

Edited by  
G.J. Alaerts  
T.L. Blair  
F.J.A. Hartvelt

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## A Strategy for Water Sector Capacity Building

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T.L. Blair  
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# A Strategy for Water Sector Capacity Building

Proceedings of the UNDP Symposium, Delft, 3-5 June, 1991

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International Institute for  
Hydraulic and Environmental  
Engineering

Delft, The Netherlands

United Nations  
Development Programme

New York, NY, USA

This publication contains selected papers from the symposium 'A Strategy for Water Resources Capacity Building' augmented by additional case studies by M. Tafesse and M. Wickremage. The views expressed in the papers are those of the authors and are not necessarily shared by their respective employers or the Symposium organizers.

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For further inquiries and to order additional copies please contact:

International Institute for  
Hydraulic and Environmental  
Engineering

P.O. Box 3015  
2601 DA Delft  
The Netherlands

Phone +31 - 15 - 78 80 21,  
Fax +31 - 15 - 12 29 21,  
Telex 38099 ihe nl

United Nations Development Programme  
Division for Global and  
Interregional Programmes

One United Nations Plaza  
New York, NY 10017  
U.S.A.

Phone +1 - 212 - 906 - 5858  
Fax +1 - 212 - 906 - 6350

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## Preface

People and institutions took center stage during the UNDP Symposium - A Strategy for Water Resources Capacity Building, held in Delft, The Netherlands, 3-5 June 1991.

This initiative was intended to formulate responses to two major challenges that have emerged from several decades of working with water related activities.

First, a growing need arises to treat these activities comprehensively and in an integrated way. Professionals working in the water sector must become better able to operate in this larger context and learn to collaborate with their neighbors who are competitive users of the same water resources.

Second, it appeared that one of the main causes of poor efficiency and effectiveness, in many water sector projects, resides in the institutional weaknesses of the organizations and the restrictions on their activities (the "enabling environment").

During the Symposium, water sector professionals and officials from around the world reached a consensus on strategic approaches needed to ensure long-term sustainability of water sector programmes and projects. Participants recognized the pressing need to improve the performance of key water subsectors, particularly irrigation and water supply and sanitation, where the demand for this vital resource is ever increasing.

It emerged, during the proceedings, that the scope of the issues at stake goes well beyond what is commonly understood by water resources. The term water resources refers specifically to the supply side. For many years it was thought that developing this resource would be the key to adequate satisfaction of needs. It has emerged, however, that the demand side of the resource is equally important and complex. Without effective demand management, national development goals, like effective provision of drinking water to all, cannot be achieved. Therefore, in the jointly adopted Delft Declaration the notion *water sector* is systematically used. The title for this document has been adapted accordingly from 'A Strategy for Water Resources Capacity Building' to: 'A Strategy for Water Sector Capacity Building'.

Recognizing population growth, water scarcity and water quality as key determinants of the quality of life, participants articulated ways and means of capacity building (increasing the capacity of institutions and people to improve the water sector planning and management processes). Indeed, water brings home the reality that the world has become a global village, where people depend on one another more than ever before.

During the Symposium much insight was gained from looking at the water sector at different levels: local level, where field operations are carried out, central government level, where policies are made, and the international level of external support agencies. The discussions covered a wide range of subjects with several key concepts attracting much attention. These include: the "enabling factor" in the development process, the full involvement of community based organizations, the role of the private sector and non-governmental organizations, the importance of national planning given the finiteness of water resources, and the adoption of common policies among the external support agencies to reduce wastage of resources and enhance development cooperation.

It appears that capacity building of local institutions can sometimes be incorporated into "common" projects. On the other hand, specific capacity building programmes may also be required. Capacity building may be modest, focussing e.g. on farmers operating an irrigation network, or it may take a broader, long-term approach, like



strengthening educational institutions to build a nation's capacity for the sector.

Water sector professionals discussed and debated the new concept of capacity building and its usefulness to Third World governments seeking to adapt their water policies to changing economic and social conditions. From their contributions, forged in workshops and plenary sessions, came The Delft Declaration which is presented in Part I.

The Delft Symposium was but one step in the long-term process of capacity building. Hopefully the many constructive suggestions offered in this volume will merit consideration by decision-makers and provide a guide for capacity building activities within water sector development programmes. The participants, now back in their day-to-day work, will determine whether it will be a small step or a "quantum leap" into the future.

Prof. G.J. Alaerts  
International Institute for Hydraulic  
and Environmental Engineering  
Delft, The Netherlands

F.J.A. Hartvelt  
United Nations  
Development Programme  
Division for Global and Interregional  
Programmes  
New York, NY, USA

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## Acknowledgements

The organizers of the Symposium are very much indebted to the members of the Programme and Organizing Committees, to the Chairpersons and Facilitators of the sessions, and to the contributors, for their efforts and commitment to make the Symposium a successful event.

This initiative could not have succeeded without the financial support of the Dutch Directorate General for International Cooperation (DGIS), which was provided thanks to the keen interest of Messrs. F.L. Schlingemann and J. Blom. Also, we thank DGIS for convening a special Dutch Water Sector Day in anticipation of the Symposium. The financial and technical support of UNDP itself is also gratefully acknowledged.

Finally, we thank the International Institute for Hydraulic and Environmental Engineering (IHE) for its warm hospitality and the facilities it offered for the Symposium. Gratitude is expressed to the course participants who acted as assistant rapporteurs and to the staff, Grietje Faber, Helga Eenkhoorn, Peter Stroo and Annemieke van Zuylen, for the professionalism and devotion shown in the organization of the Symposium and in the finalization of the Proceedings.



## **Part I**

### **The UNDP Symposium**

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# Background and Purpose

## Background

The experience of the past two decades, as formulated in the Mar del Plata Action Plan (1977), the New Delhi Statement (1990), and the policy of the UN Administrative Committee on Coordination - Inter secretariat Group for Water Resources ACC-ISGW (1990), emphasizes the urgent need for integrated, sustainable water resources management. It calls for a comprehensive vision of the 'water sector'. Water supply and sanitation, irrigation, etc. were often approached as if they were separate subsectors (they were called 'sectors').

