

project followed by multidisciplinary activities.

A more limited definition of a project or program of interventions can be defined as the

> **Provision of infrastructure which is socially, culturally and environmentally responsive and sustainable by the user community over the long term.**

This again would avoid the previous dependence on the technological fix and require the multidisciplinary approach, in particular the participation of the community and of women.

3.3 Strategies

Strategies are required to ensure that projects achieve the objectives set for them. Strategies are also required on how to reach agreement on the former and how to maintain the visibility which engenders support by governments, funders and the public at large.

3.3.1 Project Strategies are the following :

a) **Projects must be designed for effective demand and be sustainable by the user community.**

Projects designed to satisfy effective demand, i.e. based on the beneficiaries willingness to pay, will prevent further investments in facilities which are rapidly falling into disuse because the user is unable to pay for them and cannot maintain them. In practice, this approach requires much greater communnity participation and decisionmaking, with projects subject to redesign to reflect the communities' preferences and abilities rather than the designers interpretation of them. It obviously requires the use of technologies appropriate within different sectors of the community. Cost recovery, a touchy subject, is part of this approach because it reflects willingness to pay as determined during project design.
Clearly, full implementation of this approach may require a phasing in over a period of time in many countries and communities. Outside financial support will undoubtedly be needed. Such support should be conditioned, however, on the needy obtaining assistance rather than those able to pay for the service. Some past tariff and cost recovery policies have had the unintended impact of transferring subsidies to those who do not really need them.

b) **Institutional and Human Resource Development requires priority attention both within project development and as independent activities.**

Projects designed for effective demand require different approaches from those commonly applied by conventional public utilities.

Periurban areas, where most of the rapidly increasing number of unserved persons live, requires community based approaches and technologies more common to rural areas. Urban utility staff has little training, maybe little interest, in the community participatory approach. In any event, they have their hands full with utility operations. Institutionally, the question to be resolved is what form should the arrangement for periurban areas take: local independent management, branches of urban utilities, urban utility at wholesale level - local management of distribution/collection, private entrepreneurs, etc.. The issue needs to be addressed with urgency.

Human resource development is an integral part of institutional development. It must be more than training, however useful improvement of skills may be. Institutions need to provide the environment and remuneration which attracts and keeps qualified staff. Both institutional improvement and training may be part of project implementation or undertaken separately. In either case, it must be continuous.

Given the existing financial constraints facing the sector, the strategy for institutional and humen resource development should include the perticipation of sector organisations in industrialized countries. It is true, of course, that technologies and methods cannot routinely be transplanted from one country to another. But it is also true that the best learning experience is offered by staff and institutions operating competently. A PARTNERSHIP of developing country and industrialised country sector Institutions and Professionals expanding on existing twinning and similar arrangements, could help overcome institutional and staff constraints at reasonable costs. Interest, as a result of the Decade, is great in industrialized countries, as demonstrated by the longterm activities of WaterAid U.K., WaterCan Canada and the more recently established WaterTech U.S.A. Such a partnership would be particularly useful to improve operating and maintenance capacity because that depends so much on hands-on experience.

c) **Community and Women's Participation should be part of every project.**

Consequently implemented, effective demand based projects include community and women's participation.After all, even in urban projects based on utility approaches, determination of willingness to pay will involve women. In practical terms, the importance of this requirement is obvious in the rural and periurban environment.Centralised agencies have been notoriously unable to provide local support, and women are the traditional carriers of water with a vested interest in the permanent functioning of an adequate supply. They are additionally the providers of primary health care to their families and are far less likely to be absent from their community than the men. The implication is very clear, project development has to be based on a multidisciplinary approach rather than be exclusively technology oriented.

d) Sector Institutions should have access to the Capital Market of the country.

Government funds are likely to remain scarce in the foreseeable future. Efforts should be made to increase the efficiency and the autonomy of sector institutions so they become attractive to private investors, including the insurance industry. The latter is particularly important where capital markets do not yet exist.Consideration should also be given to privatisation of parts of the sector's activities if such action can increase efficiency and access to private funds.

e) New Models for urban water supply and waste disposal services need to be established reflecting latest technical developments and understanding of environmental and human factors and implemented in future projects.

Many of the conventional approaches do not respond to conditions in unserved urban environment in developing countries. Limiting attention to water and sanitation disregards the importance of other environmental problems such as lacking surface water drainage, ineffective solids waste removal practices etc. and their unfavorable impact on human health and productivity. Project design should begin with an assessment of all these aspects and assign priority to the various problems rather than blindly proceeding with water and/or sanitation. Such an assessment should further include a review of the impact of the introduction of large amounts of water into a community through water supply projects if no sewerage is available to dispose the used water. If sewers are to be installed later (for financial reasons), water quantities to be made available should be kept to a level which avoids wastewater disposal problems. Projects should also include considerations of future upgrading of technologies so initial investments can reflect existing payment capacity without preventing higher standards as the user gains the ability to pay for them.

3.3.2 Implementation Strategies are needed to gain acceptance for the project strategies, as follows :

a) Reach Agreement in Principle on Project Implementation Strategies between ESAs and Developing Country Governments.

Consensus about how to achieve success in the water supply and sanitation sector has reached a level which should make it possible to reach agreement in principle on the strategies proposed. Discussions during the planned regional consultations would make it possible to formally agree on these principles during the global consultations in New Delhi, with appropriate additions reflecting regional differences. Such agreement would not only facilitate future project preparation by confirming the experiences gained during the Decade, it would start off activities for the nineties with a consensus which did not exist when the Decade started. Such

a consensus, formally aknowledged, should facilitate the promotion of support, including funding, for projects and programs during the nineties.

b) **Make the Collaborative Council a Forum where Sector Professionals of ESAs and Developing Countries can meet, exchange information and experiences and develop a consensus on future actions to improve the sector's services,and discuss/agree on activities to be proposed to their organisation.**

Before the Collaborative Council was established, ESAs met informally to consult on sector developments as a result of the interest and enthusiasm created by the Decade. At the meeting endorsing the work leading to the establishment of the **GLOBAL FRAMEWORK FOR COOPERATION**, some meeting participants requested the inclusion of representatives from developing countries. This representation has increased subsequently, at the invitation of specific ESAs. As a consequence, the **COLLABORATIVE COUNCIL** has become a consultative body for sector professionals who are able in a informal atmosphere to work together to consult on and solve problems of common interest. The council is the only global body of its type in the sector and should continue to give sector professionals this opportunity to work together in the future ! The Framework can still count with fora where interest groups can meet to consider recommendations of the Council : there is the Decade Steering Committee in which representatives of UN Organisations meet, the OECD Development Assistance Committee where bilateral donors meet, the ECOSOC Committee on Natural Resources where Developing Country Governments can consult, and there are NGO Associations which permit the discussion of topics of common interest. There are, therefore, organisations available for the interest groups represented in the Council, but only the Collaborative Council provides a forum for all of them to meet jointly to informally consider common problems and opportunities for action. Meeting as regional subgroups (Africa,Americas,Asia and Arab States and Europe), followed by a global meeting, would establish a five year meeting cycle which should not be excessive and still permit interested parties from outside the regions to participate in the consideration of problems and topics of interregional interest.

c) **Establish a High Level Advisory Council to provide guidance to the Sector and Governments.**

The sector has suffered from a lack of visibility even during the Decade. The Steering Committee has done a valuable job and provided leadership for many activities and programs. Nevertheless, its actions and its visibility were essentially restricted to the UN System and those ESAs approached by some of its members. In the

meantime, governments and the publi were alerted to development and environmental issues by high level task forces (Brandt,Brundtland) which have stimulated interest on the topics treated. In the water sector, the most visible and successful stimulation has been a result of voluntary efforts (WaterAid being the most notable example). A High Level Council consisting of respected political and sector leaders (water supply and sanitation, community participation, primary health care, national NGOs etc), should be called together to review proposed strategies, modify, amend, improve and endorse them. They could help in promoting the sector with governments and lenders and possibly the public to gain further support for voluntary efforts such as WaterAid to mobilize the human and financial resources needed to make the nineties the success the sector is capable of becoming. Appropriate selection could make the members of this Council important advocates in the various regions to gain needed government support. This council should meet to make its recommendations prrior to the regional consultations,if possible, but at least in time for its recommendations to be incorporated into the proposals for the Global Consultation. Funding for the Councils activities should be sought from interested Foundations and ESAs.

d) Support Efforts to develop new urban water supply and sanitation models.

Development of new approaches and models for more efficient water supply require applied research efforts in addition to those previously identified by the Temporary Working Group on Applied Research. What is required is a review on how recent advances could help in situations not usually found in industrialised countries, the lack of previous investments in the sector, particularly waste disposal. Just as telecommunications in developing countries has lept to satellite transmission without going through the stage of wiring whole countries, so the water supply and sanitation sector should take advantage of the lack of existing infrastructure and try to find novel solutions which combine traditional methods with the latest in technology. Research organisations interested in tackling this problem should be identified and supported.

4 Organising for the Future

Progress towards the adoption of strategies requires certain organisational steps. To reach agreement in New Delhi implies :

- Agree to participate in regional consultative meetings on a selective basis to promote agreement on strategies.
- Participate in the preparation of and participate in the Global Consultation in New Delhi, which would include a meeting of the 1990 committee (or similar) to review preparation at the conclusion of the regional

consultations.

- Agree on the format of the FRAMEWORK and the COLLABORATIVE COUNCIL, as proposed here or modified.
- Participate in the future activities of the COLLABORATIVE COUNCIL and support its activities.

Details of support needs will have to be discussed further.The chairman should establish a committee for this purpose. The committee should submit appropriate recommendations for discussion to members of the Collaborative Council in time for decisions to be reached at the Global Consultation.

CHAPTER III

THE UNITED NATIONS

FINAL REPORT

INTERREGIONAL SYMPOSIUM ON IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER RESOURCES : FOLLOW-UP TO THE MAR DEL PLATA ACTION PLAN

Organized by the

Department of Technical Co-operation for Development

5-9 January 1987

United Nations Headquarters

New York

IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER RESOURCES: FOLLOW UP TO THE MAR DEL PLATA ACTION PLAN

I. REPORT OF THE MEETING

1. The Interregional Symposium on Improved Efficiency in the Management of Water Resources: Follow-up to the Mar del Plata Action Plan, was held at United Nations Headquarters in New York from 5-9 January 1987. The meeting was convened following a request by the Ninth Session of the Committee on Natural Resources (later endorsed by the Economic and Social Council in Resolution 1985/49B), that the Secretary-General provide the necessary assistance in the preparations for and the organization of a meeting on the implementation of the Mar del Plata Action Plan, ten years after the United Nations Water Conference was held at Mar del Plata, Argentina.

2. The main purpose of the United Nations Water Conference in 1977, had been to promote a level of preparedness nationally, regionally and internationally which would help the world avoid a water crisis of global dimensions by the end of the present century. The Conference was to deal with the problem of ensuring that the world had an adequate supply of water, of good quality, to meet the needs of a global population which was not only growing, but was also seeking improved economic and social conditions. Despite the fact that considerable progress has been made in implementing at least some of the recommendations and resolutions of Mar del Plata over the last decade, there is no doubt that the major task of supplying the world with adequate quantities of acceptable quality water continues to face serious constraints. It would, for example, require the mobilization of greatly increased financial resources during a time of serious financial recession and heavy external debts. Inadequate cost recovery policies and lack of financial planning at the national level have added to the problem.

3. The required number and level of skilled workers available have also not been adequate to carry out the task. While some countries have faced severe skilled manpower constraints, others have had an excess supply of poorly managed professionals. Combinations of the two extremes could also be found

in many developing countries. Application of appropriate technology has been another critical issue. Stages of development and social, cultural and institutional backgrounds might require different approaches in choosing suitable technological alternatives.

4. Despite the importance of water quality both in environmental and health terms, deterioration has been occurring in many areas at a rapid pace. The process has affected surface and ground water, both at national and international levels. Finally, natural disasters, such as droughts and floods, have continued to cause considerable losses, both in human and economic terms. Therefore, it was considered time to review progress made and what still needed to be done.

5. The Symposium was attended by over 70 participants representing 30 developing and developed countries, the five United Nations regional economic commissions, eight United Nations organizations, two regional banks and five non-governmental organizations. The list of participants is attached as Annex I, and the list of background documents is attached as Annex II.

6. The meeting was inaugurated by Mr Xie Qimei, Under-Secretary-General of the Department of Technical Co-operation for Development. He stated that the purpose of the symposium was to determine ways to make greater progress in a number of key problem areas which had constrained the attainment of the goals outlined in the Mar del Plata Action Plan. He noted that water was closely tied to the food production cycle and that it was a critical input to other social and economic activities. The world economic recession of the early 1980s had severely reduced the funds available for the implementation of water resources programmes and policies. This was particularly unfortunate at the time of severe drought in Africa, as it was clear that water shortages were one of the most severe constraints to development. Climatic and financial shortcomings exacerbated by inadequate management of water resources and lack of trained manpower had given rise to rigidities and difficulties in the development of this vital resource. It was appropriate that such issues

should be discussed at the symposium by some of the world's leading water experts.

7. Mr James P. Grant, Executive Director of the United Nations Children's Fund (UNICEF), then addressed the meeting on the subject of water and sanitation for child survival and development. From 1975 to 1985, UNICEF had expended an accumulated total of US$ 550 million, corresponding to 75 per cent of the total expenditure of the United Nations system in the form of grants for water supply and sanitation. UNICEF's share of grant assistance to the water supply and sanitation sector had amounted to between 10 and 20 per cent of the total provided by bilateral, non-governmental and other donor organizations over the 10-year period. He mentioned the importance of focusing on low-cost technical alternatives, of getting confirmed government and donor commitments and ensuring the community's willingness to take overall responsibility for water supply and sanitation projects, particularly with respect to maintenance of the systems. He also pointed out that safe drinking water supply and basic sanitation should be among the human requirements protected from economic cutbacks since abundant safe water was of benefit to everyone.

8. Mr G. Arthur Brown, Associate Administrator of the United Nations Development Programme and Chairman of the Inter-Agency Steering Committee for the International Drinking Water Supply and Sanitation Decade (IDWSSD), focussed his remarks on the Decade as an important aspect of water resources management. While the Decade had raised consciousness and stimulated programmes in drinking water supply and sanitation, rapid population growth had limited the progress made. Thus, the number of individuals unserved at the end of 1985 was probably the same as at the end of 1979. Without the Decade effort, however, the situation would have been much worse.

9. Mr Brown cautioned that rapid expansion of developing countries' urban areas and slums would render solutions in the 1990s more complex and costly in terms of technology choice and availability of water. He suggested that the following solutions be considered during the symposium:

1. Banks, donors and developing countries still needed to be convinced that low-cost technologies represented viable solutions. The psychological blockage that low-cost technology was only second-rate remained to be overcome in many countries.

2. While cost recovery - in whole or in part - was a controversial issue, it had to be addressed realistically because governments could not afford to provide water free of charge. There was a cost to water which must be recovered through taxation or other innovative means including local (user) participation.

3. Capital investments would be wasted if no adequate provision were made to meet the recurrent costs of maintenance. Donors would do a disservice to developing countries if they did not ensure that recurrent costs were an integral part of capital and technical assistance programmes.

4. Investments in the water sector must reflect country priorities rather than individual donor priorities. There should be one water sector development programme per country to which external donors contributed in a co-ordinated fashion.

10. Mr Nicky Beredjick, Director of the Natural Resources and Energy Division, DTCD, noted that the Division had introduced measures to assist governments in overcoming rigidities which hampered the attainment of the goals of the Mar del Plata Action Plan. Such measures included: elaboration of pre-investment studies as a means to mobilize financial resources; regional training centres for training in high-technology fields and on-the-job training of skilled workers and technicians in the water resoures field; the introduction of some modern technologies to make planning and management tasks easier, and the encouragement of local manufacture for basic equipment; and the development of ground water resources to combat poor water quality and drought conditions in many areas.

11. The six technical sessions which followed covered the following topics: (i) Management of financial resources; (ii) management of human resources; (iii) management of technology; (iv) management of water quality; and (v) management of natural hazards, comprising floods and droughts. Each session was introduced by a consultant who presented an overview of the topic in plenary. The participants then divided into working groups and discussed potential solutions to overcoming constraints in each given area. Chairmen of the working groups presented their findings at wrap-up plenary sessions, which concluded with additional comments and discussion. Final conclusions and suggestions for action were drawn up on the basis of working group findings. These conclusions are summarized below.

II. CONCLUSIONS OF THE MEETING

A. IMPROVED EFFICIENCY IN THE MANAGEMENT OF FINANCIAL RESOURCES

12. In dealing with the subject, the participants noted that the existing level of funding is but a small fraction of the estimated requirements for water resources assessment, irrigation and drainage, supply and sanitation, and other uses. They agreed that developing countries need to make significantly increased allocations of financial resources for water resources development, especially from national sources of revenue. Although most governments were reluctant to incur additional external debt, except where projects were obviously self-supporting, well prepared water resources projects and programmes were likely to receive financial and technical assistance support.

13. With regard to the efforts of the developing countries themselves the participants emphasized the need for governments to improve their assessments of immediate and longer term needs, to step up their efforts for the development of water resources and to formulate phased programmes on the basis of carefully designed projects which should include effective and reasonable cost recovery schemes wherever practical. The need was also recognized for a better integration of water resources management policies into overall government policies.

14. The participants agreed that the questions of cost recovery, institutional efficiency, and active participation from the outset by the local communities to be affected needed particular emphasis. Moreover, an increased role for private sector and autonomous entities should be given serious consideration with a view to the mobilization of additional resources, improved efficiency, flexibility and response to local, regional and basin conditions and needs.

1. National Level

a. Cost recovery

15. The meeting laid stress on the proposition that water must no longer betreated as a free good. Even in cases where for cultural reasons the resource itself has to be considered as "free", the costs of development, treatment, delivery and management could be charged for and should be an integral part of the calculations for project financing. The meeting recognized the importance of further improving the financial performance of those agencies which had always had cost recovery as part of their mandate, such as urban water utilities.

16. Accordingly, the participants agreed on the necessity of formulating and implementing cost recovery policies and the importance of the imposition of reasonable charges directly upon the beneficiaries, according to ability to pay, as a means of ensuring their interest and support, as well as ensuring the long term sustainability of projects. To this end, the project formulation process should include realistic cost recovery schemes commensurate with local socio-economic conditions, at least for the provision of labour and materials. At the same time, project formulation should be preceded by sound evaluation of costs and benefits, based not only on expenses and revenue, but also on the gap between the revaluation of foreign financing and the devaluation process affecting the currencies of many developing countries. Cost recovery schemes should take into account costs for: operation and maintenance; data collection and analysis; training and administration; as well as the retirement of the initial investment debt (the latter wherever and whenever feasible).

17. The need for flexibility in the formulation and implementation of cost recovery policies was emphasized. One of the possibilities cited was the practice of cross-subsidization of non-revenue producing uses by revenue producing ones, such as from the sale of electricity.

18. It was recommended that the cost of intermediate services such as data producing and dissemination activities should be recovered also, with the proceeds channelled to the responsible agencies. It was further suggested that external financial support for projects should contain provisions for the support of data generation and technical and social studies.