The aims are to achieve a more efficient and sustainable *supply management* of water as a prime environmental resource, and to arrive simultaneously at more effective and, again, sustainable delivery to its users (*demand management*).

The size of the challenge implied is formidable. It can be gauged by the degree of complexity and interdependency of the subsectors involved, and by the vast differences in the type of work for equally important and interrelated activities as, for example, integrated water resources planning and management at the national level, and the implementation of a low cost sanitation programme for an urban fringe area at the local level.

During the eighties a new dimension was added to this problem, by recognizing that water is in fact only one of the natural resources to be managed in an environmentally sustainable fashion. The environmental threats to economic and demographic growth necessitate global awareness and strategies to ensure balanced development.

The eighties have also taught us that progress in development is not lasting, or does not take root, if the implementers view their task primarily as supplying physical infrastructure. The New Delhi Statement is clear in concluding that future long term and sustainable development in the subsectors must rely more on adequate assistance to and development of the local capacity. The sector must change its infrastructure from supply orientated (supply of facilities to communities who presumably will one day become consumers) to demand orientated, becoming more responsive to the stated priorities and wishes of the communities.

## Function and objective of the Symposium

The growing economic relevance of water and the looming specter of increasing water resource shortages, led the UN Committee on Natural Resources to request ACC-ISGW to develop a strategy for a renewed commitment to the Mar del Plata Action Plan. Several UN agencies prepared sectoral documents, mainly in preparation for the 1992 Dublin Conference on Water and Development and the 1992 UN Conference on Environment and Development (FAO, 1990; UNDTCD, 1991b; UNDP, 1991). Also the 1990 New Delhi Consultation identified a political consensus on a number of broad issues related to the effectiveness of the water sector (UNDP, 1990b).

This Symposium has brought together the technical experts in the relevant fields to reach an agreement on the key issues, and to rally a substantial proportion of the ESA (External Support Agency) community and countries around the strategies that need to be developed for capacity building. The Symposium brought forward recommendations as to what those Agencies and the countries should do, to be supportive of these

strategies. Since these issues differ greatly from country to country, the Symposium put much effort into describing clearly the conceptual framework, and identifying the elements and actions that can become part of country specific strategies.

The Symposium thus has a pivotal function towards implementation of the new concepts that have emerged from the eighties and are considered necessary for improving the efficiency and effectiveness of the sector.

The Symposium's outcome was also elaborated in such a way as to contribute strategic concepts and statements on capacity building to the 1992 Dublin Conference on Water and the Environment and the 1992 UN Conference for Environment and Development (UNCED).

### **Focus of the Symposium**

This Symposium focussed on the strategies to build capacity for the purpose of managing water resources effectively with an aim of sustained, adequate delivery of water to users. Capacity building involves development of institutions, managerial systems and human resources, which in turn require favorable policy environments.

The focus of the Symposium was threefold:

i) A prerequisite to integrated development in the water resources sector is an accurate assessment of the demands in the several subsectors and the existing potentially available sources for meeting these demands. The focus on the demand side leads to a better linkage of the strategic activity of integrated water resources planning and management (WRM) with the water handling operations in the two large and relatively fragmented subsectors of water supply and sanitation (WSS) and irrigated agriculture (IRR). These subsectors are of prime concern in the context of sustainable water resources utilization, in contrast to other large water users like hydropower, inland navigation, river engineering, etc., which generally are centralized, clearly organized, of pronounced technical nature, and with financial and political leverage. In WSS and IRR consumption takes place by the individual household or farmer; the wide scale sustainable provision of these services still hits on numerous difficulties at the field level which can only be solved when the sector as a whole operates well. Many of these constraints appear to be common for the WSS and IRR subsectors.

Amongst the areas examined are the water use efficiency (including wastage in irrigation and unaccounted-for-water in WSS), policies and regulations regarding abstractions, the valuation of water, pricing and charging for water use, cost recovery, prevention of water pollution, water reclamation in industry, city and agriculture, water logging and salinity, the attribution of responsibilities to institutions at national and local level, decentralization and privatization, small scale water resources projects, human resources, training and education, consumer associations and other non-governmental agencies, etc.

ii) Given the findings of the assessments, the Symposium formulated what should be considered the key capacity building issues that lie behind any ineffectiveness. They may pertain e.g. to a lack of supportive policy and regulatory framework, failure to mobilize public participation, limited managerial capabilities to make institutions operate effectively, limited financial and technical capabilities, poor personnel management, and a general lack of communication ability (between grass root and planner, as well as horizontally or between subsectors).

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In this context agreement was reached on the key institutions and on their possible role or mandate in the sector's organization. The importance of some of these institutions may lie in their capacity to create an enabling environment. Institutions must be defined in the broad sense of actors and partners in the sector operations. They encompass the formal agencies, authorities, corporations, companies, national and local governments, consultants and contractors, beneficiaries, water users and their associations and committees, NGOs, the scientific and academic community, and the ESAs.

iii) The interest in capacity building is relatively new. Confusion still exists on its precise meaning, its role and on how to make it an operational concept. The Symposium has sought to clarify this.

The questions thus raised here were:

- where is the sector inefficient and/or ineffective,
- which institutions need development and what capacity should be built,
- by whom and how should this be carried out.

The agents for capacity building and institutional development are amongst others: non-governmental organizations; international professional associations and their national chapters; education, training and human resources development institutes; problem-oriented and fundamental research establishments; North-South and South-South twinning arrangements between institutions and utilities; consultants; multi-national corporations; and banks and other financial institutions.





# The Delft Declaration

We, the participants in the UNDP Symposium - A Strategy for Water Resources Capacity Building - held in Delft, The Netherlands, June 3-5, 1991, coming from developing countries, External Support Agencies and supporting institutes, are committed to a new initiative for capacity building and have, therefore, prepared recommendations as a contribution to a global policy dialogue as a basis for local, national and international action.

## **Global Needs for a New Strategy for Water Sector Capacity Building in the Next Century**

Between 1950 and 2000, the world population will have more than doubled. By 2000, of 22 metropolises of more than 10 million people, 18 will be in the developing countries of Asia, Africa and Latin America. By 2025, 60% of the world population, more than 5 billion people, will be living in cities. Water directly affects their public health and economic development opportunities. In addition, large proportions of the rural population are likely to remain unserved.

The challenge to satisfy the water needs of the exploding cities is daunting, given the equally increasing need for water for irrigated agriculture and the problems arising from urban and industrial pollution. In addition, to do this in a sustainable way, measures have to be taken to protect and conserve the water as a major resource and unifying element of our environment.

Experience shows that institutional weaknesses and malfunctions are a major cause of ineffective and unsustainable water services. This requires urgent attention to building institutional capacity at all levels. Pressure for improved local delivery of water services suggests that development of institutional capacity be more demand-responsive. Also, the need to better manage overall water resources coherently and facilitate allocation of water among all users suggests an expansion of national, integrated planning. The critical, new institutional challenge is to become much better in developing policies, rules, organizations and management skills to address both needs simultaneously without constraining the major aims of each.

An improved strategy, stressing capacity building in the water sector, has been proposed in Delft. It will, if initiated in a timely fashion, assist the developing countries to meet their future needs.

Countries and External Support Agencies (ESAs) increasingly recognize the importance of the capacity building process for sustainable development at national, sub-regional and local levels. Capacity building consists of three basic elements:

- creating an enabling environment with appropriate policy and legal frameworks;
- institutional development, including community participation; and
- human resources development and strengthening of managerial systems.

Capacity building is foremost a global concept and a strategic element in the sustainable development of the water sector; it is a long-term, continuing process that has to permeate all activities in the sector. Capacity building also entails the application of a number of specific techniques to strengthen performance of sector and sector supporting organizations.

With regard to a strategy for water sector capacity building, it must first of all be recognized that each country and region has its specific characteristics and requirements with respect to its water resources situation and its institutional framework. Therefore operational strategies must be tailor-made. To achieve this it is recommended that, based on the insights emerging from this Symposium, **water sector assessments** be initiated to provide a basis for country strategies.

The strategy involves several approaches:

- Developing improved policy and legal frameworks, institutional development and a commitment to development of human resources and managerial systems for the sector;
- Managing water and environmental resources, including modifying demand by pricing, conservation, reclamation and reuse of waste water, thereby reducing fresh water demands and pollution;
- Having the ESAs adopt capacity building as an essential element of their assistance efforts, including such initiatives as supporting community and water user associations, on farms and in the cities, so that they can participate productively in investments made on their behalf; continued attention needs to be given to the pivotal role of women in water related activities, and their proven capabilities to fulfil managerial tasks at all levels;
- Urging governments to coordinate ESA activities in their countries, and encouraging the ESAs themselves to coordinate their agendas;
- Involving, where appropriate, the private sector in managing or providing water related services;
- Encouraging local and foreign universities, institutes, consulting organizations, professional associations and others to participate in capacity building as is most appropriate to their own capacities; and ESAs are urged to facilitate this effort;
- Encouraging countries to conduct water sector assessments; these assessments must include the need for capacity building in addition to traditional technical, social and economic aspects; and
- Creating awareness of the vital role and finiteness of water on the part of decision-makers and the public at large.

In view of the pressing need in the water sector, this strategy is being presented to the countries and the ESAs for their adoption and immediate implementation.

Having considered the results of the deliberations of the participants in working groups and in the plenary sessions, which are presented in an annex, we recommend the following actions:

1. That developing countries adopt strategies and launch, intensify or expand capacity building activities in the water sector in partnership with ESAs. UNDP is invited to take a leading role.
2. That the Delft Declaration be transmitted to the 1992 Dublin Conference on Water and Environment, and subsequently to the United Nations Conference on Environment and Development in Rio de Janeiro, to emphasize the special importance of capacity building in integrated water sector management.

If we are to satisfy the acute needs of hundreds of millions of people today, and those of billions tomorrow, we must take a quantum leap by doing things differently and start doing them now.

# Annex to the Delft Declaration

## Helping countries to solve their problems themselves

### Background and Definition: Water Resources and Capacity Building

1. Water is a finite resource.  
Everywhere, but specifically in regions with water scarcity, people are realizing that water is no longer free anymore. The scarcity of the resource, the threats of water resources development to the environment and the conflicting interests of the water users, imply that water resources planning and management should be an integral part of overall national economic planning. The objectives and strategies for the water sector should be derived from the national planning process.
2. Integrated water resources planning and management is an inter-sectoral, multi-interest activity, and as such must be cognizant of competing interests among subsectors in the country, and among countries. The nature of the planning process is dynamic, interactive and multi-sectoral. Decision making must take place at the appropriate levels.
3. Allocation policies and mechanisms, for water resources, are required to address the ever increasing water demands of the different subsectors, and particularly between large urban centers of population and irrigated agriculture. More than ever national planning and management of water resources within and across national boundaries should be given the strongest possible emphasis.
4. Many national and local institutions responsible for water management and water service delivery do not work efficiently nor effectively because of:
  - inappropriate policies for water management, and unclear definition of the mandates of the institutions;
  - lack of resources (inadequate funding and human resources);
  - working in an environment that is not conducive for institutions and inhibits job satisfaction;
  - inadequate education and training facilities; and
  - lack of participation and commitment from communities and customers.
5. Countries and External Support Agencies (ESAs) recognize the importance of capacity building for sustainable development at national, sub-regional and local level. Capacity building consists of three basic elements:
  - creating an enabling environment with appropriate policy and legal frameworks;
  - institutional development, including community participation; and
  - human resources development and strengthening of managerial systems.
6. The main objective of capacity building is to improve the quality of decision making, sector efficiency and managerial performance in the planning and implementation of water sector programmes and projects.

The specific objectives are to:

- improve the capabilities of assessing water resources;
- plan better, sustainable water resources development in the context of national development planning;
- arrive at a financially and environmentally sustainable, more efficient and more effective delivery of water services, particularly for the cities and for agriculture.