19. The use of revolving funds at the disposal of the implementing agencies, was cited as a desirable mechanism, designed to cover recurring costs, such as repairs, spares inventory, data base updating, inspection, testing and evenexpansion. It was pointed out that the implementation of cost recovery policies would facilitate favourable consideration by lending agencies, both national and external. Such revolving funds, initially funded by grant aid or soft loans, could be of particular importance in the case of rural water supply and sanitation projects, as well as many other projects, which traditionally suffered from a severe shortage of financial resources. However, it was noted that revolving funds utilizing foreign currencies could be quickly depleted. On the other hand, the utilization of local currency would provide certain safeguards in this respect. Therefore, the development of local inputs for water projects was encouraged.

b. Improved Financial Management

20. The importance of enlisting the support of beneficiaries, and in particular community participation was recognized. The three measures suggested below were considered particularly relevant.

21. First, a more thorough assessment and selection of water projects was needed to identify those that could be implemented and maintained, totally or in large part, through meaningful community participation, to include the supply of labour and materials. Collection of rents or tariffs in cash, adjusted to willingness as well as capacity to pay, was shown to result in greater respect for and conservation of the resource.

22. Second, expansion of public information campaigns and educational curricula could be used to explain the health, labour-saving and other justifications for the country's water programme. It was considered that water and water-related services would then be more highly valued by the people as a whole and by those directly affected, even those adversely affected, by individual projects.

23. Third, the involvement of women in all facets of water sector activities, including planning and management, would bring to bear the concerns and insights of women often found lacking when policies, projects and programmes were devised and implemented.

24. In connection with institutional aspects of the question, the participants stressed the need for greater collaboration among local, district or regional, national and international agencies concerned, and between the various water sector agencies and those responsible for health, land use, and rural and urban development. Such collaboration should culminate in sound national plans for development and environmental protection (for example, reafforestation) with adequate attention to all facets of water conservation and water-related services. Policies needed to be fully articulated and periodically reviewed with attention to comprehensive analysis of inter-sectoral impacts. The participants also agreed on the need for a clear definition of responsibilities and for coordination between all national ministries concerned and authorities charged with river basin development and management, where they existed.

25. Respect for existing traditional and institutional systems was important, even though their functions and attitudes may need, in due course, to be brought into conformity with overall policies and project and programme administration.

26. In some countries, market mechanisms might be helpful in reducing institutional constraints. The participation of the private sector, carefully monitored by the national authorities, might also be economically more

efficient than other approaches. In this connection, the participants suggested that the provision of incentives, such as through the tax regime, and guarantees, such as for the security of equity investment and the necessary returns on capital, warranted careful consideration.

27. The urgent need to improve the management of water resources projects was cited as necessary to make more effective use of limited financial resources. Priority should be given to the proper functioning and rehabilitation of existing systems prior to undertaking new projects. In this respect, it was felt that the strengthening of operation and maintenance capabilities and procedures at the project level, along with close auditing of the financial and technical support provided (including the training of personnel at all levels), was essential. For each project the needed capabilities and procedures should be incorporated expressly at the time of project formulation. New projects should not be undertaken unless administrative and financial capacity for their efficient operation was available or assistance to that end were assured. In addition, project performance overall must be systematically monitored, through integral ex-post analysis. As in the matter of cost recovery, the role of users was stressed. In both cases, it was felt that the organization of the local people, for example, by way of co-operatives or managerial committees, was indispensable.

28. The meeting likewise emphasized the importance of using low cost, suitable technology whenever practicable as a means of facilitating operation and maintenance and of lowering financial requirements. With regard to this latter point, it was noted that since the purchase of equipment usually required foreign exchange, local manufacture should be undertaken whenever possible.

29. It was also suggested that governments, financial institutions and international agencies could consider the use of the unemployed or underemployed labour force as a potential input in the implementation of

water programmes. The selection and use of labour-intensive techniques would not only reduce costs, but would also promote employment in the construction and operation and maintenance phases of programmes and thus facilitate the redistribution of income in given regions.

2. International Level

30. The meeting noted recent efforts by the international community to step up both technical assistance and financial support, particularly in the field of drinking water supply and sanitation. The group expressed the hope that such co-operation would not only continue, but be expanded. In particular, attention was drawn to the needs of the African region. It was also felt that the needs of rural areas everywhere clearly require greater attention.

31. The estimations of needs prepared for the united Nations Water Conference or since then, should now be updated and extended at least to the year 2000.

32. The participants acknowledged the importance of the role played by the international community, not only in assisting governments in the formulation of projects, but also in the conduct of consultative meetings among specialists from multilateral and bilateral organizations and policy makers from concerned governments. The UNDP Round Tables, World Bank Consultative Group Meetings and the WHO/GTZ Country Consultations were cited as very useful examples; such meetings should be encouraged.

33. According to the group, the international community could play a catalytic role in assisting governments in devising suitable cost recovery and operation and maintenance schemes and procedures, in the implementation of priority projects (such as for training and institutional development), and the achievement of meaningful user and community participation.

34. It was suggested that if the international community would collect and

disseminate information concerning cost recovery practices, along with analyses of the reasons for success and failure in particular instances, the results would be extremely helpful to other governments struggling with the problem.

35. The representatives also requested the international lending agencies to facilitate or simplify the procedures they required before giving a loan or a grant to a developing country.

B. IMPROVED EFFICIENCY IN THE MANAGEMENT OF HUMAN RESOURCES

36. Participants recognized that human resources were the key to successful programmes. The efficiency of water resources activities depended largely on the availability and quality of human resources, which in turn were a function of, inter alia, appropriate education, training and human resource management policies. Therefore, countries should be able to develop programmes aimed at improvements in those areas.

37. Participants emphasized that training and human resources management should be given a high priority in water resources development, and should be an integral part of national plans.

38. They felt that the recommendations contained in the Mar del Plata Action Plan were still valid. The challenge was to focus on priorities and develop specific approaches to meet the most pressing requirements. Implementation mechanisms would have to be devised to ensure that those requirements could be met.

1. National Level

39. The participants suggested some prerequisites to setting up meaningful training programmes at the national level.

40. First, the gap between the supply and demand of trained personnel should be remedied in those countries and disciplines where a gap existed. It was felt that national surveys were needed, covering requirements, existing skills and existing and potential training institutes which could be used to train water resources personnel at various levels, in order to define needs in training and management.

41. Skilled workers and technicians were in great demand and training of them was the top priority in many countries.

42. It was felt that a process must be created to increase awareness among policy-makers, scientists and professionals, and the local community as to the essential nature of human resources development for water-related functions. Interaction among such groups was necessary to create the conditions to formulate and implement an action plan for development.

43. The need to create training plans was stressed. They should follow a logical sequence going progressively from primary and secondary education to the creation of regional training networks.

44. The participants felt that it would be best to establish or strengthen permanent training structures at the national level, based on existing institutions where possible. It was considered important to review and ensure the quality of those institutions.

45. It would be most cost-effective to train trainers first and prepare them to train skilled workers.

46. Water programmes which required skilled workers should establish contacts with institutions which provided training such as technical schools, training centres and universities. The training institutions should ideally be able to design and adjust their programmes according to the actual needs as assessed by agencies concerned with water resources development and management.

47. Special delivery systems could be introduced for programmes which require basic but necessary skills, such as those related to maintenance and repair of simple mechanical equipment. These systems might include mobile facilities and teams, as well as distance learning techniques. The diffusion of basic knowledge would also be helped by programmes designed to be disseminated by mass media. The types of technology used, including low-cost options, must be given their full weight in setting up the training programmes.

48. Special efforts were needed to identify womens' needs and to recruit their participation in water project activities. Priority should be given to training women in technical and managerial skills for project development, operation and maintenance, health and education. Awareness building and exchange of information regarding water project development should centre on the crucial role of women in community, rural and peri-urban areas.

49. New approaches to the management of human resources could be considered based on private sector approaches which could include self-reliance, decentralization and greater delegation of authority. Some programmes could be modelled after methods used by industrial and commercial firms.

50. The need to develop structures for human resources management within relevant agencies was also stressed. Actions based on these structures should aim at informing, training and organizing human resources.

51. Several participants stressed that priority should be given to training in technical and managerial skills with emphasis on practical and professional aspects. It was suggested that the legal structure of international construction contracts could require contractors to provide essential training in the operation of facilities to the client's personnel.

52. Training materials should be appropriate to practical needs and should be of a type which may be widely disseminated. The UNDP/World Bank low cost technology training modules on water supply and sanitation represented a serious attempt to produce and disseminate such materials. The INSTRAW/ILO/Turin Centre prototype on women, water supply and sanitation was cited as another good example.

53. For training of high level engineers or technicians using sophisticated technologies, regional and interregional training centres could be used to cater to the needs of several countries. In addition, regional interchange of technicians among developing countries was of special interest as a low-cost alternative training method.

54. At the project level, it was suggested that a systematic pre-evaluation should be made of the requirements for human resources development, including training, education and personnel policies.

55. The project could be a realistic entry point for developing technical education and training methods to be introduced within existing national institutions of learning. Moreover, specific projects could be developed at the national or regional level for training in certain aspects of water resources development.

International Level

56. It was felt that the international community was in a good position to promote awareness of the priority for human resources management and training and to support efforts for implementing corresponding measures.

57. It was necessary to coordinate interagency and bilateral efforts in training and human resources development. It would be possible for certain agencies or donors to specialize in training personnel in those areas in which they have the most competence. To such end, they might support the creation of regional training centres.

58. Donors should require an assessment of human resources availability and skills, including aspects of personnel policy, as a prerequisite to project and programme financing. The training requirements should be clearly stated. Priority must be given to financing of the training component of projects.

C. IMPROVED EFFICIENCY IN THE MANAGEMENT OF TECHNOLOGY

59. It was recognized that improvement of technological practices was not just a technical matter. It also involved social issues such as community involvement, compatibility with social and cultural conditions, and attitudinal and structural orientations within implementation agencies. The latter might need to upgrade their competence in social areas such as community participation, involvement and development.

60. There was growing recognition that all technologies adopted for implementation must be appropriate for the situation in which they are to be used. Thus, a computer-operated water treatment plant or hydropower facility might be appropriate in a region with well-developed supporting infrastructure, while a village handpump or a simple scheme for flood irrigation might be most relevant in a poor area lacking the resources to support more sophisticated projects. What is needed is to reverse the idea that appropriate technology means "second best" or "low-status" technology. There can only be either appropriate or inappropriate technology. Both national agencies and external donors must avoid the tendency to select a technology because it is "state of the art" and instead, seek solutions that best meet the development need at hand.

61. Appropriate technology also meant adopting equipment and processes that were within the competence of national agencies to implement, maintain, and, where necessary, modify and produce the adapted equipment.

62. Curricula and training programmes should be oriented towards developing technical skills relevant to national problems. Thus, arid countries without surface water sources needed hydrogeologists, well drillers, and pump mechanics far more than dam designers or hydropower technicians. Countries should tailor technical education to serve national needs. At the same time, developing countries should recognize that the primary audience for technical education and training was the individual who one day would be working for a national agency.

63. Over the years, severe problems had resulted from the requirements for "tied aid" in many donor agencies. Tied aid often resulted in a proliferation of equipment such as pumps, generators, drilling rigs, etc., which tended to overwhelm the capacity of a national agency to manage, operate and maintain them. The problem arose from overly-restrictive requirements within donor agencies to provide certain equipment from the donor country, as well as the inability of national agencies to insist upon standardization of equipment. Too often, the problems were worsened because there existed too many separate channels of negotiations between donors and national agencies. By channeling such communications through a single national body, such as a National Action Committee for water and sanitation activities or a National Irrigation Authority, developing countries should be able to control the proliferation of different types of equipment, encourage technological standardization, and thereby contain technological choices within the capability of the country to support them.

64. Donors needed to allow sufficient time for national agencies to go through the process of project identification and planning to ensure that there would be adequate community and local participation.

1. National Level

65. The participants recommended that an assessment be made of the relevance of the professional and technical curricula to the requirements of the water resources sector in a given country. Where found lacking, curricula could be modified to reflect national requirements and the needs of the low income population. The curricula review and identification of steps to upgrade engineering training need not be costly or time consuming. Similarly, curricula modification need not require revamping of training programmes but rather should incorporate the needed interdisciplinary components into existing curricula.

66. Aid donors who had in the past offered "tied aid" should provide appropriate products which respond to national needs, as determined by national agencies in the water resources sector. Standardization of

technologies should be considered a priority. Local water authorities could survey, document and introduce their own local, simple and successful technologies to foreign consultants or donors for consideration with other alternatives in their feasibility studies.

67. Every attempt should be made to improve the project specific data base before design of water projects. The cost to a government agency of generating project-specific data for design purposes was far less than the cost of over-designed technology which incorporated safety factors to overcome the lack of information needed for cost-effective design.

68. Technology assessment should be a prerequisite to project approval and implementation. This would entail specifications related to the technology, such as that it should be compatible with existing technology, that spare parts should be readily available, that operation and maintenance manuals be prepared in the local language, etc. Pre-project appraisal should include existing infrastructure, previous project experience, availability of resources, and assessment of the likely sustainability after project completion. Post-project evaluation should include efficiency and effectiveness and, in some cases, impacts. Such assessments should be carried out by trained staff who were not directly involved with the project itself and who could take as impartial a position as possible. Sufficient time would have to be allowed in the project cycle to carry out such investigations. Evaluation methodology should be standardized and simple.

69. The need for strong community development, communications and educational components in projects was recognized. Social scientists should be given real responsibility and authority in working alongside the engineers in project planning and implementation.

70. User beneficiary groups should be brought into stronger participatory and decision-making roles at all stages of the project: identification, feasibility study, approval, detailed design, implementation, operation, maintenance, cost recovery and evaluation.

71. The group recognized the considerable potential which women offered as resources in support of project in the water sector, and the importance of involving them in planning and decision making capacities throughout the stages of the project. This applied particularly to project management and maintenance of equipment at the community level.

2. International Level

72. Sectoral information centres should investigate with national governments and adopt ways by which technology dissemination could be made more aggressive and widespread. In particular, modern publishing and marketing techniques used by the private sector could be incorporated into dissemination programmes, enabling them to better reach project-based staff in the developing countries.

73. International agencies in cooperation with local authorities and/or local consultants, could undertake a specialized programme for the propagation of improved management of water resources; this programme should focus on dissemination of successful technologies and approaches among the deveoping countries requiring them. Its objectives should be:

1. To assess and document existing examples of full-scale successful projects incorporating appropriate technology, community participation, and revenue generation;
2. To define clearly those methods and tools within such projects to facilitate their adaptation and adoption by projects in other countries.

74. Such a programme could be executed by one of a number of international agencies but would require strong and imaginative leadership and a considerable degree of independence from inter-agency politics to succeed. The cost of such an activity would be relatively small compared to its extraordinarily high returns. To this end, countries were encouraged to support the creation of the above Programme for Sharing Experiences in Technology Management which would make other experiences available to their own programmes as required.

75. International donor agencies should clearly outline their existing or planned policies on appropriate technologies, community involvement, hygiene education, subsidies and financial viability, operation, maintenance and tied aid. In turn, developing countries should attempt to prepare sector policy statements setting out general and specific goals, optimum strategies, and basic development priorites.

76. International organizations had a strong influence over technology choices. Their personnel should therefore, be given an opportunity to learn first hand about successful technologies and approaches before encouraging their acceptance and use. A series of in-house seminars could be held within the bilateral and multilateral agencies for such a purpose. It was also recommended that bilateral donors review and share their experiences in commodity loans and grants with a view to expanding such forms of assistance, through regional meetings, where appropriate.

77. International agencies might assess the constraints on technology development that are being imposed by bureaucratic controls. These could be reduced to an absolute minimum. Likewise, the use of expatriates for project management should be tempered wherever possible.

78. International agencies could encourage increasing both quality and number of project evaluations. There was a need for a uniform set of guidelines for monitoring and evaluation of water projects. The United Nations agencies were encouraged to take a more active role in ensuring that more comprehensive and meaningful evaluations were carried out within water sector projects.

D. IMPROVED EFFICIENCY IN THE MANAGEMENT OF WATER QUALITY

79. Participants confirmed that appropriate priority should be given to water quality management worldwide. However, the resource constraints facing developing countries often prevented them from dealing with water quality as a priority issue. All water uses should be considered when assessing water quality issues, including industrial, agricultural, domestic and other uses. The need for environmental protection of coastal lagoons, estuaries and other water sources was stressed by the group.

1. National Level

80. The group considered a series of actions which could be initiated as a programme to tackle water quality problems at the national level.

81. First of all, laws concerning the pollution of water should be amended to make them consistent with economic realities; drinking water standards should be re-evaluated in light of existing socio-economic conditions. Laws which were simple, easy to implement and flexible would be the most effective.

82. Water quality legislation should be enforceable. An adequately staffed and equipped monitoring system was indispensable to effective enforcement. In addition, the political will to prosecute violators should be created and maintained at every level of government. Appropriate government standards on production process effluents should be adopted, and discharge levels of certain substances into water courses limited. Government planning procedures could be employed under which permits would be issued only to economic activites using "clean" processes or located in areas with adequate environmental assimilative capacity.

83. Participants suggested that, within the context of legislative actions, water quality control might include some of the following:

- Designation of protected areas or hydrological regions and aquifers;
- Requirements for special designs or construction;
- Prohibitions against discharging specific contaminating substances;
- Requirements for industry to treat effluents or to protect ground water through adequate design;
- Control of production, processing, transportation and storage of water pollutants.

84. The group noted that mechanisms for co-ordination of water quality mangement programmes were required in order to reduce duplication of efforts among national, regional, state and local agencies. Such mechanisms might include frequent interagency meetings and the hiring of liaison staff.

85. Environmental impact assessments should be required by the public and private sectors where they are not used, and improved where they are already used in environmental planning.

86. The government had a responsibility to organize and operate efficient and well-equipped emergency services and warning systems in the event of accidents involving water pollutants. Planning groups needed to recognize trade-off options and communicate them to the affected people.

87. Participants suggested that programmes be developed to: train specialists in water quality planning and management; teach environmental issues in schools; and focus on and place high priority on public education. Mass media techniques could be used to inform the public on environmental issues. Environmental interest groups could be used for co-ordinating information programmes and should be encouraged.

88. As for financing arrangements, it was suggested that monetary incentives could be considered with care, and assessed with respect to their efficacy and redistribution impact. User and effluent charge systems could be used as regulating tools and sources of pollution control funds. Approaches should reflect the specific cultural, social, economic, and technological conditions of individual countries, and charges should be updated when appropriate.

89. Local governments should assure a safe water supply for agricultural and other uses in rural areas through such measures as development of shallow aquifer springs and desalination of brackish water using solar energy.

90. Water quality monitoring needed to be developed in many countries, to include physical, chemical and biological parameters. Water quality monitoring should be combined with hydrological assessments; monitoring networks could be strengthened to include both quality and quantity in a data base. The number of ground water monitoring stations should be expanded in all regions.

2. International Level

91. Appropriate management of water quality was necessary at the international level because of the nature of transboundary pollution. Improvements in water quality could be strongly influenced by the actions of international organizations or negotiations among governments. Therefore, it was important for international organizations to support and promote national efforts to control water pollution.

92. Increased international funding was required for expanded water quality monitoring networks for assessment in developing countries, as well as for controlling water pollution across boundaries of all countries. Monitoring data could, moreover, be communicated through the international network.

93. International funding organizations could require environmental impact assessments before financing water resources projects. These assessments might be based on both technical and economic criteria. The cost of protective measures required as a result of a project should be recorded as a future commitment at the time when the project was appraised.

94. International organizations providing technical support to governments might provide assistance on the strengthening of national capabilities to

assess particularly sensitive and complex issues, such as groundwater quality. International organizations should provide information on current research so that limited resources were not used to duplicate what had already been done.