7. To meet the needs of the various users in an efficient, equitable and sustainable fashion, the adoption of concepts of demand management is a matter of urgency.
8. Capacity building activities are essential to the long-term sustainability of water sector programmes and projects. Therefore capacity building calls for a long-term strategy and is of equal importance as financial, economic, technical, environmental and health aspects.

### General Recommendations Regarding Capacity Building

9. Capacity building activities should be undertaken both within and among water subsectors, like irrigation, water supply and sanitation, and hydropower, thereby providing improved coordination. The collaboration between subsectors is becoming increasingly important and urgent in dealing with water availability and quality issues created by competing users, in particular with regard to demand from large urban areas and irrigation, and pollution caused by users. To this end, it may be necessary to establish, in many countries, control and coordination bodies at the highest national as well as local levels, together with a suitable legislative framework. In addition, collaboration with related sectors outside the water sector such as the public and environmental health sector is called for. Efforts should be oriented not only to develop new capacity, but also to maintain and consolidate what has been developed before.
10. Capacity building should be aimed at three levels:
  - **sectoral level:** provision of an enabling environment for effective sector and sub-sector management;
  - **institutional level:** development of planning and management processes so that the collective skills of the staff can be effectively used in the achievement of the institution's objectives;
  - **individual level:** comprehensive human resources development strategies and programmes to enhance skills of individuals in accordance with institutional needs.
11. Capacity building is a long-term continuous process which should be phased to accommodate requirements of national governments and ESAs. Each individual phase should have clearly defined and measurable targets. A necessary prerequisite therefore is the setting of realistic and achievable goals based on the available resources.

## **A First Step to Strategy Development: Water Sector Assessments**

12. Water sector assessments are a first and vital step in the water sector development process.
13. Water sector assessments are an instrument for country capacity building at national, regional and local levels. They include (in addition to examination of national development policies, water sector, legal and institutional policies and options, and human resources development) the following subjects:
- water resources, including the impact of pollution;
  - water requirements for agriculture, water supply, industry and other water related uses, including the needs for sewerage and waste water disposal;
  - public and private facilities and services available for water related activities;
  - the need for and availability of human resources and institutions for their development;
  - the need for and support of community and user organizations;
  - the financial situation with regard to capital and operation and maintenance, including the potential for cost recovery; and
  - identification of priority programs for technical and capital assistance including identification of potential ESAs.

It is particularly important that the assessment be undertaken by teams provided by both the government and the ESAs, with the former constituting the nucleus and corporate memory of the planning process.

14. In addition, the water sector assessment will have to devote special attention to national policy analysis, study of customary law and practices, review/design/drafting of legislation, public awareness of rights and obligations, and implementation and enforcement of laws.

Similarly, due attention must be given to the legal and institutional arrangements needed to address the development, use and protection of internationally shared water resources.

In reviewing the existing legislation, the impact of legislation on facilitating or constraining the roles of both the public and private sectors needs to be assessed.

15. The country water sector assessments should be executed by the countries, assisted where necessary by ESAs. The assessments will play an important role in capacity building, and their Terms of Reference should adequately reflect this.
16. One of the most important criteria for measuring capacity building success would be the extent to which activities in the water sector are sustained locally, recognizing that this implies the acceptance of an appropriate degree of cost recovery.

## **The Institutional Framework of The Water Sector**

17. The institutional framework required for the planning and management of water resources is nation specific and should develop from the existing situation.
18. Due to the inherent complexities in water resources management, it is rarely feasible or wise to allocate all necessary management functions to one institution. Planning, decision making, technical implementation, management, etc. have to

be distributed over institutions at various levels. The coordination of functions from grass roots to central level is therefore an important element in achieving integrated water resources management, and may need strengthening.

19. In order to improve services, governments may wish to consider options for the involvement of the private sector. This could range from delegated management services to ownership and would always require provisions for accountability.

### **Information, Communication and Awareness**

20. Since information plays an important role in decision making, the management of information is an integral part of the decision making process involving partners at all levels in a continuous process.
21. Supported by NGOs and ESAs, the water sector professionals should undertake initiatives directed towards politicians, decision-makers and the general public to raise awareness of the finite and fragile character of the water resources.

### **Specific Recommendations for Capacity Building**

22. To allow for more rational decision making research needs to be conducted on costs and benefits of alternative policy options and institutional arrangements.
23. Governments and ESAs should allow for more flexibility in project preparation to involve future beneficiaries on key points in the decision making process, and develop commitment and hence sustainable demand.  
It needs to be stressed again that in this process recognition must be given to the roles of women in the water related activities, and to their proven suitability as staff to carry out tasks at various levels of management.
24. For the post-project phase, withdrawal of external support should be gradual in order to guide the local managing institutions to take effective charge of operation and maintenance.
25. The process of involving communities should be used as a mechanism to reverse the trend of supply-driven policies to demand-oriented ones. This should be compatible with consideration of social dimensions.
26. In regions with water scarcity, institutions must be capable of orienting demand of households, industry and agriculture, using tariff structures, regulations (e.g. on groundwater abstraction) and other arrangements. This should include water reuse and the whole range of demand management techniques.
27. In decentralized administrative structures, introduced in developing countries, local level institutions need a proper mandate which is comprehensive, relevant and unique to them. They should also have clear programmes and plans with objectives, targets, monitoring and evaluation systems.
28. Administrative rules and regulations must be checked for suitability, to enable institutions to act in a more flexible manner. These include staff and personnel

management, salary scales, water use, institutional mandates and autonomy. These rules and regulations may require review. Rules and regulations that support integrated water resources management (e.g. waste water discharge regulations) on the other hand need to be further developed and expanded.

29. In many countries a continued need exists for governments to adopt an appropriate community participation approach, including creation of community organizations and build adequate staff capacity to this end.
30. If possible and suitable, training should be given simultaneously at all levels. A pronounced need exists for novel training methods in integrated water resources management and planning, as well as to further promote training on community participation approaches for water supply, sanitation and irrigation institutions. These concepts should be included as well in the training and education curricula for related professions in the water sector, specifically at the level of university and polytechnic education.
31. Management skills training should be extended to the levels of local institutions and communities.
32. Training activities should be better geared toward function and objectives of the institutions in the sector.
33. Universities and training and education institutes, as well as the ITN (International Training Network for Water and Waste Management) should be mobilized wherever possible, and used as instruments to implement capacity building in water resources planning and management.

### **Recommendations to Countries and ESAs**

34. For the purpose of optimum utilization of resources, countries and ESAs are encouraged to adopt common policies tailored to each country to the greatest possible extent.  
ESAs, when dealing with countries, should coordinate their agendas and address conflicting interests with each other. This coordination could take place through consultative groups, round tables or local consultations organized by the governments or through UNDP Resident Representatives/UN Coordinators. Countries should make an effort to coordinate effectively the ESA contributions.
35. Developing countries and ESAs are encouraged to use local and international institutes, professional associations, water and sewerage utilities, twinning arrangements and consulting firms as additional ways of obtaining expertise and of sharing information.
36. The countries and ESAs should look to utilize the private sector's facilities and expertise as well as appropriate market based incentives.
37. Specifically the ESAs have to play an important role in assisting developing countries in strengthening their capacity to deal with water systems, e.g. to collect and manage information on surface and ground-water hydrology, as well as on water quality - and to integrate this information into data systems, interrelating



these with demographic, economic and social data, and information on water uses. It must be understood that this is a long-term, continuing process.

- 38.** ESAs should be committed to capacity building and assign qualified staff to assist developing countries, with water sector assessments and with addressing capacity building needs in a timely and sustained fashion.
- 39.** In order to enhance the capacity building process, institutional success and failures should be kept under review by regular monitoring and evaluation using adequate criteria.
- 40.** In conclusion, capacity building should be a fundamental component of cost and target national action plans.

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# Welcoming Speeches



## Opening Address

By Prof. W.A. Segeren, Director, International Institute for Hydraulic and Environmental Engineering, Delft

Ladies and Gentlemen, I am very pleased to be able to welcome you to Delft on the occasion of the UNDP Symposium "A Strategy for Water Resources Capacity Building".

Some of you are quite familiar with what is called "capacity building"; you have been discussing the subject for months during the preparation for this Symposium. But for some of you the concept may be rather new. Depending on the definition used, one might say that here in Delft, at the IHE, we have been performing capacity building since IHE's formation in 1957. In the early years the main activity of IHE was education. But gradually, with the changing views of the people involved in working in developing countries, the activities broadened to include training projects, transfer of knowledge, research, institution building, institutional development, and human resources development. And now, next in line, we find capacity building, an activity that involves all the above.

If it is so, that we have been deploying these activities already for years, then what makes capacity building for water resources management so special that it deserves to be addressed by a Symposium? I see three good grounds.

In the first place, and this is illustrated by the historical development of IHE's activities, the issue of what we now call capacity building has developed somewhat haphazardly over time. New needs were addressed the moment they occurred, whereas we did not yet possess the overview to address the issue in an integral manner. This is illustrated by how donors until now have approached capacity building. In the international cooperation of The Netherlands, for example, a country where transfer of knowledge has always been an important policy item, capacity building has been performed through different channels:

1. through a fellowship programme (which is not country, region or problem specific),
2. through a sector programme which is problem specific but not aimed at a certain region,
3. through institutional development, training and research projects in specific countries which have no intentional relation to the sector programme, and
4. through applied research and international education at international institutes within The Netherlands.

These different activities should be considered as components of one concerted activity aimed at solving the capacity problems of a specific country, river basin or institution. (And Mr. Biegman, the Director General of DGIS who is present here today, is probably going to touch upon that subject.) Hence, an important issue to address here is how each individual ESA (external support agency), as donors prefer to call themselves nowadays, can coordinate the efforts that it is presently deploying, and maybe expand the efforts, to enhance their effectiveness.

I don't think that, in this respect, we can avoid an even more challenging issue, and that is how ESAs should coordinate their efforts to enhance their effectiveness in capacity building. And I hope that this Symposium may be the first step towards a commitment of all ESAs to cooperate and to coordinate their efforts in capacity building.

This brings me to the second reason. Water has, for far too long, both by governments and by donors, been regarded as an isolated sector and sometimes even as an unconstrained resource which could be used, at will, by a project under study, without considering the consequences it has on other projects. It has occurred that the same donor, without being aware of it, financed two separate projects each of which was planned to use the same water resource.

The interesting thing about the water sector, in relation to institutional development, is that *water* supplies the physical links between almost all sectors of the economy: agriculture, industry, environment, transport, recreation, fisheries, infrastructure, physical planning, water supply and sanitation, etc. These sectors, often represented by ministries or other government institutions, are forced to communicate and cooperate, simply because they use the same resource.

In those developing countries, where, until recently, development had not yet reached the level that water was a major constraint, this problem may, at first, have been overlooked, but that situation is rapidly changing. The development of activities that make use of water, or otherwise relate to water may not be considered in isolation. And if this applies at the level of project formulation, design and implementation, then it certainly applies to capacity building. Now is the time to look at capacity building as an integrated activity. I hope that as a result of this Symposium the various donors will take steps to coordinate their activities in the water sector based on a coordinated assessment of the water sector, taking into account all major users of water and all other sectors involved.

The third reason why I think that now is a good moment to discuss capacity building is because of the growing awareness of the environmental issue and the aspect of sustainability of water exploitation. These will be the main issues to be discussed in the Dublin conference on Water and Development and in the Brazil Conference on Environment and Development. The relation between sustainability, environment and water resources capacity building is important.

In sustainability, one may distinguish different types:

- *Technical sustainability*, which depends on the sound design of water resources development works, sizing of reservoirs, sustainable exploitation of groundwater, balanced demand and supply, etc.
- *Environmental sustainability*, meaning that water resources management should guarantee that no negative, long-term or irreversible effects result from interferences in the water system.
- *Financial sustainability*, meaning that the costs spent to develop and manage water resources are recovered, one way or another.
- *Social sustainability*, implying that society supports the activities and is willing to pay for the services, whether in money or in kind.
- *Institutional sustainability*. The capacity of a nation, river basin authority, or water company to plan, manage and operate the system, in a sustainable manner (technical, environmental, financial and social), to collect data, to monitor performance and to adequately react to ever changing circumstances.