95. International organizations should recognize the need for, and promote, differential standards for case specific needs. This was particularly important in the case of water supply systems, especially those serving low income communities where sophisticated technologies were not feasible at present. Differential standards might be appropriate in situations where they expedited realistic, affordable goals and encouraged the expansion of water services to communities which would otherwise not receive them. The role of the international organizations should be to provide guidance and to act as a source of information to national standard-setting bodies.

96. Technical assistance should be accompanied by training programmes at regional and national levels to train water resources personnel in the crucial aspects of water quality management. Training of local personnel should be an integral part of all new and continuing projects. Training of women for technical and management positions was viewed as very desirable.

97. International agencies must strengthen their programmes for dissemination of information on water quality issues. Such programmes could include workshops, meetings, conferences, newsletters, demonstrations, and training by organizations within the United Nations system. Consultation with users, polluters and environmental interest groups, including consumer and women's organizations, should be carried out.

98. More sharing of experiences - successes and failures - might be achieved through a compendium-type document. A conference (or workshop) to address water quality issues could be developed to permit detailed consideration of developed versus developing country needs, community vs. rural, drinking water vs. other uses, etc.

99. International organizations could and should promote the development of low-cost, site-oriented technologies for the control of water quality problems, particularly as they related to toxic and hazardous wastes, and could assist in preventing the transfer of negative impacts in projects related to international rivers and lakes.

100. The transfer of pollution across national boundaries was a growing international concern which should be monitored and controlled. International organizations could co-ordinate and assist in achieving co-operation of affected nations. Principles for equitable and rapid redress, including appropriate compensation, and procedures for forecasting events, could be developed as joint national-international efforts.

101. Significant pollution might originate in agriculture from land drainage (acids, salts, fertilizers, and pesticides), and from erosion and mining (silt) as well as from direct industrial discharges. Protection against, and appropriate response to, accidental spills and other sources of pollution was desirable at international and national levels.

E. MANAGEMENT OF NATURAL HAZARDS: DROUGHT AND DESERTIFICATION

102. The group pointed out that, over large parts of the world, recurring periods of drier-than-average conditions had led to various forms of drought, often with disastrous consequences. At the height of the recent drought in Africa at the end of 1984, for example, 30 million people in 20 countries were desperately dependent on food aid. There were breakdowns of agricultural and pastoral systems, widespread dislocations of communities and large losses of human lives and of livestock.

103. The social and economic consequences of the climatic phenomenon in many areas had been successfully reduced by efficient drought management systems. There was a clear need, therefore, to improve the efficiency of drought management in vulnerable developing countries to mitigate the effects of climatic drought using the accumulated experience of countries which had successfully managed this phenomenon together with appropriate technological solutions tailored to individual countries' needs.

104. At the same time, accelerating environmental degradation - essentially man-made - including desertification and soil erosion, exacerbated and compounded the effects of rainfall deficits. Human disturbance of fragile ecosystems could be countered by a wide range of measures to restore ecologically-sound agricultural and pastoral systems.

105. The interrelationship between drought and desertification called for integrated programmes, of which water resources development and conservation were one facet. The huge scale of the problem demanded immediate and effective intervention by both national and international agencies.

1. National Level

106. A number of suggestions were made for action at the national level. Contingency plans for implementing emergency measures for the supply of food, water and medical assistance should be prepared. Efficient information

systems for the rapid collation and dissemination of data on emergency situations were essential.

107. National institutions should be strengthened to improve their ability to implement effective drought and desertification programmes and to monitor land use changes. Co-ordinating bodies could be established to plan, manage and monitor drought and desertification programmes.

108. The information base on climatic conditions and surface and ground water resources, needed to be improved. More research was needed on meteorological, hydrogeological and agricultural problems associated with drought and desertification, as well as early warning systems and climatic forecasting.

109. Comprehensive soil and water conservation programmes should be implemented, with emphasis on technologies which could be carried out by community self-help organizations in traditional agrarian and pastoral societies.

110. Water supply and sanitation programmes needed to be accelerated in drought-prone areas to provide safe and reliable drinking water during emergency situations for both human and livestock populations.

111. The adoption of ecologically sound land use systems and desertification control measures needed to be encouraged in harmony with prevailing social and cultural traditions; firm policy decisions needed to be formulated by governments on problems such as deforestation, overgrazing, land tenure and demographic changes.

112. Further investigation was needed on the conjunctive use of ground water and surface water to alleviate drought conditions.

2. International Level

113. Acknowedging the important role of the international community in supporting measures to improve the efficiency of management of drought and

desertification, it was felt, nevertheless, that better communication and co-ordination among external support agencies and between those agencies and the national governments would lead to more effective intervention. The tendency of donor agencies to support the exploitation of natural resources without due regard to conservation and the difficulties arising from certain project appraisal techniques had led to conservation programmes coming out second best in the allocation of financial resources. The question of setting aside funds for combating drought and desertification deserved attention.

114. The international community could play a major part in financing research and development. There should be continuing support for hydrological and meteorological research and for agricultural research on appropriate land-use systems, including improved estimates of the carrying capacity of rangelands and to special problems of marginal lands.

115. Other research and implementation activities could relate to providing assistance in the linking of national programmes for drought management to targetted water demands. This could include research aiming to: assess current water needs; determine priorities and establish minimum levels of satisfaction; assess cost-effective options; and implement, operate and maintain the measures and facilities required to meet the targeted needs.

116. It was generally agreed that the provision of food aid, although necessary in the emergency phase, is a short-term contingency measure, and one of the least effective types of external assistance in the long run.

117. A whole range of technological systems was available, many of which required application in specific regions. It was felt that a number of pilot schemes demonstrating the successful application of packages of measures such as comprehensive soil and water conservation schemes, small-scale irrigation and rangeland management, might assist in accelerating the spread of ecologically-sound management.

118. Finally, it was recognized that combatting drought and desertification often required co-operation among a number of countries and the support of intergovernmental bodies.

119. The Permanent Interstate Committee on Drought Control in the Sahel (CILSS) and the Intergovernmental Authority for Drought and Development (IGADD), in Africa could contribute to the implementation of comprehensive programmes of action.

F. IMPROVED EFFICIENCY IN THE MANAGEMENT OF NATURAL HAZARDS: FLOODS

120. The recommendations of the Mar del Plata Action Plan on flood loss management were based on the optimistic assumption that floods were not part of nature's order. However, adequate resources and appropriate institutional structures for mitigation of flood hazards were still lacking. The Plan, therefore, emphasized the need for decreasing flood losses by comprehensive structural and non-structural precautions and by organization of emergency services, including an expansion of hydrological services to aid in forecasting flood and related events. The Conference also noted with concern the tragic losses of life and crippling damages caused by floods that frustrated the heroic efforts of many developing countries to break the vicious cycle of poverty. In this context, it was observed in the conference that "the negative economic impact of water related natural disasters in developing countries was greater than the total value of all the bilateral and multilateral assistance given to these countries."

121. Though the techniques for minimization of flood losses were well known, the frequency and intensity of floods since the Mar del Plata Conference have not changed significantly. Flood devastations were not confined to developing countries alone; the developed countries were also severely affected. Deaths were caused by flood not only in Asia, Africa and Latin America, but also in North America and Europe. The widespread effects of flood phenomena made the discussion of the subject one of the significant issues of the meeting.

1. National Level

122. The group considered that both structural and non-structural measures for flood mitigation should be executed within the framework of a comprehensive, long term and integrated land and water development plan. Within the broad outlines of a long term plan, a number of suggestions were made.

123. Very often, structural and non-structural measures were complementary to each other. Wherever an option was available, non-structural measures should be preferred to structural measures because they happened to be less capital-intensive and more beneficial from the ecological point of view. Experience showed that structural measures by themselves were not always adequate for flood mitigation, and should be supplemented by non-structural measures.

124. The components of a comprehensive land and water development plan could be disaggregated into regional plans. Within the broad framework of the comprehensive plan, local level planning and execution of projects could be encouraged.

125. In the short run, structural measures were immediately necessary in many flood-prone areas where natural hazards like floods were contributing to a process of pauperization of small and marginal farmers. However, adequate resources should also be available to remedy the external diseconomies and harmful effects of such structures.

126. Adequate funds were needed for satisfactory maintenance of all flood protection works. Special care should be taken to ensure the safety of dams.

127. In order to minimize economic losses, flood mitigation measures could be given priority in cities, towns, villages and industrial areas.

128. Emphasis was also given to effective institution-building to cope with ever-increasing flood hazards. Specific suggestions on measures to be considered are listed below:

1. People's participation in flood mitigation projects should be encouraged by giving proper weight to local views and by motivating the people.

2. There should be effective horizontal and vertical integration of all agencies dealing with flood prevention. Civil defence measures in case of emergency should be strengthened.

3. Flood mitigation projects should be flexible so that feedback from errors could always be taken into account.

4. In certain deeply flooded areas, immediate mitigation of floods might be neither feasible nor desirable. Attempts should be made to minimize flood losses by undertaking research for improving varieties or deep water crops as well as for improving the housing and sanitary conditions in those areas.

129. To minimize flood losses, the machinery of flood warning, evacuation and relief might be strengthened. To this end, it would be desirable to

- Increase the forecast lead time by strengthening the flood forecasting and warning system through installation of effective equipment for collection of hydrological and meteorological data and through adequate training of related personnel;

- Set up an efficient system for the dissemination of flood warnings;

- Encourage the introduction of zoning laws;

- Educate the public about flood hazards, especially through development of flood-risk maps;

- Include disaster relief and preventive health measures in development programmes;
- Experiment with flood insurance wherever possible to reduce the burden on the national budget and to encourage small farmers to invest in modern inputs.

2. International Level

130. Close interstate cooperation should be actively promoted in relation to the use, management and development of shared water resources in accordance with the principles enunciated in the Mar del Plata Action Plan.

Specifically, the following measures could be taken:

- Enunciation of principles for equitable and just sharing of flood risks by co-riparian states;

- Establishment of mechanisms and methods for compensation in cases where new flood risks are created;

- Establishment of effective linkages between flood forecasting agencies of a region;

- Undertaking joint programmes for structural and non-structural flood mitigation measures;

131. Since the threat of flood cannot be eliminated overnight, it is essential to undertake long-term research and provide technical cooperation for minimization of flood losses. In this conection, such activities should be encouraged and intensified by intergovernmental and international organizations.

132. Adequate hydrometeorological data and continuous monitoring of dynamic changes in flood hazard occurrence should be collected. Legal and economic issues associated with environmental changes occurring as a result of floods should also be studied in depth and the information disseminated.

133. Models for flood forecasting should be developed and national professionals trained in their application. Appropriate technologies for flood mitigation measures should also be disseminated. Studies should be carried out on conditions for effective community participation with successful examples of community participation in flood mitigation projects.

134. Other measures suggested were to provide adequate training and to establish a focal point within the United Nations system for research and monitoring of floods on a long term and continuous basis.

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ANNEX II. LIST OF DOCUMENTS

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CHAPTER IV

THE BILATERALS

FRENCH COOPERATION

Dec. 86

DOCUMENT PREPARED FOR THE FOLLOW UP MEETING TO THE MAR DEL PLATA ACTION PLAN

FRENCH COOPERATION IN THE FIELD OF WATER

A - Introduction

1 - French cooperative action in the field of urban and rural water supply have recently taken a new turn.

An important effort has been made financially and global contributions of French aid in this field attain an annual level in the order of 1 milliard francs (approximately $150 million).

- Further, action has been carried out in conformity with recommendations formulated by international organisms, and in support of activities undertaken in the framework of the International Drinking Water Supply and Sanitation Decade.

- Finally, it has revealed the need and encouraged specialized operators who are in close contact with the users who implement the appropriate technology compatible with national or regional standards.

These activities are carried out by public bodies, chiefly the Ministry of Foreign Affairs, the Ministry of Finance, the Ministry for Cooperation and the Central Treasury for Economic Cooperation. Specialized institutions such as ORSTOM,CIRAD, IGN, BRGM, CEMAGREF, CEFIGRE, the Water Foundation or GERFAR provide technical backing, whilst the planning offices (SOGREAH, SAFEGE, BCEOM, SEURECA, Geohydraulic, BURGEAP) provide expertise.

2 - French cooperative action in the field of water has especially taken place in Sub-Saharian Africa, with the following aims:

- inventory and utilization of water resources;
- mobilization of human resources.

Through these activities it has been possible to identify a certain number of findings and to define the orientations of French policy in support of the Decade.

B - Activities - B - 1 Inventory

3 - Surface water resources of certain watersheds (Senegal, Niger, Voltas, Chad...), of small watersheds and of inland drainage areas were, prior to 1975 the object of a study by ORSTOM and the Interafrican Committee of Water Studies (CIEH). These studies were up-dated taking into account the drought as of 1975 and following the take-over of the hydraulic network by the national authorities.

French aid, together with that of UNDP, was more particularly directed towards:

- the gathering of information, its processing and publication in different forms (monographs, yearbooks, studies...).

- the rehabiliation of measurement networks and establishment of models for collecting, stocking and presenting results.

- construction of simulation models: mathematical models of the Niger River, of the propogation of floods and falls, of discharge forecasting and of flow management of large rivers.

In this context, support was provided to national services and more especially to regional ones: Niger Basin Authority (ABN), Commission of the Lake Chad Basin (CBLT), Organizations for the Restoration of the Senegal River (OMVS) and of the River (OMVG), CIEH, AGRHYMET, etc.

4 - The inventory of groundwaters is being prepared in most of the Western and Central African countries; it appears that groundwater is abundant, of good quality and easily mobilized.

Thus, from 1975 to 1980 planning maps of groundwater have been prepared, an up-dating of these documents is in progress, integrating data provided from numerous village water development programmes implemented over the last few years.

In most of the States there are computerized records of water points assembling available data in such a way as to improve the programming and the follow-up; systematic processing of this data also reveals new perspectives (PROSPER Records).

B - 2 Development of Water Resources

5 Mobilization of groundwater has given encouraging results in comparison to what was expected ten years ago. In fact, it can be noted that in almost all countries of West and Central Africa the volume of useable groundwater amounts to several tens of billions of cubic metres; annual renewal is assured for a large proportion of this amount.

For example, in the periphery of Niamey, in 1984-85, a programme of 120 drillings into the crystalline substratum permitted, in a very short time, to serve with a 95% rate of success, and with water of excellent chemical and bacteriological quality, suburban settlements spontaneously set up by rural populations victim of the drought, seeking refuge in the vicinity of the capital.

Very rapidly, most of these works were used for irrigation of out-of-season market-gardening. Many were equipped with a "mini water supply".

In north Togo the town of Dapaong was satisfactorily supplied through drillings into the crystalline and neighbouring sedimentary formations, as well as processing and raising stations, at a cost covered by investment and exploitation.

6 - Construction of regulating works was carried out for the dams of Sélingué on the Upper Niger, and that of Diama, acting as an "antisalt" device in the Delta of the Senegal River, and was initiated for the hydroelectric installation of Mompienga in Burkina Faso.

One can also mention the Maga Dyke of the Semry 2 project of North Cameroun creating a reserve of 30,000 hectares, and the completion of the Costes-Ongoïba Canal, as well as the restoration of the main regulating works of the Office du Niger in Mali.

On the other hand, few commitments have been made concerning development of small projects because of the difficulties experienced in their exploitation (soil vulnerability or change in the water regime, variability of water flow, importance of sediment discharge...). At present, priority is given to the improvement of major structures, while an alternative can often be found with groundwater for small-scale projects.

7 - Agricultural water development

Irrigation is necessary in Africa in order to increase and regularize agricultural production: To this end, French aid, especially in the Sahel, has been concentrated on the development of agricultural water installations in various forms: rice-growing schemes under controlled submersion or water control, food crops for diversification and market-gardening, aboriculture, etc.

Initial studies were progressively followed by:

- technical support to development companies;
- an improvement of existing equipments: rehabiliation of irrigation schemes, regulation of water supply and sanitation systems;
- experimentation of new types of irrigation.

Certain examples show that threshholds can be attained (without guarantee of the viability of the project: thus, the production of palm oil was increased fourfold in Benin through drip irrigation, which meant an increase of 3 to 4 tons of oil by 5,000 m3 of water supplied per hectare.

8 - Intensification and diversification of production is seeked throughout the irrigated area; the cost of construction and exploitation is high, often reaching two or even three tons of cereals per hectare and per harvest.

In order that the profits be sufficient an intensive model capable of being rapidly adapted to the market conditions must be envisaged.

This implies the use in the rural environment of research results: concerning varieties, calendar, agricultural practices, etc....

Naturally, provision should also be made at the national level for the maintenance of incentive prices, the supply of agricultural inputs, the land tenure system of reclaimed lands, etc...

9 - Protection of the environment

It is now recognized that the control of water and the developments it implies have an impact on the natural and human environment; it can include the modification of the water regime following the construction of important works (dams, dykes), the evolution and the degradation of soils (erosion, acidification, alcalinization of poorly-drained zones, desertification due to overgrazing induced by water points); but also by new living conditions (socio-economic and sanitary aspects) which have to be taken into consideration in the evaluation of the effects on the environment.

This concern over the protection of the environment implies more and more the inclusion of specific actions, such as:

- amplifying studies: impact assessment studies (baseline) taking account of socio-economic data
- setting-up of observation networks and of measurements to monitor the evolution of the natural environment (soils, water, flora.....)
- socio-sanitary surveys, like the one carried out over 8 years on a representative sample of the population living on irrigated territory (Semry 2, Cameroun).

B - 2 - Mobilization of human resources

10 - For many years now, French activities in the field of water are accompanied by a particular effort in training. To be noted are two institutions having an international function, the CEFIGRE and the Water Foundation.

Established in 1977, by France and UNEP, the CIFIGRE (International Training Centre for Water Resources Management) has as aim to aid the authori

ties in developing countries to better master and utilize their water resources: it collects knowledge and experience and ensures exchange of this know-how through the utilization of nearly 200 water specialists from 30 countries who participate in training sessions or international seminars; each year several hundred high-level water specialists attend. More than half the sessions are organized in developing countries. CEFIGRE's programmes are approved by the International Scientific Council composed of representatives from 20 developing countries, international agencies and organizations, and scientific personalities. CEFIGRE also acts - and this is a more recent activity which will not doubt gather importance - as an advisory body - at the request of the country. This can be interpreted in many different ways: planning of training, evaluation of training projects or complete or partial realization of training projects.

Water Foundation was also established in 1977. It has two centres, one situated in Limoges and the other in La Souterraine (in La Creuse). The training provided is professional, that is to say, practical and oriented towards the carrying out of daily tasks of a job, from the operator level to the engineer level. Its field covers that of the water cycle: utilization of resources, distribution and treatment of water, used waters treatment, recuperation and valorization of waste.

The Foundation accepts trainees, half of whom come from France and the remainder from developing countries.

C - Findings and orientations of French policy for support to the Decade

11 - French policy support to the Decade is based on the following findings:

- frequent weaknesses in the functioning or urban and rural institutions for water supply and sanitation.

- frequent necessity to improve recovery of sectoral costs.

- weaknesses in land tenure laws, in regulations concerning water services and their application.

- insufficient attention often given to water sanitation programmes in relation to water supply programmes.

- insufficient attention also given to operational maintenance services and to rehabilitation of existing installations.

- need to increase community participation in a significant way and to improve education and hygiene.

- insufficient coordination between external aid organisms, between aid organisms and sectorial institutions of the beneficiary country, and between sectorial institutions within the beneficiary country.