All these types of sustainability relate to capacity building in the sense that they require adequate education, training, research, human resources development and institutional development. But particularly the latter encompasses the issues that we are addressing here.

Ladies and Gentlemen, I sincerely hope that this Symposium will give you ample opportunity for fruitful discussions and exchange of views from different backgrounds and experiences. I am confident that you will come to valuable conclusions and recommendations to enhance the capacity building activities in the water sector. I would like to conclude, as may be expected from me, by stressing the importance of adequate education in institutional development by quoting from the recent WASH Report: "A dedicated, well trained person will always find a way to get a job done, whatever the institutional setting. On the other hand, a good institutional structure, however well defined, may have no impact if the people working within the structure do not have the capability to implement the programme."



## Address

By Dr. N.H. Biegman, Director General, Directorate General for International Cooperation (DGIS), The Hague

### **Water Sectors, North and South, Must Change with the Times.**

I am certainly not an expert in the field of water sector capacity building, but I have lived in a few countries where water resource management was essential, to say the least.

One of the countries is my own. The Netherlands would not exist without good water management. In historical times, at the end of the first millennium AD, the Dutch started to protect themselves, with dikes against flood waves from the sea and at the same time they started with the reclamation of land from the sea. These low lying areas had then to be drained continuously to protect them from inundation. Special water authorities were created by the users to maintain the dikes, canals, ditches and pumping devices (mostly windmills of course) and to keep the water levels optimal for agricultural production. These systems continued to function for centuries and are still functioning. If they were not, we would be sitting here in several feet of water, or at least people on the ground floor would.

During the last 30 years, due to urbanization and industrialization, the problems have become more complex. Even in a country as wet as the Netherlands, resources for water supply have become limited and there is a serious risk from pollution either coming from abroad through our main source of fresh water (if fresh is still the right word) the river Rhine, or generated within the country itself.

Due to all these new, complicating aspects influencing the water system, we had to move to another approach towards its management. Not having an intimate knowledge of the latest techniques in integrated approaches, our Ministry of Traffic and Public Works invited experts from the Rand Corporation of the USA to assist in the policy analysis of the water management system. During two years of cooperation, the particular expertise of the Rand Corporation in this field was transferred to Dutch professionals.

In more recent years a further step in our development was made through the integration of water management policy with environmental policy.

Having dealt for a long time with water management in so many aspects: flood control, water level control, river transport, water supply, ground water development, environmental engineering etc., we have gained quite a thorough know-how in this field.

I consider the fact that UNDP has chosen Delft, the hometown of Delft Technical University, of Delft Hydraulics Laboratory and of the International Institute for Hydraulic and Environmental Engineering, as meeting place for this Symposium, as a sign of appreciation for the contribution The Netherlands have made in this area.

My work gave me the opportunity to visit many countries we have the pleasure of cooperating with. Most of them face problems with water management, be it scarcity of resources, flooding, competition between different user groups for the same water source, or lack of international coordination. One rather extreme example of such a



country, and one where, like my UNDP friend Frank Hartvelt, I lived for a number of years, is Egypt.

In Egypt the whole country depends on only one single source of water. Water management dates back to the times of the pharaohs, when water measuring devices (nilometers) and waterworks were already in existence. Water management was always highly centralized. All agriculture was, and is, irrigated and neglect of the irrigation system would have resulted in serious famine. After the construction of the Aswan Dam on the Nile, and the change of the irrigation regime, the country faced a general problem of rising water tables in the agricultural lands and Egypt requested Dutch technical assistance in land drainage. Most of the agricultural land is nowadays provided with drainage.

In both cases, the Dutch, facing problems with policy analysis and the Egyptians, with land drainage, did not hesitate to seek technical assistance from parties with more experience in that particular field.

That brings me to the potential role of my Department, DGIS, of the Ministry of Foreign Affairs. At the moment we are making an inventory of our involvement in the field of water management and water development. Preliminary results indicate that there were about 1100 water projects over the last 10 years. This is 7% of the total number of projects. Money-wise this percentage might be somewhat higher, given that many water development projects are quite capital intensive. Of these 1100 projects about 50% are in the field of drinking water and sanitation and about 20% in irrigation.

Our general policy emphasizes that activities shall contribute to sustainable and equitable development. One of the main conditions for sustainability is a sound approach towards the environmental aspects in projects. In many countries water resources are at the core of the environmental problems. Desertification, pollution of ground and surface water, side-effects of irrigation, deteriorating urban environment, you all know the examples. Handling these problems will receive high priority.

We give priority to other fields of attention in our policy.

*Institutional development* is one of them. Good water resources management is certainly dependent on well developed institutions and "good government". This includes a dialogue with the users of the water as fully fledged partners, and the development of user organizations.

Some other fields of attention that relate to the topic of this Symposium are:

- health and drinking water and sanitation
- rural development
- urban poverty reduction and industrialization
- infrastructure and
- education and research.

Moreover, we are developing the application of 3 checks in project preparation. Every project that is proposed for Netherlands assistance will be appraised on its expected impact on:

- the poverty situation in the project area
- the influence on the position of women and
- the environment.

Any project that has an expected negative impact on one or more of the above mentioned subjects will be rejected. I realize that it will not be easy to set objective criteria for impact analysis, especially for poverty, but we are working on that point.

As a preparation for this Symposium we organized a meeting with the Dutch professionals involved in DGIS activities in the water sector. This meeting indicates

the importance we give to this UNDP initiative.

Professor Oudshoorn, former Director in our Ministry of Transport and Public Works, charged with policy analysis for the Dutch water management system, will tell you more about the results of that meeting.

I sincerely hope your Symposium will be fruitful. I hope it will come up with efficient and effective ways of transferring managerial and technical know-how in the field of water resources management and sector development, to countries that need it.