12 - The French contribution has been considerably reinforced, and better coordination with other donors has been established; furthermore, new forms of cooperation allow the mobilization of local resources, thus the water-solidarity programme which has set-up decentralized cooperation, calls upon local communities to directly finance water projects in developing countries. This programme, of French inspiration, was launched at the level of the EEC. A fellowship project was set up and as far as France is concerned, 10 Million francs have already been collected, and more than 500 municipalities mobilized, as well as the important association of Les Eaux de l'Ile de France.

A better coordination with other donors is seeked, as well as an evaluation of efficient financing; thus, France adheres to basic principles of evaluating investment projects financed with European aid, principles adopted during a Conference of EEC countries-ACP, Bamako, in November 1979, and participates at different consultative meetings concerning the progress of the Decade. But, especially, France is concerned with considerably improving the efficiency of the credits allocated to drinking water and its sanitation. It is with this aim that, at the request of OECD, it organized in June 1986, the first consultative meeting on the programmes of water supply and its sanitation in Burkina Faso, which made various recommendations facilitating this consultation. The success of this meeting encouraged the participants (international organizations, multilateral and bilateral aid organizations) to request that the experience be repeated.

- Support to multilateral programmes should also be mentioned: France contributes in particular to the UNDP-IBRD water-sanitation programme (8 million francs) for the development of low-cost technology; French contribution concentrates upon the following activities:

. contribution to the Regional Offices of Abidjan (one Drinking Water engineer and one specialist of Urban Community development) and of Nairobi (one economist).
. contribution to an information and training programme (establish training modules, translation, testing,...).
. study on the recuperation of wastes on site at Dakar.
. test of man-powered pumps in the laboratory and in the field.

13 - Major options

- with regard to village water development, they involve:

a) participation by the population with indispensable action to ensure their effective take-over of the works, including sanitary education;

b) valorization of acquired knowledge in order to intensify the use of existing equipment and improve their profitability rather than to launch poorly-rooted projects;

c) use of appropriate technology, such as a hammer for drillings, solar energy, records for computerized data, etc.

d) integration into global development programmes, especially taking into account sanitary education, the creation of small irrigation schemes and related activities, carrying out of training and follow-up programmes...

Other than improvement of existing works and the strengthening of installations, more than three thousand new water points are established each year in Sub-saharian Africa. Technology is now well-mastered and used by decentralized operators and these water points are more and more exploited for agricultural needs for orchards, gardens, out-of-season crops, etc.

With regard to urban water development the options aim at progressively reducing the gaps listed hereunder:

- on the institutional level: it appears desirous that the institutions within the sector have, in the framework of the policy defined by the Government, their autonomy in management matters.

- on the financial level: the financial balance of the sector and the financial autonomy of the institutions guarantee the efficiency of their operations, the maintenance of their installations and satisfaction of an increasing demand.

It will be achieved by a policy of cost recovery through a tarification based on the following principles:

- social principle: it is desirable to allow each citizen to have access to a satisfactory source of drinking water and to provide him with the minimum level of service.

- economic principle: once minimal needs have been satisfied, the tarification of drinking water should be in function with the long-term marginal cost of adequate supply, including when resources are reduced,and the control of an increasing water demand.

- financial principle: the urban water supply sector must be financially viable.

14 - Lastly, French policy as regards investments has evolved; it now aims, prior to any large programme of new works, to ensure the good functioning and, if necessary, the rehabilitation of existing installations.

This implies an improvement of the training of executives responsible for the direction and management of these installations and an improvement of their organizational methods. That is why emphasis is placed more than ever on training, which will be the major concern of the Water Institute which is currently being organized.

"COLLABORATIVE COUNCIL" Meeting

Sophia Antipolis (France)
November 28 to December 1st, 1989

FRENCH AID
AND
VILLAGE WATER SUPPLY IN SUB-SAHARAN AFRICA

Prepared by:
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FRENCH AID AND VILLAGE WATER SUPPLY RURAL HYDRAULICS IN SUB-SAHARAN AFRICA

INTRODUCTION

To conform with the utilization and respond to a need for clarity, we shall briefly recall the classification of the hydraulic sector each of whose components has its own specific problems and traits.

By the term village water supply, we mean pastoral hydraulics aimed at watering cattle, and village hydraulics to satisfy the domestic needs of rural populations. This term is less restrictive than village water supply, more frequently used in the literature; and we prefer it to the extent that a large number of water sources serve both purposes.

Agricultural hydraulics concerns the use of water for food crops whatever the technicity of the processes; although agricultural uses of water sources are tending to develop, the boundaries between rural hydraulics and agricultural hydraulics are fairly clear. This is not the case of rural and urban hydraulics when they concern supplying water to major rural centres. Village water supply alone will be discussed here.

Development of the sector: the major steps

The village water supply sector in Africa has known a lengthy development which can, for better understanding, be divided into 4 major periods. The dates indicated are merely intended to give a broad idea since, it is always arbitrary to break up a continuous process and, moreover, changes have occurred at different rates in different countries.

Traditional village water supply

From the beginning, only traditional means were used for watering men and cattle. This obvious fact should be recalled if only to understand the impact of modern hydraulics on rural society. The Sahel landscape is still marked by the traditional hydraulic system - hafirs, wells - remarkably efficient for the depths it can reach, 80 to 100 meters, and its quality of execution. The traditional lifting mechanisms using ropes and animal-powered lifts offer flows that are quite comparable to those of modern pumps (4 m3/hour for wells with three animal-powered lifts).
The water supply is essential to the structure of rural society: highly specific rules governing the use of the water sources whose access was strictly codified, reflecting the social hierarchy.
Well construction was the domain of special corporations of well diggers who possessed the requisite know-how but did not fare any better than the blacksmiths' cast.
Their rudimentary techniques, particularly concerning the catchment, did not allow the traditional wells to reach lower than ground water. Many of them dried annually or were subject to considerably lowered flow at the first dry spell limited recharging of the water levels. Moreover, they often suffered collapse for lack of appropriate casing.
Traditional techniques could not dig wells in loose ground - common in the Sahel - or in bedrock.

From the fifties to 1972: Development of Hydraulics Departments

The growth of pastoral economy resulting from improved health conditions in cattle and their increase within a favorable climatic context cannot survive in the face of the precarity of traditional wells. During the fifties, new administrative services were created to develop a sustainable hydraulic system with modern means.

These new departments made it possible to standardize these constructions, improve techniques, define the organization of building sites with teams of well-diggers. They benefit from the know-how of the traditional well-diggers they recruit. Village water supply was truly born of pastoralism in years of good rainfall and not, as is often believed, from the domestic needs of a drought-struck rural population.

Some pastoral drillings equipped with motor pumps were developed - in Chad, Senegal, Niger - with FIDES funds. They were not very numerous because these programmes did not last, except in Senegal.

The basic unit remained the well, but it was being modernized. The casing was now made of concrete. And a catchment was added, made of concrete tubes sunk several meters deep in the ground water with mechanical means, kirving, pumping. The use of a compressor and explosives made it possible to dig in bedrock, which had been inaccessible until then.

When they became independent, most countries had administrative or parapublic structures in charge of the village water supply. The private sector is almost non existent, except for some drilling firms who worked only occasionally in rural areas.

The execution of works under government control by the public authorities remained the rule.

It is surprising to note that in this growing Africa, the village water supply sector was not considered a priority, although the population is essentially rural and that rural exodus had not really begun.
In 1955, West Africa's rural population of 16 million benefited from a 500 million FCFA hydraulic equipment budget while the 3 million people living in cities of more than one thousand inhabitants had one million FCFA, a per capita investment ten times higher.

Public resources first went towards completing large-scale irrigation projects, towards urban water supply structures and towards great industrial hopes.
In this respect, the lack of interest in village water supply by the lending institutions is revealing. This social sector appeared to the authorities and development agencies alike to be rather unprofitable and it seemed that, somehow, the populations would always manage to satisfy their needs; it was simply a matter of the distance in miles to be covered by the women entrusted with the transportaiton of water.
The institutional tribulations of the village water supply departments are also significant: their pastoral origin often places them in the same Ministry as cattle raising - Niger, Chad. But, very often, they have been an unclassifiable by-product attached to the most diverse Ministries: Mines, Public Works, Agriculture, Industry... The creation of these departments was more the result of the will of some civil servants, isolated pioneers in a yet untouched sector than the result of concerted policy.

The period is characterized, however, by a remarkable development of reconnaissance and innovation.
Hydrogeological survey became generalized and led to the mapping of water tables. Hydrogeology did benefit from the intensification of mining in the fifties. The Hydraulic Resources Inventory - HRI - created in 1952 is at the origin of the listing of water sources.

But the great discovery of the sixties was the elaboration of a simple and rapid technique for drilling which results from a combination of factors:
* the use and interpretration of aerial photographs and geophysics made it possible to locate basal fractures and implant water sources in vast areas considered sterile until then. To appreciate this improvement fully, let us recall that in 1965; type specifications were published for drilling without previous reconnaissance, since many people questioned the reliability of such surveys.

* Specialized equipment (marteau fond de trou) made drilling possible in crystalline areas that could be equipped with hand-operated pumps.

* the perfecting of new hand-operated pumps, like the original VERGNET pump (pompe à baudruche).

The BRGM and BURGEAP played an crucial role in gathering the basic data which are the foundation of large-scale drilling programmes.

It was in Ghana that drilling, systematically undertaken on a large scale early in the fifties, was definitively selected, at the end of the seventies, as the single means of catchment.

At the end of the seventies, the approaching drought which was already imminent but whose breadth had not yet been properly anticipated. all the institutional, documentary and technical instruments were available and ready to give this sector a new dimension.

1972 - 1985: the drought - large-scale works

In 1972, the great drought reappeared in the Sahel For the third time in the century, the region of the Sahel faced considerably reduced rainfall. Much has been written about this phenomenon and here we need only recall its major characteristics.
For its duration - approximately two decades - it has been the longest and the worst. Average rainfall since 1972 fell almost 30%. In 1983 and 1984, the Senegal river, whose flow has been recorded since 1902, reached its two lowest water marks. In 1985, for the first in the elders' memory, the Niger river ran dry at Niamey.

The effects of the drought are particularly devastating for cattle. Trapped on withered or destroyed pastureland, herdsmen could neither lead entire herds South along the cattle trails, nor move to pasture located in areas without any water sources. The pastoral people of the Sahel have been destabilized by the shock of the drought from which they have never recovered.
Its dramatic consequences on agricultural production, equally well known, have given rise to the international movements of solidarity we all know so well.

In both cases, the drought has produced deficits in agricultural production and fodder, resulting in famine and loss of cattle. The aquifers have been lowered in the long term, many wells have dried up and made water transportation far more difficult and, contrary to the widespread belief, the worst consequences of the drought are not from the lack of water for domestic or pastoral purposes, but the lack of food. It is hunger rather than thirst that has killed.
The 1972 drought has truly launched major hydraulic projects with the intrusion of lending institutions in a sector with which they were unfamiliar.

It is in this dramatic context that the International Drinking Water and Sanitation Decade was launched on November 10, 1980. Its principles give high priority to rural area, education and the involvement of women in development.
Its ambitious goal was to supply 10 liters per day in 1985, and 20 liters in 1990 per person. The DIEPA's greatest achievement has been to have made the water supply in

rural areas an overriding theme and to have awakened the conscience of lending institutions.

The programmes are elaborated under amazing emergency conditions

1) the cattle trails are lined up along regularly spaced water sources for sufficient watering during transhumance.

2) equipment for drilling wells are delivered by plane.

The lending institutions' enthusiasm has not ceased to grow until the mid eighties; producing extensive drilling programmes. Several tens of thousands of drillings, about 5 000 per year, punctuate the landscape of the Sahel. These means have made it possible for the beneficiaries to ensure that the the most urgent needs of the rural populations were met.
The second basic change of this period lies in the systematic adoption of drilling. Because they are more time-consuming and costly; wells gave way to drillings that can be completed in a single day, but they require the use of traditional lifting mechanisms - pumps operated by hand or by motor, mechanical, aeolian or even solar pumps.

Village water supply has greatly benefited from the lending institutions' solidarity in the Sahel, but, like the national departments, they brought only technical solutions through true industrialization of programmes. New operators entered a expanding market - engineering for the elaboration and verification of work, drilling contractors and suppliers. We have come a long way since the time when national departments placidly conducted their yearly programme of well-digging on famine budgets, but we are nearing the age disillusion.

1985... the time of reckoning

The mid-eighties are a time for looking back. The conclusions are disturbing enough to put the entire sector in jeopardy. The purely technical approach has led to a cul-de-sac. With a few years delay, the village water supply sector is experiencing the same problems as agricultural water supply for the same reasons: institutional organization, maintenance and financial balance...
We are beginning to understand the amplitude of the consequences of the spectacular acceleration of programmes following the technological breakthroughs in this sector.

A generalized failure in pump maintenance

Surveys have revealed that the number of works out of order lies between 30 and 50%. More than fifty million FCFA for investment are thereby neutralized.

The consequences are particularly serious for users since, unlike the wells, access to water is impossible when the drilling's lifting mechanism is out of order.
The growth of hydraulic systems requires painful policy revisions.

Heavy recurrent expenses

Public funding is far too insufficient for maintenance of this equipment. In the face of financial constraints, the myth of free water for everyone has collapsed. Users will be made to participate, without having been warned. Cost recovery is not certain.

The weakness of national institutions in charge of water

The ability of departments to master these problems is overwhelmed by the profusion of outside funding and the multiplication of agents of all sorts: highly varied sources of

funding, research and development bureaus, firms, NGO, each with its own special procedures, technical standards, conditions and requirements. In 1984, in Senegal, from 10 to 15 sources of funding participated simultaneously in village water supply programmes in all parts of the country.
In many cases, the national departments are gradually yielding responsibility for the sector to development agencies through the decision-making process and the implementation of projects. To tell the truth, this is an advantage in a context which favours them in governments spheres and ensures them comfortable means of operation. For the same reasons, we can see the multiplication of national institutions conducting work programmes. Although ill-prepared for this task, and somewhat without the availability of the requisite technical competence, agriculture, national education, social service departments; for example, all with to supervise the programmes from which they benefit.

The weakness of national policy

Few states have been able to define a true sectorial strategy capable of creating an environemnt favorable to investment programmes. In most of them, planning is limited to lists of projects without seeking coherence with available financial resources, with the priority of needs and with a national land development policy.
The lending institutions had to consult each other in the context of the Water Decade for planning to begin to lead to a broader sectorial policy, accounting more particularly for financial, institutional, human factors.

Resource conservation

Aquifers are increasingly depleted for urban and rural water supply through programmes with several thousand drillings which in the long-term affect their reserves. Today, pumping often excedes replenishment and threatens such sensitive areas as Cape Verde, Senegal.
Priority given to works have overshadowed the problem of proper management of water resources.

Insufficient coordination of assistance

Without national interlocutors to guide their actions, lending institutions were unable to coordinate them. As a result, there was a great deal of confusion in programmes, their works and operators, along with inconsistencies in equipment.
Attempts to improve coordination were in vain when lacking national support.

Insufficient valorization of human resources

This has certainly been one of the major constraints in the sector. Training of manpower has not kept up with financial aids. This explains weaknesses noted in central departments for making policy and setting up projects, and in regional departments for follow-up of realization, and in local communities for maintenance.
Moreover, the fragmented organization of departments hinders constitution of the multidisciplinary teams now required for the technical, economic, social, health, financial and educational organization of projects.

The fallout of the sector's development

Water supply of large rural centres of 2,000 to 5,000 inhabitants and of peripheral neighbourhoods of major agglomerations has never been truly addressed.Since they are not relevant to the techniques and approaches of urban hydraulics whose management is ensured by a distribution company, they are, in the best of cases, grouped with villages and benefit from a few inappropriate hand-operated drillings.

Exclusion of users

The responsibility of factors unfavorable to the controlled expansion of the sector is variously assessed according to the observers' and each country's individual sensitivities. But the exclusion of users is unanimously recognized as a major factor in the system's degradation.

Modern water sources have been imposed on a rural society ill-prepared to assume them. How many villagers believed they would have a water source when they witnessed the arrival of the drill... only to be disappointed when it departed leaving behind no more than a piezometer.

A 1987 meeting of lending institutions at Interlaken had already made it a priority to eliminate these constraints. Little real progress has been made since.

ACCOMPLISHMENTS

Through a classic pendulum swing, the emergence of new problems relating to the extremely rapid expansion of the sector has led to a reduction in the actions of lending institutions, thereby diminishing the importance of the accomplishments. Paradoxically, they emphasize the major role played by the village water supply in the concerns of governing bodies and lending institutions.
In-depth study reveals however definitive accomplishments, on which a new development strategy can be based.

Realizations

More than 50,000 drillings have been realized in Sahel, 8,000 with France's support. Village water supply has undoubtedly been improved through the installation of modern, permanent and essentially safe water sources.

Cattle was better able to resist the second dry spell, in the eighties, thanks to the development of cattle trails facilitating transhumance. New water sources were implanted in areas as yet unexploitable.
We can admit that the means used did help solve the emergency problems that prevailed.

General awareness of problems

It has been less than 20 years since the development agencies became truly aware of the problem of village water supply, and they became massively committed with the launching of the Water Decade. As far as the states are concerned, needs are better understood than the necessity of sectorial measures. The place allocated by governments and their funding to national institutions in charge of water resources reveals that the hydraulics sector is definitively considered to be a major component in rural development.

This development goes largely beyond the Sahel's boundaries. The vigorous equipment programmes launched in certain humid tropical countries, such as Gabon, Cameroon, Congo, show that they have also been faced with this type of problem in the drinking water supply.

The institutional development
on the part of the States illustrates this new concern. Most of the African countries have created departments and even, in some cases, ministry departments, in charge exclusively of studying water resources, their management and involvement. Thus, they broke away from their traditional function as agencies, branches of administrations, mainly oriented towards urban distribution and public works.
They do not always have the appropriate staff and requisite efficiency. Nevertheless, they represent true interlocutors for external partners.

Experienced operators

By coming of age as an economic sector, village water supply has improved the dynamism of private operators and promoted innovation.
All along the process of conception, realization and verification of work, the firms involved have gained in professionalism through specialization. Financing conditions have contributed to multiplying and diversifying methods overly. The national departments find it extremely difficult to integrate them in their frame of work.

Scientific and technical accomplishments

A considerable effort has been made to improve knowledge in water resources, data collection and processing and to design management tools.

* programming and database softwares, ACTIF from BRGM and PROSPER from BURGEAP.

* water level gauges with automatic measurements, and satellite remote-sensing.

* mathematical models for aquifers and surface flows.

* computerized hydrogeological mapping ; positioning of water sources.

* lifting mechanisms using solar energy has gone from the experimental to operational stage.

National decision-makers now have access to a wide range of tools, issued from the latest technological breakthroughs, to aid them in decision-making and management in order to implement a reasonable water policy in their own country. The purpose of this document does not include listing them all; this would require a separate study.

A regional approach

Exchange of experiences has led some African States to elaborate joint policies and programmes in hydraulics.

* The Conseil de l'Entente illustrates an extensive programme of 3,000 drillings, conducted in its member states with French support, as a basis for practical study of community drilling management and agricultural water use.

* The CEAO has conducted projects to improve the operation of water sources.

* The CIEH, based in Wagadugu, has become a true reference centre for hydraulic studies and information.

* The CILSS methodically examines means of drought prevention and long-term development of the Sahel.

A change in attitude

Water is no longer free of charge. Its exploitation is costly and must be paid by the users.

This message has become the creed of governments. It is taking root in the users' minds, as illustrated by the notable improvement in quality in the operation of water sources in areas where information campaigns were undertaken.