Ladies and Gentlemen, students at IHE tend to have the feeling they have to work very hard. Looking at your programme, it is my impression that the spirit of IHE is very much upon you.

Still, I hope that, apart from the hard work awaiting you, you will have some time and energy left to enjoy your stay in this hometown of "Delfland", which is one of our biggest and oldest local water management authorities.



## Address

By F.J.A. Hartvelt, Deputy Director, Division for Global and Interregional Programmes, UNDP, New York

### Capacity Building for a Great Step Forward

I am pleased to welcome you to the UNDP Symposium "A Strategy for Water Resources Capacity Building". I wish to express our thanks to the Directorate General for International Cooperation for their interest in and financial support for the Symposium and to the International Institute for Hydraulic and Environmental Engineering for its excellent organization and intellectual contribution to the Symposium.

Institutional and human resources development was a major discussion point at the UN Water Conference in Argentina which led to the Mar del Plata Action Plan. The same issues were brought up in the Reports of the UN Secretary-General to the General Assembly on the International Drinking Water Supply and Sanitation Decade (1981-1990) and, most recently, during the International Consultation on Safe Water and Sanitation for the 1990s, organized by UNDP and hosted by the Government of India. Also my visits to developing countries led me to believe that neither governments nor external support agencies were doing enough to strengthen institutions and develop the human resources required to ensure the long-term sustainability of water sector programmes and projects.

Rather than leaving matters as they are, we felt that a fresh initiative was needed to focus national and international attention on capacity building, with emphasis on the strengthening of institutions and the development of human resources.

Let me now address a few key aspects which, in our view, are central to the discussions over the next few days.

Population and economic development can no longer be considered separately from water resources and the environment. Based on the experience of the past decade, we are better equipped with know-how about managing resources. The best guardians of water resources and the environment are people working hand-in-hand with institutions. We find a wide range of institutions at all levels and in different forms. Government ministries, utilities and external support agencies are the "classical" institutions but recent years have witnessed the emergence of dynamic community level institutions, such as groups of women well caretakers and farmers' associations. Each of them play their part and interact within a larger whole.

Better trained people and responsive institutions are essential if we are to stay ahead. In addition, people, both as providers and users of water for domestic purposes, agriculture, and industry can no longer live in blissful ignorance of each other. Consumers, technicians, engineers, economists, managers and politicians have no other choice but to better understand each other and work together if social and economic needs are to be met in a balanced and equitable manner.

Clearly, safe water supply and sanitation, and availability of water for agriculture and industry are the basic underpinnings of an environment for sustainable development.

As human development takes centre stage, we must take a quantum leap in the years ahead and erase "business as usual" from our vocabulary.

I should like to invite your attention to the wider context within which our deliberations can be placed due to UNDP's recent explicit commitment to human development.

Conventional wisdom says that developing countries are too poor to finance their human development needs. National budgets and foreign aid allocations are too tight to accommodate even the most urgent agenda for human progress. This view is challenged by the *Human Development Report 1991*, published by Oxford University Press for the United Nations Development Programme.

According to William H. Draper III, the Administrator of UNDP, "There are far too many examples of wasted resources and wasted opportunities: rising military expenditures, inefficient public enterprises, numerous prestige projects, growing capital flight and extensive corruption," and "most budgets can accommodate additional expenditure for human development if priorities are recast".

UNDP is the world's largest multilateral grant development assistance agency, working with an annual budget of \$1.3 billion through a network of offices in 112 countries. UNDP also plays the chief coordinating role for on-site economic and social activities of UN agencies, from emergency relief to long-term development.

This is above all a practical report, about financing human development. A single powerful idea runs through it -- that, with the will to change, there is enormous potential for restructuring national budgets and international aid in favour of human development. Says the report: "The lack of political commitment, not of financial resources, is often the real cause of human neglect".

The Report identifies many concrete areas for changing priorities in the national budgets of developing countries and foreign aid allocations of donors. As much as \$50 billion a year could be released in the developing countries from low priority expenditures towards higher priority human concerns. It points out that many developing countries spend more than 25% of their GNP through their government budgets but their expenditure on human priority goals (basic education, primary health care, rural water supply, family planning, food subsidies, social security) is generally less than one tenth of their total public spending.

The Report is equally critical of existing priorities in aid allocations. "If only one third of today's aid were committed to human priority areas, the aid allocation to these areas would increase four-fold," says the Report. At present, only 1/12th of total aid is earmarked for human priority goals. This shows the enormous potential for releasing more resources for human development by restructuring priorities in aid budgets.

The authors are quick to point out that "the plea for greater efficiency should not be confused with indifference to economic growth or to the mobilization of additional resources". In fact, additional resources are needed since all the essential human goals for the 1990s cannot be financed without more money. But "the best argument for mobilizing more resources is spending existing resources well," contends the Report.

Keeping this overall context in mind, the active participation of all of us here (sector professionals and officials) will be essential to take the "quantum leap", I mentioned earlier, needed to sustain water resources development well into the next century. Putting people and institutions first is our common goal.

## **Part II**

### **Background Documents**



# Capacity Building for Water Sector Management

## An International Initiative for the 1990s

D. A. Okun and D. T. Lauria  
University of North Carolina at Chapel Hill

### Summary

This paper summarizes recent studies and experiences of external support agency (ESA) involvement in the Water Sector. It explains why capacity building (CB) has been identified as a requirement for future, sustainable development and discusses the key element of a strategy to achieve it.

That a capacity building initiative is needed, there is little doubt. While the International Drinking Water Supply and Sanitation Decade of the 1980's, initiated by the Mar del Plata Action Plan (UN, 1977), made major strides toward meeting community water and sanitation needs, it fell far short of its goal of service for all by 1990. Also, recommendations of the Action Plan concerning water resources generally and agricultural irrigation particularly were not adequately addressed. Nevertheless, numerous lessons were learned, above all the interdependence of all water uses and the indispensability of effective institutions, if water resources projects are to be sustainable and are to contribute substantially to national development.