In this respect, a step forward has been made in less than 10 years. Thirty years ago, in France, many users still assumed that water was still available at no cost.

However, the determination of public authorities results from the pressure of budgetary constraints rather than true promotion of village communities. Consequently, there is a risk in too rapid a transfer of equipment to the communities, ill-prepared to receive it, since there is no legal ownership status for this equipment.

Community participation

Community participation has been reinforced in the course of this water source management decade. As of 1982, drilling committees have been created in Senegal. In Niger, the Development Company, a major political body, has conducted its first practical experiments in the field of hydraulics. Burkina Faso has been one of the first to initiate participation and development in Yatenga Comoe. Since then, different organizational schemes, which vary from state to state, have been extended.

Thanks to new work programmes supported by France, the participation of village communities has been extended to designing and selecting equipment and to valorizing water sources.

MAJOR CONTRIBUTIONS IN VILLAGE WATER SUPPLY

In the course of the last decade, the monolithic nature of public service has given way to a diversification of participants in the sector. This development has been a determining factor in its expansion and the introduction of new techniques. Conversely, it has represented a source of conflict between national instititutions, detrimental to programme consistency and the harmonization of sectorial policies ; it has led to a multiplication of equipment types. Finally, it has led to the dispersion of the few national executives into autonomous projects.
The sector's institutional support remains a major preoccupation for lending institutions, including France. It has, however, been limited generally to reforms in public water organizations without having considered the role, activities and interrelations of each of these actors.

Public service

After having been transferred from one Ministry to another, as we have seen, most of the national departments in charge of the sector have been stabilized, or at least represent autonomous entities, for whom changes in affectation do not alter their functions.

They have experienced a strong development in their tasks, as a result of new priorities : water resource management, maintenance of facilities, cost recovery... Four types can be identified :

* Water management programmes

Improvement of hydrogeological or hydrological knowledge, data storage and processing, hydraulic databases, setting up of master plans to optimize management, conservation and different uses of water resources.

* the supervisory function of equipment programmes

Programming of project investments, identification, studies and setting up, verification of work in the firm.

* Maintenance

Definition of water source management and maintenance conditions, organization of the various agents, management committees, repairmen, suppliers - and verification of the fulfillment of their respective commitments.

* The entrepreneurial function

The work of digging wells and drillings which was the departments' main task less than ten years ago, is gradually being replaced by the private sector. At present, only those states in which private firms have difficulties in establishing themselves still have administrative structures for such work (Djibouti, Mauritania, Chad).
Observation has shown that few departments manage to preserve a proper equilibrium between these missions. The tasks linked to the realization of government projects and launching on the market to companies are given higher priority than more conceptual public service missions. There are several reasons to this : public works have a more visible impact and ensure the operation resources on which the departments rely exclusively.

Other national level actors

Providing equipment is one of the factors in rural development. In this respect, multiple structures for regional development design and launch work programmes without consulting hydraulics departments : development companies, various ministry departments - health, national education, and tourism.

Non governmental organizations - NGO - have multiplied to such an extent that no state can keep up with them. Even certain lending institutions had set up autonomous projects independently of national structures.

The multiplication of actors has certainly been an appreciable factor in accelerating providing facilities for water sources. In this respect, the NGO have played a significant role. Working under difficult conditions, they have successfully undertaken programmes which, though limited, have often shown impressive capabilities.
French Aid has increasingly associated them with its action in a new formula, Solidarity - Water, which aims to sensitize local communities in France, to development assistance programmes.

But, there are few countries in which the national authorities have been able to connect all such actions in a single directive framework, ensuring the coordination of operators and respect of national options.
New constraints for the sector have resulted. Overlapping and incoherence of programmes, lack of technical standardization of construction and pumping equipment, leading to problems of maintenance of supply of parts, the lack of respect of minimum technicity, which amounts to tinkering, a great variability in the conditions of village participation, which is poorly understood by users.
Too often volunteerism has replaced professionalism.

Lending institutions

In the first part, we underscored the recent phenomenom of the irruption of development in the sector. Notable improvements have appeared in their approaches. The exclusive priority given to investments has yielded to operations emphasizing assistance to institutions, resource management and maintenance. Little progress however, has been

accomplished in the era of coordination. This problem which has been often mentioned particularly during CAD consultations has not yet found an answer, because the beneficiary countries have no directive sectorial policy. and we must admit, this is true among certain lending institutions.
The dossiers submitted to round-table and national sectorial meetings are insufficiently prepared and the shopping list remains too often the basis for sectorial planning in most countries.
Periodic consultations in the context of the Water Decade offers an appropriate framework for dialogue on major common orientations but they are insufficient to make coordination on the level of each state effective.

MAJOR ORIENTATIONS OF FRENCH OVERSEAS SERVICES

The Water Decade has been, for many lending institutions, that of an increasing awareness of drinking water supply problems and launching major drilling projects, but also bringing out the difficulties resulting from the discrepancy between heavy technical and financial means and the weakness of the national organization that should mobilize them.
Rather than in numerical terms, the results of international cooperation will be assessed, in future, on their ability to reinforce sectorial institutions and policies. This is why the emphasis on supporting the definition of adequate policy in this sector must be a priority.
As for French Aid, the promotion of a national water policy is construed around the following principles: water must be

* the central element of environmental policy

* a factor in rural development

* a structuring factor that helps delegate responsibility in the rural world

1 - The promotion of a national water policy

Too many countries have limited the expression of their national policy in the water sector to the establishment of a list of investment projects whose priority and integration do not appear. This approach has been accepted by lending institutions because of the delay in supplying water to rural populations and the need to undertake effective action in the shortest possible time. This investment race imposed by the beneficiaries is not satisfactory to face the new problems we previously reviewed.

The end of the decade is characterized by a context in which water become a rare resource, in which competition appears between the various categories of users and in which the problems of quality, long considered marginal, have become essential: salinization of aquifers by overuse, biological and chemical pollution of aquifers and streams.

More than in the past, we must invite the States to have a more holistic approach of the sector and express it by a sectorial policy for:

- organizing the follow-up of resources and optimizing their qualitative and quantitative management,

- rationalizing investment programmes and the selection of facilities.

As for village water supply, the acquired advantages will have priority on the new investments. But tomorrow's challenge will centre on supplying major rural areas and peripheral urban neighbourhoods of the cities which require specific investment - localized water connections - and management - such as franchising to private groups solutions:

- making water a tool for land development by allocating water resources according to economic and social criteria,

- suggesting institutional, regulatory and financial measures - too often considered to be "accompanying measures" - to ensure mastery of the sector and its financial equilibrium,

- anticipating tomorrow's fields of concern; in this respect, it is obvious that the supply of water to periurban populations will be one of the next decade's major challenges.

French Aid will continue to privilege:

- competitive exams for setting up piloting instruments for the sector and help in decision-making, and, in agreement with its partners, it has made it an essential mission for technical assistance. It will reinforce this type of support in the next decade and wishes to do so together with the other decision-makers working in the same area to avoid juxtaposing different methods which might hinder the objectives sought.

1 - In certain states, we are beginning to observe the redundancy of files and programming methods

Among these tools, we shall mention original programming methods, now widely diffused in Africa, perfected by the BRGM-BURGEAP group to rationalize the choice of water sources by avoiding the overlap of programmes and respecting criteria of priority: a computer application makes it possible to bring together files relating to the availability of the resource, to the supply situation and to water needs whose priorities have been set up in complete sovereignty by the national departments.

- The reinforcement of these institutions in the sector to refocus them on public service missions and disengage them from construction activities. This means increasing the capacity for making proposals of the departments in matters of hydraulic policy, reinforcing project supervision, optimizing resource management, reinforcing the possibility of coordinating the actions; in parallel, we must promote new actors: community structures and private firms for implementing the facilities and ensuring their maintenance.

2 - Water policy as a component of environmental policy

The problems of environmental conservation are not all identical in the developing countries, but are particularly acute for environments in which water is a limited resource, which is vulnerable to chemical and bacteriological pollution.
The mastery of water - and the facilities it requires - had definite environmental consequences: alteration of the ecosystem by the facilities, setting up of new socioeconomic and health conditions, slow soil degradation (acidification of former mangrove swamps), introduction by overpumping of excess salt in coastal aquifers...

And the environmental concern is expressed by a whole series of specific measures which have the special attention of French Aid:

- setting up networks for observation and measurement in order to follow natural environmental changes (soils, flora) and water resources,

- reinforcement of impact studies,

- preserving the quality of water: sanitation programmes, testing for drinkability, development of simple procedures for making water drinkable and methods for health education. A great deal remains to be done to deliver clean water to populations. Drilling has not had the effect hoped for since contamination often occurs during transportation and storage of water drawn from these sources,

- the improvement of water resources management: reinforcement of knowledge of aquifers and surface water flow, renovation and modernization of piezometric and hydrometric measurement networks (automatic reading markers and satellite remote sensing), means of optimizing their management.

The improvement of technological means shall continue to be a strong point in French overseas services (software for programme assistance, modelization of aquifers and flow, computerized data bases...).

Should the decade of the 1990s be the Environmental Decade?

3 - Water as a factor of development

The water source must be the basis for village development in which the community enhances the potential of its territory with the concern of preserving it. This is why French Aid wishes to include hydraulic programmes in a broader approach to land development management and environmental protection. The agricultural valorization of water sources and land development management have, moreover, been the objects of discussions which shall not be detailed here.

4 - Water as a factor for structuring the rural environment to maintain and manage

The need for ensuring the maintenance of hydraulic facilities has been unanimously expressed by donors in the last few years. Most have made it a priority in their actions or even conditional to their investment. Their strategy reveals, however, very different approaches on their part:

- either the organization of projects set up by funding agencies take full responsibility, free of charge, of maintenance operations and renewal of pumps,

- or the reinforcement of administrative departments to take charge of drilling maintenance,

- or the training of repairmen.

As for French Aid, its approach is to make the local communities act as the essential partner in equipment design, setting up and maintenance.

The management of water sources is often the first project to mobilize villagers around a common goal. In this method, perfected and tested by French assistance systems and the FED, maintenance relies on sensitizing the following agents to their responsibilities:

- a village committee boosted by a promotional campaign

- repairmen for some twenty villages after practical training,

- commercial circuits for detached parts servicing.

In this scheme, the national departments have the sole mission of supervising contract commitments between these three parties.

The financial participation of users is a condition for the system to function properly.

Training shall receive priority treatment on the part of the French Overseas Services since development of this sector depends, in fine, on the quality of the men in charge of it.
Each of its projects includes a specific component for specialized training; France shall pursue support for long-term training of technicians and engineers in the Inter-States Schools of Wagadugu, together with the CIEH in an African focal point for water concerns.
The CEFIGRE has opened itself internationally; by becoming a training centre common to lending institutions who wish to associate with it, the CEFIGRE will play a major role in training projects in the years to come.
Finally, for long-term training, France offers to set up a second International Irrigation Management Training Centre in Montpellier presently being put together under the aegis of the World Bank.

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GERMAN COOPERATION

Federal Ministry for Economic Cooperation
Federal Republic of Germany

WATER SUPPLY AND SANITATION PROJECTS IN DEVELOPING COUNTRIES

"Sector Paper"

1981-1990

Guidelines for the Planning and Implementation
of Bilateral Cooperation Projects
of the Federal Republic of Germany
in the Drinking Water and Sanitation Sector

Bonn, May 22, 1984

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I. INTRODUCTION

The present sector paper replaces the one entitled "Communal Water Supply in Third World Countries", which was issued in May 1974. It incorporates the experiences acquired in project work during the last ten years, and now also includes rural water supply and sanitation.

A number of project evaluations carried out in the last few years have helped to identify bottlenecks and weaknesses in the planning, implementation and operation of projects. Taking into account these evaluation results and the experience of other donors, indicative figures and guidelines were elaborated for future development cooperation in the "drinking water supply and sanitation" sector.[1)]

The new sector paper addresses the relative importance within the development policy of water supply and sanitation and defines the principal criteria for project selection and design.

This sector paper is supplemented[2)] by a "Summarized checklist of Project Assessment Criteria"

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1) "Sanitation" means all measures connected with the disposal of liquid and solid waste, excreta disposal, and hygiene education.

2) The "Summarized Checklist of Project Assessment Criteria" and the detailed "Project Assessment Manual" will be finalized by BMZ, GTZ and KfW on the basis of the present Sector Paper in the next few months. In addition, KfW will adapt its internal project appraisal guidelines "Drinking Water Supply" to this Sector Paper and its assessment criteria, and will supplement it by incorporating also Sanitation.

(target group: Regional Sections of the BMZ) and a more detailed "Project Assessment Manual for Drinking Water and Sanitation Projects in Developing Countries". The latter is based on the principles contained in the present paper and will contain a specific catalogue for collecting and evaluating project data. It is intended as an aid, in particular for consulting engineers and project-executing organisations, to systematise and simplify the planning and assessment of projects.

II. IMPORTANCE OF THE "WATER SUPPLY AND SANITATION" SECTOR IN THE DEVELOPMENT PROCESS

The provision of qualitative safe water[3)] is one of the most important basic human needs. For health reasons, water supply projects must always be planned with a view to water resources assessment and protection and to the disposal of the resulting waste water, of faeces and solid waste; wherever necessary, measures related to these aspects should be included into the scope of the project.

The Federal German Government has set the supra-sectoral target of meeting basic needs (food, drinking water, health, housing, clothing, education) and therefore promotes measures in this sector.

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3) "Safe Water Supply" (World Health Statistical Report, 1976, Volume 29, X, p. 546). Guidelines for safe water are provided in Volume I of "WHO Guidelines for Drinking Water Quality", WHO, Geneva, 1983 (EFP/82.39)

Being particularly orientated to basic needs, water supply and sanitation have acquired special importance as factors of economic and social development and as a result of the increasing population pressure in the developing countries. The traditional way of life and type of economy of the population used to be heavily dependent on locally and regionally available water resources as a result of the clearly apparent interdependence between the natural conditions and the peoples' behaviour patterns. As a result of far-reaching changes in the socio-economic structure of the developing countries, which were either deliberately promoted (colonisation; monocultivation; industrialisation etc.) or which resulted as a consequence (population growth; urbanisation; environmental impacts; dwindling resources; changes in political structures etc.) temporary shortages, with originally only limited effects in terms of duration and affected areas, have become lasting phenomena all over the world. Therefore, the supply of drinking water acquires increasingly a key role in the ability of urban conglomerations and rural regions to survive.

Although they cater to basic needs and have a direct impact on health and performance, water supply, and, in particular, complementary sanitary measures, have not been accorded the appropriate priority in the development process of many developing countries. According to estimates of the World Health Organisation (WHO) in 1981 only

73 % of urban population and
32 % of rural population in developing countries

had access to safe drinking water and only

53 % of urban population and
15 % of rural population

had adequate sanitation facilities. Some experts consider these data to be even overestimations.

The fundamental hazards associated with unsafe drinking water and poor sanitation often lead to intolerable living conditions in urban areas.

This extremely unsatisfactory state of affairs is normally demonstrated by the following circumstances:

- Since only a part of the population in developing countries had access to hygienically safe drinking water, the other population is forced to use unsuitable, often heavily polluted and contaminated water for drinking. This leads to serious health hazards and damages, which are often not recognised, underestimated, or their origin not understood.

- Town centres and priviledged residential areas usually are equipped with water supply systems - even if the water quality and quantity are often inadequate - or have been equipped in the last two decades with such systems, frequently with external support. The urban problem zones and rural areas often cannot obtain sufficient support to improve their drinking water supplies and to promote sanitation.

- The health hazards affecting a large number of people because of the absence of complementary

sanitation measures (liquid and solid waste disposal; hygiene education), frequently become apparent only some time after the water supply improvements. Even today the often disastrous effects of these health hazards are largely underestimated both by the people concerned and by the decision-makers. Moreover, the activities between the executing agencies of water and sanitation projects and the health authorities are frequently not sufficiently coordinated, and curative health measures receive usually higher priority than preventive measures.

Yet, according to findings of WHO, 80 % of all diseases in the developing countries are "water-related", of which a significant proportion is attributable to inadequate drinking water supplies and sanitation installations, and to the absence of hygiene education.

III. TARGETS AND OPPORTUNITIES OF THE "WATER DECADE"

Targets:

On account of the health hazards resulting from the inadequate supply and disposal of water, the United Nations conference of 1977 in Mar del Plata declared the period from 1981 to 1990 as the "International Decade for Drinking Water Supply and Sanitation", setting the following targets to be achieved for over 2 billion people in the Third World by the year 1990:

- to provide all people with a minimum quantity of safe drinking water in urban and rural areas and to

- improve the sanitary conditions by implementing measures for the disposal of waste water, faeces, and solid waste.

That means that a quarter of the urban population and two thirds of the rural population in these countries are to be supplied with drinking water, and about half of the urban population and about three quarters of the rural population are to be provided with basic adequate sanitation facilities. In addition, the existing water supply and sanitation facilities must be maintained and rehabilitated.

Attainability of these Targets:

Assuming the continued application of the non-adapted technologies, frequently found in countries of the Third World, between US$ 500 and 600 billion would be required until 1990 to meet these Decade targets, as estimated by the World Bank and WHO. However, even using low-cost adapted technologies, about US$ 300 billion would be necessary, that is, about US$ 30 billion in each year of the Decade; or that, according to WHO, about US$ 6 billion would have to be raised through external support (actuals in 1981 only US$ 2,175 billion).

Unless appropriate alternatives are chosen in future in the planning and implementation of water supply and sanitation projects, these figures mean that at best 30 % of the Decade targets can be achieved. This does not take account of the fact that a substantial part of the available funds is actually used for re-investment, in other words for the maintenance of existing facilities. In reality, therefore, we are in fact further away from reaching the Decade targets today than we were in 1977.

Deterioration in the Situation:

In many developing countries the situation has deteriorated further as a result of

- the general population increase in conjunction with increasing population concentrations into urban centres;

- the unexpectedly high increase in the overall demand for water, caused in part by a high level of water losses and wastage, and the consequent premature capacity utilisation of existing water supply facilities;

- the sometimes dramatic reduction or even depletion of available resources suitable for drinking water supplies (e. g. as a result of desertification and deforestation; overexploitation and contamination; the absence of water resource management);

- concentration of projects on high-cost, non-adapted supply and disposal technologies; neglect of measures designed to maintain or make better use of such installations; failure to set up efficient executing agencies (including cost-related progressive tariffs, training and payment of qualified personnel);

- the frequently isolated planning of individual projects without the necessary supplementary measures and without involving the beneficiaries concerned (e. g. drinking water supply without liquid and solid waste disposal; water supply and sanitation works without hygiene

education; housing and industrial settlement programs without water supply and sanitation).

Conclusions:

Taking into account that the currently available funds cannot realistically be expected to increase significantly in the years ahead, these must be used more effectively in order nevertheless to bring about a significant improvement in water supplies and sanitation in the developing countries, to reduce health hazards and to meet basic needs. Among other measures, it is therefore necessary to ensure a greater participation of the population in the planning, construction, operation and maintenance of the projects.

For economic as well as technical reasons it is necessary to apply technologies that are as simple as possible and appropriate to the situation in the respective developing country and project region and to reduce the technical standards and water consumption rates (frequently still oriented according to the industrial nations). It is in this context that the process of rethinking that has already begun both in the developing countries and at the donor organisations must be intensified.

IV. NECESSARY ADAPTION OF THE TARGETS

Assuming the continued provision of full conventional water supply systems, as usually implemented in the past, the Decade targets would imply a level of investment for which nowhere near enough financing could be found. This also applies even

if the Decade targets were to be, more realistically, extended to the year 2000, as has already been done by several developing countries. It must be the objective in future to give priority to projects in regions where the drinking water supply and sanitation conditions do not meet even minimum health standards. This applies in particular to problem areas in urban agglomerations and to rural regions.

Decision-makers in the developing countries and donor organisations must ensure, therefore, that the limited economic possibilities on the one hand and the water supply and sanitation requirements as well as the technical standards on the other hand will be attuned better than in the past.

This means that the consumers may have to accept lower, economically feasible supply standards and simpler technologies better suited to the prevailing conditions. This is justifiable especially in view of the fact that in many cases higher water supply and sanitation standards not only serve to improve health conditions but mainly to enhance users convenience. Therefore, all possibilities to improve health conditions by combining hygiene education with adapted technologies should be fully exploited before introducing higher water supply and sanitation standards.

Many technically not adapted systems - including those financed with development assistance funds - become partly or totally inoperable after a short time because of insufficient technically trained operating personnel and/or operating funds, non-existent or inadequate institutional set-ups, or

politically non-enforceable covenants in the financing agreements. Again, these experiences underline the necessity to develop, design and apply technologies - in cooperation with the target groups -, which are adapted as far as possible to the local conditions. In this connection, decentralised systems that can be maintained on the local community level - without permanent government subsidies - should be promoted wherever possible.

V. CRITERIA FOR PROJECT SELECTION AND DESIGN

Project selection will be facilitated if the respective developing country disposes among its development plan of regional masterplans for water supply and sanitation or of a special "Decade Plan".

Care should be taken to ensure that, wherever possible, only such projects are promoted which have rightly been accorded high priority in national development policies and plans, i. e. according to the Decade targets and taking account of specific shortcomings in the field of water supply and sanitation.4)

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4) On the initiative of the United Nations (WHO), plans for the necessary water supply and sanitation measures within the sanitary engineering sector (so-called "Decade Plans") are being elaborated by numerous Third World countries, several of which are being assisted by the Federal Republic of Germany through a special cooperation programme WHO/BMZ/GTZ.

Project selection must be based on assessment criteria that take into consideration existing plans and ensure compliance with basic sector objectives.

The following chapter contains a presentation and explanation of project assessment criteria from a development policy point of view. These criteria are basic requirements that should be taken into account at the time the decision to promote the project is taken; they are therefore to be given special attention by the regional and sectoral sections of the Federal Ministry for Economic Cooperation.

V. 1. Basis for Project Planning and Implementation

V. 1.1 General

Project preparation should lead to an integrated plan of all the measures necessary for the supply of water, as well as the disposal of sewage, faeces and solid waste, which should be agreed upon by the project executing agency and the financing agency. Integrated planning comprises technical design and implementation concepts, planning horizons, qualitative and quantitative development stages, financing, organisation of self-help, training and hygiene education.

The technical project plan must meet the basic water demand of the entire population in the project region. The main components of the project (e. g. water catchment, storage and supply lines) must be designed to the expected demand within a planning horizon of ten to twelve years. In order to reach the overall cost-minimizing solution, the project should be integrated into a long-term masterplan.

Supply standards and total project costs must be appropriate to the local situation and to the economic capacity of the project region, in order to cover, within the limitations of the available funds, the basic water demand of the entire population.

In the preparation of water supply and of sanitation projects existing, and alternative individual, supply and sanitation facilities should be taken into account, as well as the traditional water use habits of the population, in order to ensure acceptance of the future facilities by the people. Project design should provide for staged improvements, so that the population can benefit immediately from low-cost initial measures and is given an incentive to actively support the respective next step of the improvement sequence (e. g. water supply: public standpipe - yard connection - house connection; sanitation: pit latrine - septic tank - sewer connection).

As the project planning stage the maximum possible participation of local qualified personnel and - wherever feasible from the organisational, technical and political point of view - also of the population in developing the basic design concept must be ensured.

The various technical solutions should be adapted to the technological level of the country so that the works can be constructed to the largest possible extent by qualified local labour and with participation of the population - wherever feasible from the organisational, technical and political point of view - and that the operation and mainte-

nance can be taken over by local workers trained for the job.

Therefore, labour intensive solutions (e. g. in the installation of water mains, construction of latrines, utilisation of simple garbage containers) should be applied for implementation and not result in a major increase of investment and operating costs.

In rural areas the water supply and sanitation projects are to be planned and implemented in such a way that operating costs are minimized. Technical installations should be simple enough to allow the users to carry out inevitable repair and maintenance work themselves as far as possible.

Special importance should be attached to the rehabilitation of existing installations and systems - particularly for reasons of economy and protection of resources.

V. 1.2 Preservation of resources

As water resources are limited almost everywhere, the preservation of these resources must be given top priority when planning, constructing and operating water supply projects.

Management and preservation of the water potential are elements of integrated environment planning and are, in the long run, more effective and, as a rule, less expensive than implementing only new water supply and sanitation systems or having to implement later corrective measures of damage repair.

All water resources development schemes must in general be in accordance with national water laws and rights. The drinking water supply must be given priority over all other forms of water utilisation. The steps necessary for the management and preservation of water resources comprise:

- exploration, survey and evaluation of water resources,

- water use planning and actual water utilisation.

Exploration serves to obtain an overall inventory of the available and exploitable potential of surface water (streams and lakes), groundwater (including springs) and other water sources (e. g. precipitation). In order to survey water resources and to prepare water balance plans, stock-taking and sometimes supplementary hydrogeological and hydrological investigations are necessary. The assessment of water resources should furnish data on their location, the economic possibilities and limitations of their utilisation in quantitative and qualitative terms.

Water use planning sets out the possibilities and limitations of resource exploitation in the project region for all types of water uses (drinking water supply, irrigation, livestock, commerce and industry, hydropower, etc.). At the same time, the risks of contamination through domestic sewage/ solid wastes, industry, mining, agriculture, etc. must also be taken into account as a limiting factor. Water use planning should define the technical priorities for the management and preservation of the water resources.

Water use planning must, in principle, include water protection measures (e. g. protective areas for drinking water). In addition to the technical measures, legislative and administrative action must also be provided (for e. g. at water capture structure). The utilisation of surface water for drinking water supplies is to be considered as equivalent to that of groundwater, provided its quality meets adequate standards of hygiene and/or allows application of simple technologies for its treatment and conveyance.

The decision to utilise either the surface water or ground water resource must be made primarily dependent upon economic aspects, taking into account, however, socio-cultural water consumption habits. In order to prevent overexploitation, actual water use must in general be compatible with the long-term renewal of the resources.

When planning and designing water development and supply schemes long-term negative impacts to water resources (e. g. through dangerous sewage) must be prevented.

V. 1.3 Drinking Water Supply

Domestic Water Demand:

The principal objective of water supply projects is to ensure the supply of a sufficient amount of hygienically safe drinking water for basic human needs (drinking, cooking, washing) for all strata of the population.

What is to be regarded as a sufficient and adequate basic demand depends on the water use habits as well as on climatic and cultural conditions. A sufficient basic supply can be achieved with 20 to 40 litres per inhabitant and day (20 - 40 l/cd) (WHO: 30 l/cd).

In general, only those projects should be promoted where the target group of the poorer population strata represents the major part of the beneficiaries. Therefore, projects with a high proportion of public standpipes and individual yard connections enjoy special priority.

When defining supply standards for a specific project area, a supply solely based on public standpipes should normally first be considered. If higher standards (yard connections and house connections) are envisaged for certain consumers or for parts or all of the project area, this must be justified by specific local conditions. The following consumption rates are adequate and eligible from a development policy point of view:

up to 40 l/cd for public standpipes
up to 60 l/cd for yard connections
up to 120 l/cd for house connections.

The distance between public standpipes or other public or semi-public water taps depends on the population density and on reasonable waiting times. In urban areas walking distances from the dwelling of the user should not exceed 300 m. In rural areas a greater distance to the water tap or well may have to be accepted. Even for settlements in arid regions drinking water should be available

within one hour's walking distance. In areas of extreme water shortage the water supply must be adapted to the available resources and limited to the basic demand and may, if necessary, have to be rationed.

Drinking water projects must include all necessary project components, i. e. the water catchment works, treatment facilities (if necessary) and the conveyance to the consumers, as well as preparation of systematic maintenance and the necessary hygiene education. Partial measures are eligible for financial assistance only if the other necessary system components have already been implemented or if the financing of their, preferably simultaneous, implementation is ensured through other sources.

Public Demand:

Water demand of public institutions (community needs), especially in urban areas, must always be covered and the corresponding measures must therefore also be a component of the project. The danger of uncontrollable and excessive consumption of those consumers, however, makes it necessary to employ all appropriate technical measures in the design of the works and installations that will ensure low water consumption volumes and contribute to a reduction of cost.

Commercial and Industrial Demand:

Water supply for commercial and industrial enterprises is indispensable for regional economic development and should therefore be taken into account in the planning of water supply projects.

Because of the higher production cost of water with safe quality, only those commercial water needs which really require potable water quality (food production, water for employees, etc.) should normally be covered by the public drinking water system, provided there are alternative supply possibilities. The production water demand without such quality requirements should, if possible, be covered by a separate water system of the company concerned; nonetheless, requirements of resource preservation should also be considered when granting permission for such separate private water supply systems.

Special Considerations for Rural Areas:

The principle of aiming at a maximum simplicity in the design of water supply projects is of particular importance in rural areas, not only with a view to cost-saving but because of the special difficulties to ensure adequate operation and maintenance of the facilities. This implies depending upon the local conditions construction of simple dug wells or drilled wells - equipped with easy-to-maintain hand-pumps -, of rain water cisterns, or of spring water catchments with gravity lines into the supply area. Motordriven pumps should be used only in exceptional and justified cases not only because of their higher operating and maintenance costs (usually representing foreign exchange requirements) but above all for reasons of environmental protection and safeguarding of resources (excessive grazing in the well catchment area, excessive use of ground water).

In cases of small individual supply systems, such

as simple wells or rain water cisterns, distribution networks should not be installed. Only under special circumstances (spring water chambers connected to gravity lines, single wells outside settlements) simple supply lines can be installed to convey the drinking water to the necessary public standpipes. In very small villages, it may even be sufficient to install a single water tap.

V. 1.4 Disposal of Waste Water and of Faeces

Under every water supply project, the planning should include provisions for suitable disposal facilities for waste water (domestic waste water, possibly also rain water) and for faeces, as well as for the necessary finance. Without proper sewage disposal and sanitation facilities no lasting improvement in the hygiene conditions can normally be attained.

The selection of the appropriate sanitation technology (e. g. latrine, cesspit or conventional sewerage) is determined essentially by the volume of drinking water consumption and the resulting sewage volume. Decentralised solutions should be given preference for reasons of lower cost as well as smaller environmental impact. Installation of conventional sewerage systems is justified only in urban areas with high population densities and large sewage volumes because of the extremely high construction and operating costs. The construction of a conventional sewerage system requires the simultaneous construction of sewage treatment facilities, unless the safe disposal of the sewage can be achieved otherwise. For the treatment of

sewage simple and natural purification processes (e. g. bio-oxydation ponds) should be applied as far as possible.

Latrinisation programmes, as developed by the World Bank/UNDP, are particularly suitable for promotion as they are typical low-cost solutions adapted to local conditions and provide opportunities for users' participation in the construction, operation and maintenance of the sanitation facilities. Waste water disposal and sanitation programmes, too, should be accompanied by supplementary hygiene education campaigns, specifically tailored to the project.

V. 1.5 Solid Waste Disposal

In the interest of environmental protection as well as housing and drinking water hygiene, solid waste disposal requirements should be taken into account as an integral part of the planning for any sanitary engineering project and should cover all strata of the population and settlements in the project. Similarly, storm water disposal projects must take into account adequate disposal of solid waste, even if no drinking water and sanitation measures are planned or carried out simultaneously.

The very different composition of solid waste in developing countries and the traditional processes of collection and treatment (labour-intensive recycling of raw materials; composting) must form part of the planning. A reduction of solid waste

disposal costs should be sought by recycling and subsequent reuse of raw materials (e. g. composting).

V. 2. Preparatory and Accompanying Measures

Hygiene education campaigns, institution-building support activities and training of technical staff must be included in line with local requirements as integral part of all water supply and sanitation projects.

V. 2.1 Hygiene Education Campaigns

Supplying drinking water and implementing sanitary measures have a direct impact on public health in the project areas.

In this connection, one of the most important aspects is the timely and comprehensive information of the target groups, especially the women, about

- the importance of safe water for their health;
- the necessity to actually and exclusively use the new supplies of safe water;
- the proper hygienic use of the drinking water (protection of the new water catchment works against human and animal pollution; utilisation of clean vessels for drawing and storing water; observing the danger of qualitative deterioration of stored water);

- the required supplementary installation and use of sanitation facilities.

Without hygiene education campaigns, drinking water projects may even have negative effects on the health situation of the target group, because the consumption of safe water reduces the traditional immunity against certain diseases. Thus, when again drinking contamined water afterwards, the risk of acquiring a serious disease will be much higher than before. Hygiene education campaigns should be conducted by qualified persons, preferably coming from existing institutions within the primary health care system.

The participation of the people in the planning, construction, operation and maintenance of water supply and sanitation projects is designed to ensure in the long run their acceptance of the new facilities and to contribute towards decisively improving the efficiency and prolonging the life of these facilities.

V. 2.2 Project-Executing Agencies

Qualified and efficient executing agencies are an essential prerequisite for the success of water supply and sanitation projects. Because of the interdependence of water supply and sanitation both should, if possible, be under the responsibility of a single executing agency; this does not necessarily also apply to solid waste disposal.

The executing agencies should be invested with clearly defined responsibilities and should have a

technical capacity - with a potential for further improvement - to organise the planning, implementation, operation and maintenance of the facilities. Should, however, the responsibility for planning and construction be vested with other organisations, the operating institutions should be involved in the design and construction of their future installations. The executing agencies should be as independent as possible and able to employ local operating staff on appropriate wages. It must be ensured that water/sewage charges are in fact collected and, to the maximum extent, used by the executing agency under its own responsibility.

Where no suitable executing agencies are available or not yet sufficiently effective, this must be remedied, prior to the commencement of construction, if necessary by means of advisory and training measures. Particular attention should be given to practice-oriented institution-building advisory services to executing agencies on organisation, technology and financial administration. This applies especially to advisory measures on operation and maintenance.

V. 2.3 Tariff Policy

As a matter of principle, cost-covering charges should be aimed at for water supply as well as for sewerage/sanitation. At least, actual effective income must cover all running expenses (operating and maintenance costs, small replacement expenditures) of the project and/or of the executing agency.

Projects in which present revenues do not comply with this requirement because tariffs are too low or collection systems inefficient, are eligible for financial assistance only if the necessary tariff increases and improvements of collection systems and financial administration management can realistically be expected to be enforced.

If no charges have so far been levied for the provision of drinking water, a flat rate should at least be introduced in a first stage (e. g. fixed charge per inhabitant or household supplied with water) as a contribution towards the project cost. Here, too, however, consumption-related charges (per volume of consumption unit) should be sought as this is an economic prerequisite for a sound financial management by the executing agency which would ensure cost recovery. Furthermore, also at standpipes water should be delivered only against payment of a charge. However, especially in rural areas, the consumption charges can partly be substituted by an appropriate contribution (in money or labour) by the consumer to the construction cost.

Above-average tariffs should be levied for water consumption exceeding basic requirements. Through application of progressive tariffs the marginal costs of supply and disposal of these water quantities can thus be borne fully by the users; in addition, such a tariff system can provide the basic for cross-subsidising insufficient cost recovery from problem areas. Tariffs for large industrial/commercial consumers must ensure full cost coverage of their consumption.

The rationale for aiming at steeply progressive tariffs follows from several reasons:

- they ensure a more economical utilisation of water resources which are scarce in many developing countries;

- they reduce undesirably large waste water volumes and contribute thus to avoiding rather costly conventional sewage collection and treatment systems and to protecting the environment; they also prevent a further deterioration in the hygienic conditions resulting from excessive amounts of waste water;

- they permit a "cross-subsidisation" for socially legitimate cost recovery shortfalls resulting from provision of basic water quantities.

In some developing countries (in particular LLDCs) neither a full cost recovery (operation and maintenance, depreciation and adequate interest return) nor even a covering of running expenses through collection of charges will be economically feasible in the short and medium run. In these cases it must be ensured that external financial support covers, during an initial phase (up to five years), also the cost of supply of spares and operational requirements, as well as part of maintenance costs, provided the executing agency is willing and able to gradually assume an increasing financial share itself.

Cost-covering sewerage tariffs must be introduced if the level of water consumption requires waste water disposal via a conventional sewerage system.

Here, also tariff structures should be developed along the same lines as for water supply. It is desirable that the water supply agency is also responsible for collecting the sewerage charges.

Even if, in the case of individual private sanitation facilities (by means of a latrine, cesspits, etc.), the executing agency incurs no expenditures for construction it should perform - in the interest of public health - advisory and supervisory functions during planning, execution and maintenance of the facilities.

Tariffs for solid waste disposal should be levied per inhabitant and dependent upon the type of disposal. In countries where, because of the low per capita income, charging of each household is unrealistic, other types of revenue, geared to the interest of the general public (e. g. in the form of land tax) must be ensured for the executing agency.

VI. CONCLUSION

In view of the limited financial means and especially the marked shortage in foreign exchange of most developing countries, and also of the limited funds available to this sector under external development assistance, it is apparent that only a part of the "Decade" targets can be achieved. This implies, that in future only those projects can be assisted, which are in line with the targets and criteria laid down in this Sector Paper and thus attain the largest possible developmental impact.

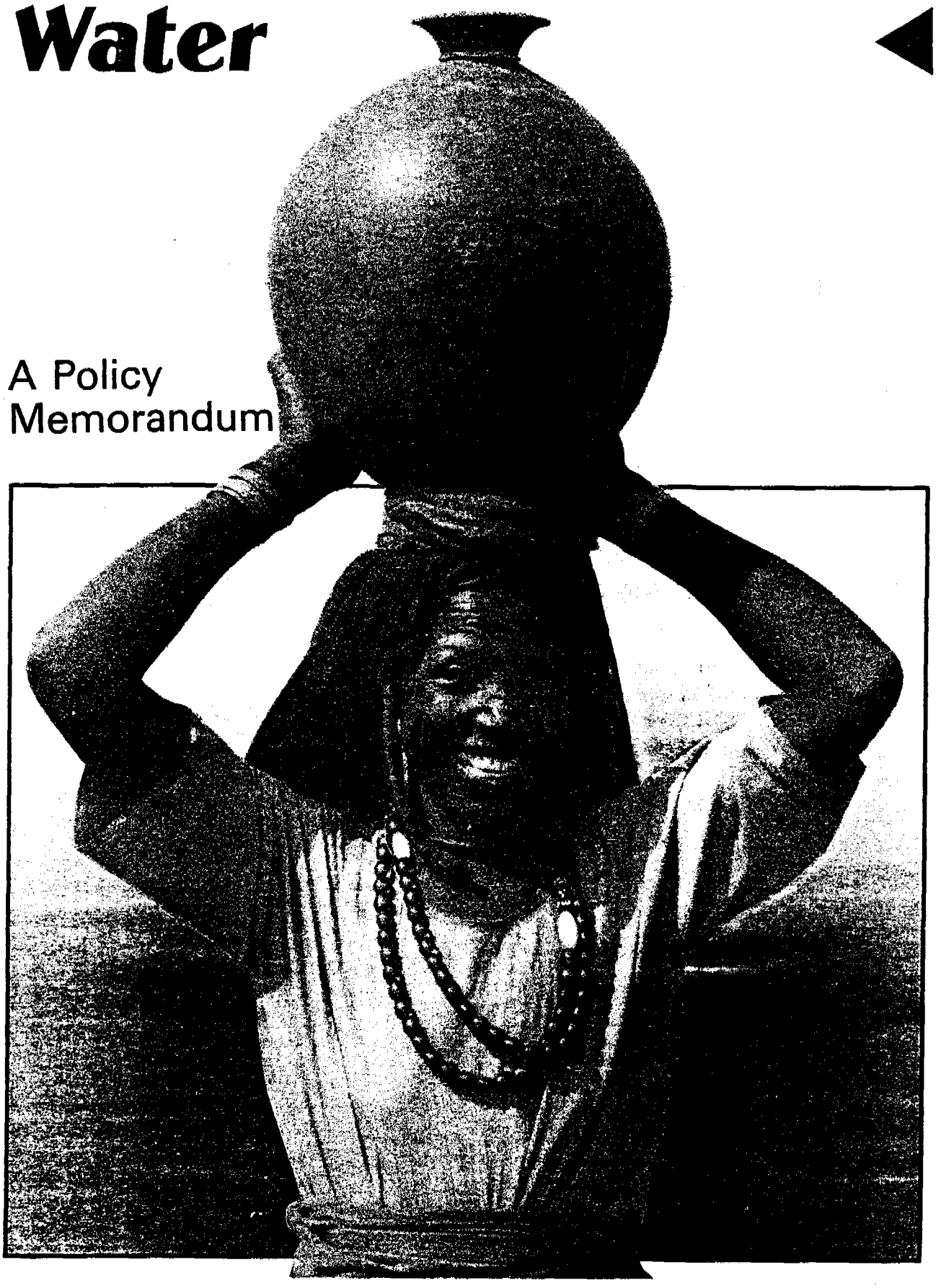
In the future, the guiding figures presented in this Sector Paper and in the list of Project Assessment Criteria should, as far as possible, also be enforced - for economic reasons - vis-à-vis the decision-making bodies in the developing country and should be persued vis-à-vis other donors in the case of joint negotiations.

Finally, reference is again made to the "Project Assessment Manual for Drinking Water and Sanitation Projects in Developing Countries", which should be taken into account additionally in project preparation and implementation.

DUTCH COOPERATION

Water

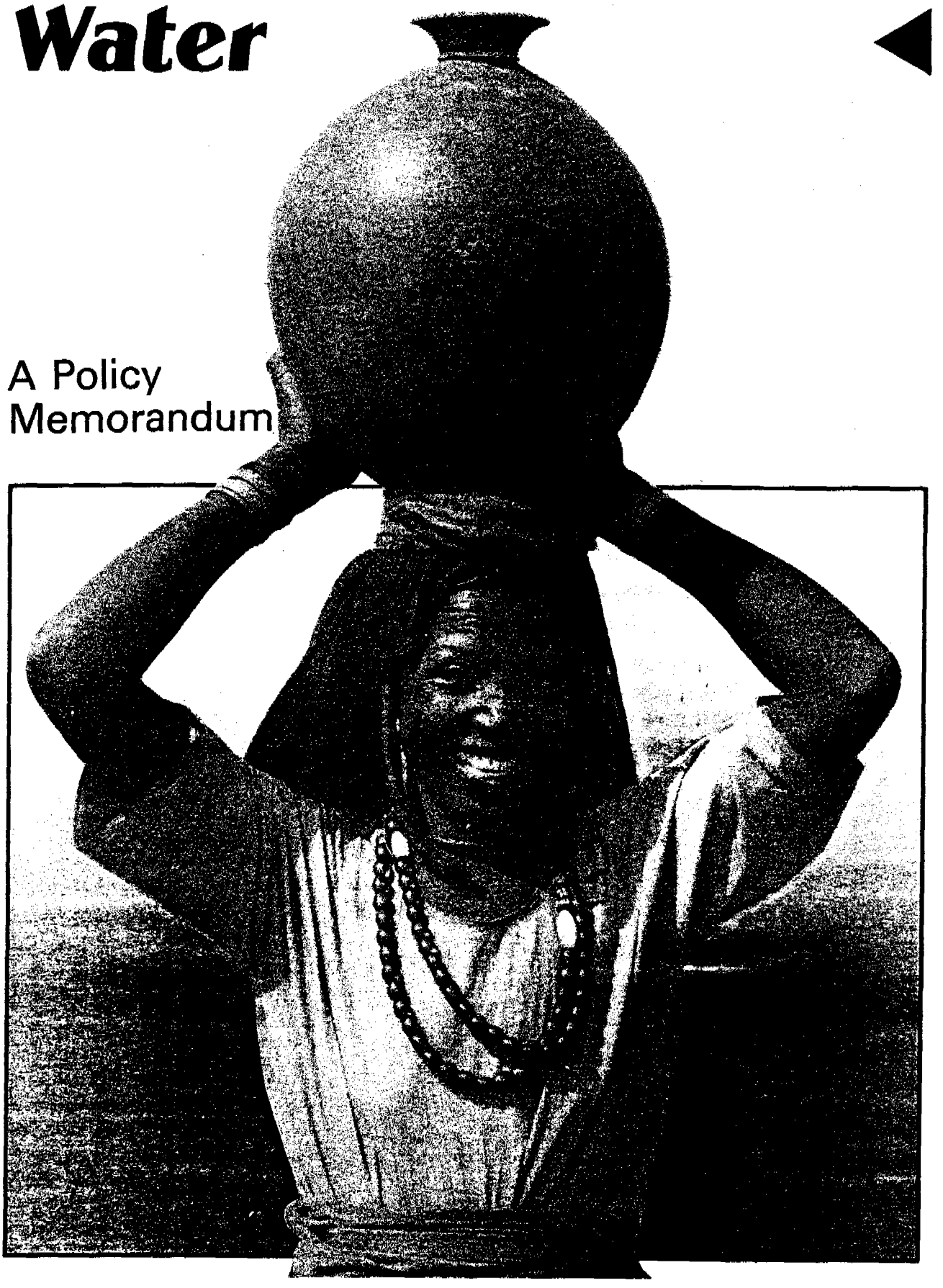
A Policy Memorandum



DEVELOPMENT COOPERATION INFORMATION DEPARTMENT OF THE NETHERLANDS MINISTRY OF FOREIGN AFFAIRS

Water

A Policy Memorandum



DEVELOPMENT COOPERATION INFORMATION DEPARTMENT OF THE NETHERLANDS MINISTRY OF FOREIGN AFFAIRS

DRINKING WATER SUPPLY, SANITARY FACILITIES, DRAINAGE AND WASTE DISPOSAL

in

DEVELOPING COUNTRIES

SECTOR MEMORANDUM

February 1989

CONTENTS page

1. INTRODUCTION

The provision of good quality drinking water in sufficient quantities and the hygienic disposal of waste water and of solid waste are two basic preconditions for achieving a reasonable standard of living, good health and economic progress. These conditions will be satisfied only if there is a reliable supply of water close at hand and effective sanitary facilities. In addition arrangements are required for the disposal of polluted surface waters, household waste water (including excrement) and industrial waste water. These technical facilities, together with facilities for the disposal of solid waste, are termed D/S facilities.

A reliable source of water is required not just for human consumption, but also for the industrial processing of agricultural products. There is also a significant demand for water for other industrial purposes; in urban areas, industrial and commercial use can amount to as much as 40% of total consumption. The same applies to waste water, which can pose complications for the surface water or ground water into which it is discharged, or for purification plants.

Recognition of the need for reliable D/S facilities led the United Nations in 1977 to declare 1980–1990 the International Water Decade. In this context the World Health Organisation (WHO) drew up a forecast of the total requirement in 1990, in which year it estimated that D/S facilities of an acceptable standard would be needed for three billion more people than in 1979. At a very rough estimate, this would cost between 300 and 600 billion U.S. dollars. Taking the lower of these figures, average annual expenditure during the decade would need to be five times as high as the amount spent in 1979 on D/S facilities.

A requirement for facilities on this scale and hence for work in the form of preliminary studies, planning, design, implementation and the transfer of knowledge and experience, including management and maintenance, meant that the stated aim of the decade was more of a challenge and a stimulus than a feasible, concrete objective.

There remains every reason for such an incentive: many people in developing countries, in both urban and rural areas, lack minimal D/S facilities. In 1970, 35% of the urban population and as much as 87% of the rural population had to make do without a proper water supply. In the case of sanitary facilities, the figures were 46% and 91% respectively. A certain amount of progress had been made by 1980, but 26% of the urban population and 67% of rural inhabitants still lacked safe drinking water, while 50% of urban dwellers and 87% of the rural community had to do without proper sanitary facilities. Apart from the common lack of proper facilities in working order, growing population pressures in both rural and urban areas have meant that existing facilities have become increasingly polluted or inadequate.

Inadequate or polluted drinking water and unhygienic sanitary facilities are to a significant extent responsible for the high morbidity and mortality rates in developing countries. According to estimates made by the World Health Organisation, 80% of all diseases are related to lack of water or use of contaminated water or stem from a lack of knowledge of elementary hygiene. In dry areas, for example, women – who always bear responsibility for household management and nutrition – may have to fetch water from a considerable distance. In other areas where water is closer at hand it may be heavily polluted, for example because open water is used as a latrine or because the water contains bilharzia or as a consequence of industrial discharge.

As a stimulus, the International Water Decade has been effective. Notable progress has been made in the D/S sector as a result of large-scale efforts in recent years, most notably in the developing countries themselves, where non-governmental organisations (NGOs) and the national authorities have assigned high priority to the D/S sector. The large-scale deployment of resources by national governments and substantial efforts on the part of the many NGOs, combined with numerous initiatives by users, have resulted in a particularly rapid increase in the construction of facilities. In financial terms, the developing countries are estimated to have funded two-thirds of the total costs themselves.

The international community has provided substantial support for these initiatives in financial, material and professional terms. The Netherlands too regards the D/S sector as one of the priority areas of its development-cooperation policy: in recent years the Dutch contribution to D/S activities has been running at between 100 and 150 million guilders a year.

The results of these efforts are impressive. In developing countries between 1980 and 1985, in both urban and rural areas, 300 million more people gained access to improved water supplies and 140 million to improved sanitary facilities.

The slogan adopted for the water decade, "WATER FOR ALL," has therefore worked as an incentive, but this ideal will not have been achieved in 1990. On the contrary: it is estimated that there were even more people in 1985 than in 1980 without proper D/S facilities; the first half of the decade has barely kept pace with the growth in demand for facilities. One of the reasons has been that the economic recession and debt crisis have meant that less money has been made available in recent years than envisaged when the Decade was declared in 1977. In addition the population has been growing rapidly in many developing countries, with the result that facilities have become overloaded and polluted.

A major source of concern in international consultations has therefore been the need to find new ways of sustaining and increasing the momentum with respect to both the construction of new facilities and the improvement of existing ones – apart from which

it is evident that many facilities rapidly fall into disuse through poor maintenance and management. Finally, studies have shown that the construction of improved D/S facilities is not sufficient in itself to bring about a reduction in water-related diseases. Equally as important are good hygiene in relation to the facilities and the optimal use of facilities. These latter aspects are promoted by campaigns to stimulate the level of participation and to provide information and education on proper use and hygiene.

The growth in awareness during the Decade of these and other problems has formed the subject of regular international consultation on sector strategies and concepts. These consultations have resulted in a number of recommendations which are also of relevance for the D/S activities supported by the Netherlands.

These considerations provide the background to this memorandum, which is primarily intended for use in the Netherlands for the formulation of sound policies in this sector and for the compilation of handbooks for the planning, design and implementation of projects or programmes within that sector financed or co-financed by the Netherlands. The document also serves by way of background for consultations with governments and organizations in host countries. Thirdly, it has been written with a view to consultations with other donors and U.N. agencies concerned with or active in this sector; such consultations are particularly important for donor coordination, which can significantly increase the effectiveness of joint efforts.

This memorandum, which is set in the context of Dutch development cooperation policy in the fields of health care and rural development, is designed to stimulate the development of:
- general policy proposals - manageable goals and hence - practical guidelines.

2. PROGRESS AND PROBLEMS

Despite the fact that the construction and management of new D/S facilities and the improvement of existing facilities have lagged behind the growing demand, considerable progress was recorded during the International Water Decade.

In the first place, there is a much greater recognition that the availability of proper D/S facilities within walking distance is essential for attaining a reasonable standard of living and good health. Secondly, new and standardized designs have been developed which enable comparatively inexpensive, technically straightforward facilities to be constructed and maintained on a large scale. Another important factor has been the greater insight into a number of problems (of a non-sector-specific kind) such as:
- optimal participation by users;
- the setting up of D/S organizations for management and maintenance;
- financial self-sufficiency, depending on whether the facilities are run along public or private lines;
- the tendency to concentrate on drinking-water supply while underestimating the need for sanitary facilities, drainage and waste-water disposal;
- lack of coordination between national agencies, donors and multilateral organizations, and
- coordination with other relevant sectors such as rural development, health care, agriculture, manufacturing and rural industry.

Although much has been written on these subjects, there remains a marked demand for detailed and factual documentation on successful large-scale activities in such fields as community participation and the organization and financing of maintenance and repairs.

The following sections examine some of the general views on these problems. The sections broadly follow the recommendations drawn up by the Development Assistance Committee of the OECD and the WHO, which were in turn the result of intensive international consultations between the UNDP, WHO, World Bank, UNICEF and a large number of bilateral donors.

2.1 User participation

Experience has shown that where D/S facilities are provided without organized support and involvement on the part of the user community, the facilities soon break down and will not be used to best effect. The result is a low rate of return, e.g. on the health status of the beneficiaries.

User participation is designed to help ensure that the improved facilities will be used effectively and to maximize the improvement in living standards. This can be achieved

by involving the users in planning, implementation and maintenance. The community of users and the authorities will then share responsibility for the facilities, and the likelihood that the facilities will be properly used and looked after will be enhanced; rapid deterioration and frequent and often unnecessary repairs can be avoided. In order to avoid misunderstandings, however, clear agreements about the nature of user participation need to be reached between the authorities and users before a project is embarked upon.

Particularly important is participation by female users, since it is women who are primarily responsible for obtaining water and for domestic hygiene. It is also important that women participate in the management of D/S facilities, e.g. as members of maintenance committees or even as maintenance engineers.

User participation will be possible only where national policy permits. In a number of developing countries, the policy is for the central government to supply basic water facilities to the population free of charge. Active involvement on the part of users is not required in these countries, and the assignment of co-responsibility to users requires a change in national policy. This is a structural matter, in the sense that such a switch in policy necessitates the reformulation of responsibilities from user level right up to and including national level. With the support of such organizations as the UNDP, WHO and the World Bank, a large number of countries are in fact preparing for and implementing policy adjustments of this kind and are reformulating responsibilities and making the necessary organizational adjustments.

In those countries where user participation is encouraged, the nature and scale of community involvement are increasingly being taken into account from the planning stage onwards. Prior to the compilation of the project plan itself, a start is made with the education and mobilization of the users at the same time that the technical feasibility of the project is being evaluated. Increasingly, preliminary socio-economic studies are being carried out to assess the extent to which users might be able to help in preparation, implementation and maintenance. Education, information and mobilization, and the socio-economic research are often referred to as the 'non-technical' activities.

Upon completion of the feasibility study and the socio-economic research, consultations are held with the users concerning the results, including the most appropriate technique, desired locations of the facilities and the division of responsibilities between the various bodies concerned, etc. Actual implementation of the project does not get under way until these consultations have been completed.

In the case of the non-technical aspects a number of options are available. In some projects, special, temporary socio-economic units are set up for the duration of the project. A second, increasingly popular option consists of calling in a specialized NGO.

Alternatively responsibility for the non-technical side may be assigned to a specialized ministry, e.g. Community Development or Health. Finally, additional tasks may be assigned to the body responsible for the technical side of the project, e.g. the Ministry of Water. In all cases, it is fair to say that the continuing and careful coordination of the technical and nontechnical sides is required for participation to be a success.

2.2 Organizations

National organizations and agencies responsible for D/S facilities are often not properly equipped to handle the numerous and rapidly increasing activities in the D/S sector.

In deciding how to use their own financial resources or funds obtained from abroad (e.g. from multilateral development banks), many developing countries assign priority to the construction of facilities in urban areas. Bilateral Dutch activities tend to concentrate more on the construction or improvement of D/S facilities in rural areas or on the periphery of intermediary, regional towns. In both cases the use, maintenance and repair of D/S facilities will generally be the responsibility of the national D/S agencies.

National D/S agencies tend to have a limited executive capacity. Lack of trained staff and poor management, in combination with insufficient or poor materials, hold back the pace at which D/S facilities can be constructed. Large projects financed by one or more donors therefore often make use of a temporary project organization which is then phased out some time after the project has been completed (usually after several years). Many D/S facilities have been constructed in this manner, but it is a system that does little to build up local executive capacity.

D/S facilities constructed by a temporary project agency are normally handed over (within a limited period) to the national body responsible for utilization, maintenance and repair. Generally speaking these national organizations will be unable to take on additional tasks on account of staff shortages and budgetary constraints.

The delegation of responsibilities down to and including user level can appreciably ease the burden on national bodies at central level. The delegation of responsibility depends, however, on the complexity of the technology. Maintenance and repair are possible at village level only where the technology permits, besides which the village will need the necessary equipment and parts. These form the central objectives of the Village Level Operations and Maintenance concept (VLOM). Inspired by this concept, a number of hand pumps have been developed which are now being installed on a large scale. These hand pumps are primarily intended for application in rural areas and sparsely populated localities, but are also being used in poor urban districts. Under the VLOM approach, the government's role, in terms of both construction and maintenance, can be

kept limited to that of advisor and where necessary sponsor. For the government to exercise these supporting functions properly, however, up-to-date and reliable information is required on operational aspects of existing D/S facilities, so that the user can be accurately advised of the costs of usage and maintenance, wear and tear and the need to replace components, etc. Such information is still largely lacking, but cost-effective methods for gathering operational information are at present being developed and introduced.

Generally speaking, technically complicated and ramified urban facilities lend themselves less well to decentralized utilization and maintenance. In most cases these aspects are handled by semi-government agencies or public utilities. In order to promote efficient management and to establish a more direct relationship between costs and income, vigorous efforts have been made in recent years to privatise the running of these facilities. Examples include the PDAM enterprises in Indonesia and the Water Corporations in a number of African countries. In order to meet the marked requirement on the part of these new enterprises for training and support in such fields as management, administration, financial matters and technical training, a number of 'twinning' arrangements have been established in recent years between D/S companies in developing countries and Dutch public utilities.

2.3 Cost effectiveness and financial self-sufficiency

It is essential for investments in the D/S sector to be costeffective. Cost-effectiveness is established by means of a analysis, in which a distinction is drawn between the financial, economic and social effectiveness of the costs. Various calculation models and quantitative yardsticks have been developed for cost-effectiveness analysis. These models and yardsticks are also used in the D/S sector, especially for companies supplying drinking water.

A second basic requirement for the sustained development of the D/S sector is that capital costs (= interest and depreciation), operating costs (= costs of usage) and maintenance costs (= repair costs) must be covered. The capital costs of D/S activities are generally funded in whole or in part in the form of investment capital provided by external development banks or donors. Operating and maintenance costs are normally charged to the users and the national D/S agencies.

Capital, operational and maintenance costs vary greatly, depending on the technique in question, local factors and the number of users per facility. The World Bank regularly publishes cost figures for a large number of countries. These reveal that the capital costs of a well plus hand pump serving between 50 and 300 people are between 20 and 60 guilders per head. Piped water systems with public standpipes cost between 60 and 120 guilders a head and piped systems with house connections between 120 and 220 guilders a head. Consumption costs also vary markedly. In the case of hand and foot

pumps and latrines, the costs are negligible. Where motorised pumps are used, however, labour and energy costs can drive the price up to between 10 and 50 guilders per head per year. Similarly the utilization costs of sanitary facilities vary considerably, depending on the technique. Sewerage with full-scale water purification can cost up to 40 guilders per head per year. The repair and maintenance of water facilities cost in the order of 1 guilder for a hand pump; 3 guilders for a standpipe, and 5 guilders for a house connection.

In practice many national D/S agencies find themselves unable to cover the interest payments on loans. Even the operational and maintenance costs often form too heavy a burden for the national D/S agencies: charges are often too low, while the collection of payments is often patchy. This may mean that fuel for the motors or essential spare parts can no longer be afforded, so that the D/S facilities operate only intermittently or lapse into premature disuse. It is, however, essential for the costs of utilization and maintenance to be met in all cases and from the outset by the responsible national D/S agencies or by the consumers/users. Interest payments on the investment capital could be paid in the longer term.

Experience has shown that the users of improved facilities are willing and able to contribute towards the costs of construction, utilization and maintenance, particularly if the facilities are satisfactory and if the charges are set at a reasonable, i.e. income-related level. For the lowest income categories, the guideline is sometimes used that the total costs of utilization and maintenance should not exceed 3% to 5% of household income. It may also be possible for users to contribute in kind, for example by supplying unskilled labour or locally available building materials. They may also be able to carry out simple repairs and/or to assume co-responsibility for careful and responsible use.

Final decisions about the financial and other contributions of users, the provision of grants by the national government and the implications for the selection of the technique will of course need to be taken in close consultation between the users and the national D/S authorities.

The total costs and the choice of technique will depend to a significant extent on the location of the D/S facilities, i.e. whether they are being installed in a densely populated urban area, a less densely populated regional centre, a village or in sparsely populated rural areas.

Urban areas

Urban D/S facilities are concentrated in a small area. The utilization of hand pumps in combination with latrines is generally inadvisable, since the latrines can pollute the wells from which water is drawn. Generally speaking, however, the poorest population groups in urban areas will be unable to pay for the operational let alone the replacement

costs of a public mains system or central sewerage. To enable these groups to be reached, urban facilities require:
- the development of a national policy under which all population groups, including the urban poor, are provided with proper D/S facilities;
- the introduction of a progressive system of charges for wealthier user groups, with relief for poorer users.

Rural areas
The rapid growth in population in thinly settled rural areas means that existing (often traditional) water facilities become overloaded, that water quality declines and that people have to fetch water at a greater distance. Rural communities are well aware of the consequences of these developments and usually attach high priority to the improvement of drinking water facilities. With the exception of gravity-feed systems, mains networks are not generally suitable for sparsely populated rural areas. The construction costs are high and an effective organizational infrastructure is required for the management and utilization of the facilities, while maintenance is elatively complicated and requires well-trained engineers, properly equipped work shops and a wide range of spare parts.

For these reasons, simple and inexpensive techniques, such as hand pumps and straightforward distribution systems based on gravity feed, are much to be preferred in sparsely populated rural areas. The construction and maintenance of such facilities can be handled by the users themselves. These techniques have, however, only a brief history of being applied on a large scale, and utilization and maintenance systems remain the subject of widespread experimentation, especially in rural Africa. In some countries, repairs are carried out free of charge by the D/S agencies at district level. In other countries repairs are carried out against payment by specially trained independent specialists. Some of the specialists are paid by the users of a water system for each repair carried out, while others are paid a monthly salary. The collection of money for utilization and maintenance also varies. In some cases money is specially collected each time a repair is carried out, while in other cases the users make a monthly contribution to a water fund. Generally speaking, the arrangements for collecting funds and making payments will need to be worked out in close consultation with the users or their representatives.

2.4 Techniques and local manufacture

Technically complicated and expensive D/S facilities have proved unsuited for large-scale application in poorer developing countries. Considerable and successful efforts have been made in recent years to develop simple and affordable techniques.

The most important technological advances have been made in the field of hand and foot pumps. The Netherlands has also made a significant contribution in this area.

Many types of hand and foot pumps, including direct action hand pumps and easy to maintain hand pumps, have been placed in production and hundreds of thousands of hand and foot pumps are being installed annually. New techniques for sinking wells have also become available, e.g. manual augers. Similarly a number of variations have been developed in the field of sanitary facilities, e.g. Ventilated Improved Pit (VIP) latrines, composting latrines, 'pour-flush' latrines, and so on. A number of simple techniques have also been developed for the disposal and purification of waste substances, such as small bore sewers and biogas plants.

Since they are technically straightforward, a number of the recently developed facilities are now being manufactured in developing countries, e.g. various hand and foot pumps, shallowwell augers and latrine steps. By permitting only a limited number of manufacturers within a given country, the range of facilities available in the open market can be kept down and local manufacture can contribute towards standardization.

The commercial viability of local manufacture depends however on a number of conditions. Import duties on raw materials and sales taxes on the end-products will need to be set at levels that enable local goods to compete against imported products. Local producers will also need sufficient hard currency to buy the necessary raw materials. In setting up local manufacturing plants, the desirability has also emerged of limited expert assistance in such fields as management support, quality control and product development. In recent years a number of local joint ventures have been set up and there has also been an increase in local manufacture under licence.

2.5 Uneven development

Drinking-water supplies have traditionally been the main focus of attention in the D/S sector; sanitary facilities, drainage and solid-waste disposal have received less priority, on the basis that responsibility for the construction and maintenance of sanitary facilities is primarily a matter for households. In addition the costs of sanitary facilities (especially sewerage) are high and special organizations are required for the purpose, while given a choice, users generally give preference to improving the water supply over sanitary facilities, since drainage and solid-waste disposal are generally less urgent problems in rural areas.

The demand for proper sanitary facilities, drainage and waste disposal is, however, increasing, partly because the problem of pollution is becoming more acute in and around urban areas, and partly because information and education activities on the technical possibilities have stimulated interest in improving sanitary facilities. In addition, the development of cheaper techniques has brought the improved facilities within the financial reach of poor population groups.

A significant handicap for balanced sectoral development is the fact that separate organizations (including the Ministry of Water, Ministry of Health and municipal agencies) are generally responsible for the individual sectors of drinking-water supply, sanitary facilities, drainage and solid waste disposal. The balanced provision of these facilities therefore depends on establishing effective coordination between the various bodies concerned. This is more easily said than done.

Effective coordination between the various bodies responsible for water supply, sanitary facilities, drainage and waste disposal in therefore a pre-condition. Examples of integrated and coordinated urban projects supported by the Netherlands include the Kanpur/Mirzapur project in India, the Integrated Urban Infrastructure Development Project in Indonesia and the Integrated Urban Water and Sanitation Project in Rada, North Yemen. Examples of integrated projects in rural areas are the drinking-water and sanitation projects in Morogoro/Shinyanga, Tanzania and in various states in India.

Although it is still too early to measure the effect, it may be assumed that living standards and health will benefit more from this integrated approach than from an isolated improvement.

2.6 Coordination and Cooperation

Coordination and cooperation among donors, between donors and national agencies and between the D/S sector and other sectors often leaves a lot to be desired.

Thanks partly to regular international consultations (such as those organized by the DAC), there has been a considerable improvement in coordination and cooperation among donors in recent years. Sector strategies have been developed that are gradually finding their way into sector policy plans in many donor organizations. The continuation of such coordination and cooperation, even once the Water Decade is over, will be to the benefit of the sustained development of the D/S sector.

At national level, coordination and cooperation between the national government and donors and between the various agencies responsible for the D/S sector is of course primarily a matter for the national government. During the Water Decade, consultations on sector policies and strategies have been initiated between national D/S organizations and international bodies such as the WHO, UNDP and the World Bank. In certain countries, the national D/S agencies have been helped by the Sector Development Teams of the World Bank/UNDP to draw up sector investment plans.

In a number of countries, Regional and Country Sector Strategy Workshops organized with the aid of the WHO or bilateral donors have led to necessary adjustments in national policy and sector strategies. An example was the Arusha seminar (1986) in

Tanzania, which explored in detail the delegation of responsibilities from national to district level and user participation.

The D/S sector cannot be viewed in isolation; developments in this field have implications for other sectors, such as health, the environment and productive capacity, while conversely developments in other sectors can have a major impact on the D/S sector.

- agriculture: the large-scale extraction of water for industrial or agricultural purposes - especially irrigation can seriously reduce water reserves, and hence pose a threat to drinking-water supplies. The increasing demand for water makes the effective management of the available water supplies all the more important.
Sound management requires a knowledge of water reserves - which are rapidly being depleted - and extraction techniques. In countries such as Indonesia and North Yemen and in the Sahel, the need for such knowledge is often acute.
- the environment: the large-scale withdrawal of water from limited water reserves and discharges of polluted waste water can affect the environment. Examples include desertification, serious forms of surface-water pollution and the salination of ground water resulting from the intrusion of sea water. Measures to control or prevent this degradation and pollution of the environment will need to be taken in good time.
- physical infrastructure: improvements in D/S facilities generally have the most impact on welfare and health if they are coupled with improvements in living conditions and general economic progress.
- health: primary health care and to a much lesser extent curative health care are complementary to D/S facilities. Effective primary health care enhances the effectiveness of activities in the D/S sector.

3. DUTCH INVOLVEMENT, PRINCIPLES, OBJECTIVES AND GUIDELINES

3.1 Involvement

The Netherlands has taken an active interest in the improvement of D/S facilities in certain developing countries for some time now; in recent years it has allocated 100–150 million guilders a year to the D/S sector.

Apart from the financial contribution made by the Dutch government, many institutes, educational establishments and agencies are also involved. There is a growing interest within the non-governmental sector to help develop this sector by means of commercial and industrial contacts.

The Netherlands supports numerous and varied D/S facilities in developing countries, ranging from one-off projects with a specific aim (e.g. conducting a groundwater survey in a particular area or the secondment of a specialist to a national D/S agency) up to and including the preparation and implementation of a multidisciplinary and integrated project in which water supply, sanitary facilities, surface-water drainage and waste disposal form integral elements in addition to the provision of information and education on hygiene and optimal utilization. Money is also provided to help provide spare parts, equipment and other materials.

3.2 Principles

The Netherlands will continue to devote its specialist expertise and such resources as it can to the D/S sector. Because those resources are limited, choices have to be made. In this respect the following considerations and criteria will apply:
- the allocation of priority to countries with which the Netherlands has a long-standing development relationship, namely the programme countries and regions, as they are known.
- in consultation with the host government, and with the latter's agreement, preference will in appropriate cases be given in programme countries or regions to limited areas (e.g. regions, districts, regional centres and small towns).
- activities supported by the Netherlands will be consistent with the policy framework and development plans for the D/S sector of the local partner(s) and the Netherlands. Where such frameworks and/or plans are lacking, their development will be encouraged. Where possible Dutch support will be provided for an extended period. Before a project is commenced, the objectives, various activities, actors and the financial, material and professional input of the various parties concerned will normally be described and agreed.
- D/S facilities will as far as possible lead to concrete, quantifiable results. Preparatory activities and studies e.g. into the need on the part of a particular population group for improved D/S facilities or into the availability of groundwater reserves – will qualify

for Dutch support where these activities can be followed up by a concrete project – activities supported by the Netherlands should enhance the potential for autonomous sectoral development. Dutch assistance will therefore be geared towards local capacities in the sector in question. The transfer of knowledge and demonstration will remain key elements in Dutch assistance.

3.3 Objectives

The overall Dutch objective in supporting the D/S sector is to contribute towards a lasting and effective improvement in the living conditions and health of primarily the poorest population groups in rural areas, regional centres and the intermediate towns.

Specific objectives relate to improving the quantity, quality and/or accessibility of drinking-water supplies and sanitary facilities. Other activities in this sector include the responsible utilization and management of ground water and surface waters, measures to improve the recovery and/or purification of waste substances, and steps to prevent or reduce environmental pollution.

3.4 Guidelines

Two of the central, overall objectives of Dutch policy are durability and effectiveness. A detailed account was provided in Chapter 2 of factors affecting durability and effectiveness, e.g. participation, institutional support, financial self-sufficiency, coordination and sound management. Needless to say the emphasis on individual factors will vary greatly from locality to locality; in some cases active participation will be a central concern, while in others the focus will be on training and development of institutions or on promoting coordination between various collaborating agencies, e.g. by setting up a Steering Committee.

A careful examination will be needed in the case of each project to determine which aspects require special attention (e.g. participation, covering costs or coordination), and what form that attention might take in practice, e.g. preparatory studies or the development of guidelines for funding and maintenance.

With respect to the factors outlined in Chapter 2, the following general Dutch guidelines apply.

3.4.1 Community participation

The Netherlands recognizes the importance of active participation by users from the preparatory stage up to and including the utilization and maintenance of D/S facilities.

The Netherlands recognizes that changes in national policy will be required in a number of countries in order to permit effective user-participation. A number of developing countries are being successfully assisted in this field by the WHO and the World Bank. Where possible activities of this kind will qualify for Dutch support in countries where the Netherlands is involved in the D/S sector.

With respect to D/S facilities supported by the Netherlands, it will in principle be assumed that the users will play the fullest possible role in planning, implementation and especially maintenance. More specifically this means:
a. during the planning stage, the need for an improvement to D/S facilities will be assessed by means of a preliminary study carried out in collaboration with the present or future users. In close consultation with the users, especially the women, agreement will also be reached concerning the technical options, the extent and nature of participation and the location of the facilities;
b. in the case of technically uncomplicated D/S facilities, especially in sparsely populated rural areas, regional centres and smaller towns, every effort will be made to encourage user-management where this is technically and organizationally feasible;
c. special attention will be devoted to active participation by women;
d. to ensure that improved D/S facilities are effectively used, instruction on the interrelationships between improved D/S facilities, optimal utilization, hygiene and health will form an integral part of the planning and implementation of D/S facilities.

3.4.2 Financial self-sufficiency

The Netherlands will continue to operate on the principle that utilization and maintenance costs should be borne by the users or the national authorities. The Netherlands will promote the overall financial independence of the D/S sector, meaning that it will also encourage users and the national D/S agencies to bear the cost of interest and depreciation. Where this is not yet feasible, grant aid will be provided. On the basis of preliminary socio-economic studies, project proposals will be required to determine the social and financial capacity of users and the viability of the activities, as well as how and by whom the costs of utilization and maintenance are to be met. These studies will need to result in specific agreements beforehand between the users and the national authorities concerning charges and the collection of payments to cover (as a minimum) the costs of utilization and maintenance.

If the preliminary study should reveal that the costs of utilization cannot reasonably be charged to users (i.e. if they exceed 3–5% of the average household budget) or to the relevant D/S agencies, the activities will not be proceeded with unless projections indicate that it will be possible for the users and/or the D/S agencies to finance these costs in the not too distant future.

The effective and lasting provision of services depends on sound economic and financial management. At the least this means that there must be a self-supporting system to cover utilization costs. In the case of D/S facilities in rural areas this will need to be devised in close consultation with the users, with the authorities providing encouragement, supervision and advice, if necessary with temporary support in the form of foreign (e.g. Dutch) expertise.

3.4.3 Institutional development and transfer of knowledge

On account of the inevitable budgetary constraints on the part of central governments, and with a view to involving the community in aid activities, the Netherlands supports the present trend towards the decentralization of national D/S agencies down to user level. Support will also be provided for initiatives to transfer relevant activities to the private sector (e.g. the manufacture of hand-pumps and drilling equipment, or construction work).

Dutch experts can, in appropriate cases, play an advisory role in helping to decide the form that decentralization should take. They can also make a valuable contribution towards the training of staff at all levels.

In the private and semi-private sector, Dutch know-how and experience are already been used for a large number of activities, including consultancy on business management in the form of twinning arrangements and joint ventures. The encouraging experience with management training in the water sector provide grounds for stepping up these arrangements.

If the improved facilities are to be properly used and maintained the scale of new D/S facilities will need to be geared to the current or future institutional capacity. The institutional capacity of local D/S agencies will therefore need to be determined in the preparatory phase, when feasible plans (e.g. budgetary commitments) for institutional development in the longer term can be made. These plans will need to lay down the tasks and duties of the national D/S agencies at all levels as specifically as possible.

Foreign experts may be temporarily deployed for planning and training/transfer of knowledge.

3.4.4 Technology

The Netherlands will where possible support research programmes for the development of simple and affordable D/S techniques for the poorer population groups in developing countries. Local, commercial manufacture will also be encouraged. Limited support in the fields of training in business management and product development may be considered.

Selection of the appropriate kind of facility will be based on the following criteria:
- local capacity to maintain the facilities properly;
- the adequate provision of services at an acceptable price to consumers.

3.4.5 Balanced development

In both urban and rural areas, the policy favours the balanced improvement of the water supply, sanitary facilities, drainage and waste disposal. Active and effective cooperation and coordination between the national D and S organizations will therefore be encouraged. In the preparatory phase, intersectoral planning will be encouraged in conjunction with information activities.

It is assumed that prior to implementation, projects with Dutch support that involve the extraction of ground water or surface water or that lead to the discharge of waste water or the generation of waste will advise the relevant authorities of any adverse effects on the environment. Such advice will also be accompanied by recommendations as to how these adverse effects could be limited, e.g. by the introduction of a licensing system for water extraction or a levy system in the case of waste discharges or dumping.

3.4.6 Coordination and cooperation

The Netherlands will actively stimulate coordination and cooperation between donors, e.g. by means of close collaboration and consultation with international bodies such as the UNDP, WHO and World Bank. In this respect the Netherlands will continue to participate actively in international consultations on sectoral policies and strategies, which received a particular boost during the International Water Decade.

Closer cooperation will be pursued in programme countries and regions with the World Bank's Sector Development Teams, and the Netherlands will take part actively in the sectoral policy talks between recipient countries and donors.

The transfer of information and knowledge between national and international organizations and the development of relevant stocks of knowledge (e.g. in data banks or in library form) will be encouraged as an integral element of projects.

4. POLICY IMPLEMENTATION

With a view to the implementation of the Dutch objectives and guidelines for the D/S sector as outlined in Chapter 3, the following principles will apply:

1. In the case of programme countries and regions where the Netherlands supports the D/S sector, the policy plan shall include a section on the D/S sector setting out the goals and principal implementation aspects for bilateral cooperation activities in that sector.
2. In the programme countries and regions where the Netherlands provides support for the D/S, multi-year sectoral plans will be drawn up for each country, and especially for the targeted regions within that country. These sectoral plans will describe the general and specific aims of the programme as well as the package of activities, the actors and the resources to be deployed. The plan will also cover the relationship with other sectors, such as health, agriculture and rural development, and will examine the effects on the environment. Sectoral plans will need to be brought up to date at regular intervals. The plans will provide the basis for the Netherlands to make forward-looking commitments.
3. The national authorities, in consultation with the Dutch embassies, will continue to be chiefly responsible for the identification of appropriate activities. A number of sector specialists will be appointed for this purpose and for the consultations with national authorities on the Dutch guidelines. Independent experts not in any way associated with the implementation of projects will be engaged for the purpose of monitoring and reporting on project progress. Generally speaking the implementation of projects will be contracted out to the private sector.