The UN Administrative Committee on Coordination, Inter-secretariat Group for Water Resources (ACC/IGWR) agreed to address the shortcomings of the last decade through the development of a strategy for capacity building (CB), including institutional and human resources development at all levels.

Capacity building, and the institutional and human resources development efforts that are integral to it, is essential to provide program and project sustainability. Strong, capable institutions mean that sound assessments of water resources availability and needs can be made on a continuous basis, that laws and regulations for the wise and efficient use of water resources can be assured, that the skills and resources of consumers be enhanced and utilized, and that funds for operating, maintaining and extending all the necessary physical facilities and institutions can be obtained.

Country capacity building programs involve improvement of the 'policy environment' and, most importantly, institutional and human resources development at national and local levels, with emphasis on local community organization. Legal issues, information management, the role of international and national professional associations, multinational consulting engineering organizations and industries, also need to be addressed. Rapid assessments of national needs are proposed as an essential first step in embarking upon a program of capacity building.

Finally, external support agencies (ESAs) must themselves be committed, and be seen to be committed, to capacity building if governments and institutions are to be stimulated to invest in it.

This paper originated from discussions among United Nations agencies during the annual meeting in 1989 of the Inter-secretariat Group for Water Resources of the UN Administrative Committee on Coordination (ACC/IGWR). It was commissioned by the United Nations Development Programme (UNDP), Division for Global and Interregional Programmes (DGIP) and prepared by Dr. Daniel A. Okun and Dr. Donald



T. Lauria of the University of North Carolina at Chapel Hill. The consultants carried out a literature survey and extensive consultations with personnel of external support agencies (ESAs) including United Nations Specialized Agencies, UNDP, the World Bank and other multilateral, bilateral and non-governmental organizations. Its first draft was reviewed by the ACC/IGWR in 1990 which concluded that capacity building is a vital ingredient for sustainable water resources development, use and management in the 1990s and that both developing countries and external support agencies would derive long-term benefits by increasing investments in institutional strengthening and human resources development which are the twin concepts underlying capacity building.

The paper was prepared under aegis of Frank Harvelt, Deputy Director of UNDP/DGIP. However, the contents and opinions expressed are the sole responsibility of the authors.

## Introduction

### Development and the Water Sector

The last half of the 20th century has witnessed a rapidly growing recognition of the problems of water supply and sanitation (WSS), irrigation (IRR), and water resources generally throughout the world and especially in the less developed countries of Asia, Africa and Latin America:

1. Water-related diseases, particularly infant and children diarrheas, although completely manageable in the industrialized world, exact an increasing toll in the less developed countries.
2. Women and children in urban and rural areas of Asia, Africa and Latin America are obliged to spend hours each day in fetching water for the home, time that might be put to more socially and economically productive purposes.
3. Whilst the world population will have grown 150% over the half century, urban populations will have grown 300%, to a point where at the end of the century, almost half of the total population will be living in cities (*Figure 1.1*).
4. The number of cities of over one million population will have grown more than five fold over the half century.

**Table 1** Growth of Cities of More than One Million Inhabitants

Year	Number of Cities	Population (millions)
1950	78	200
1960	114	299
1970	160	432
1980	222	605
1990	290	850
2000	408	1204
2025	639	2205

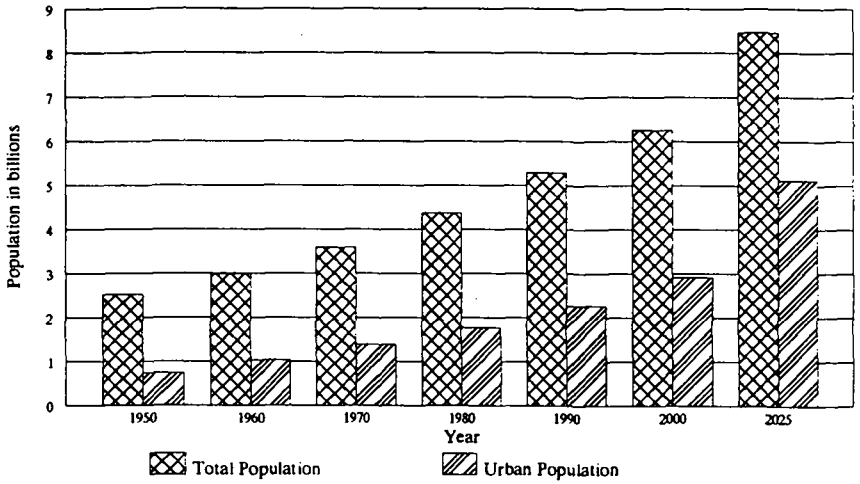
Adapted from UN Department of International Economic and Social Affairs, Estimates and Projections of Urban, Rural and City Populations, 1950-2025: The 1982 Assessment, UN, New York, 1985.

5. Population growth in the developing countries is three to four times that of the industrialized countries.
6. In 1950, only one of a total of three "giant cities" was in a less developed country; by the end of the century 18 of a total of 22 giant cities will be in less developed countries (*Figure 1.2*).
7. Because urbanization increases and concentrates the demand for water, cities throughout the world are suffering from water shortages. In the less developed countries they also suffer from supply shortages, resulting from inadequate facilities.
8. The explosive growth of cities in the less developed countries is generally not accompanied by provision of necessary water and sewerage infrastructure; they often experience falling groundwater tables, destructive land subsidence, soil contamination and water pollution from inadequate solid and liquid waste disposal.
9. Urban water shortages are accompanied by a growing demands for water for agricultural irrigation. In the less developed countries, the institutions required to manage water resources effectively are only now beginning to be developed. (This is not to say that such institutions are always adequate in the more developed countries.)
10. By the year 2000, the area of agricultural land requiring irrigation will have increased by about 10 percent. Many irrigation projects have not achieved their objectives and many have been wasteful of scarce water resources for technical and institutional reasons.
11. Most water projects are still initiated by central government without the participation of the communities to be served. The people are seldom involved or even consulted. The consequences of this top-down approach is that the intended users are reluctant to pay for the service and are unwilling to contribute towards the maintenance of the facilities because they do not "own" them.

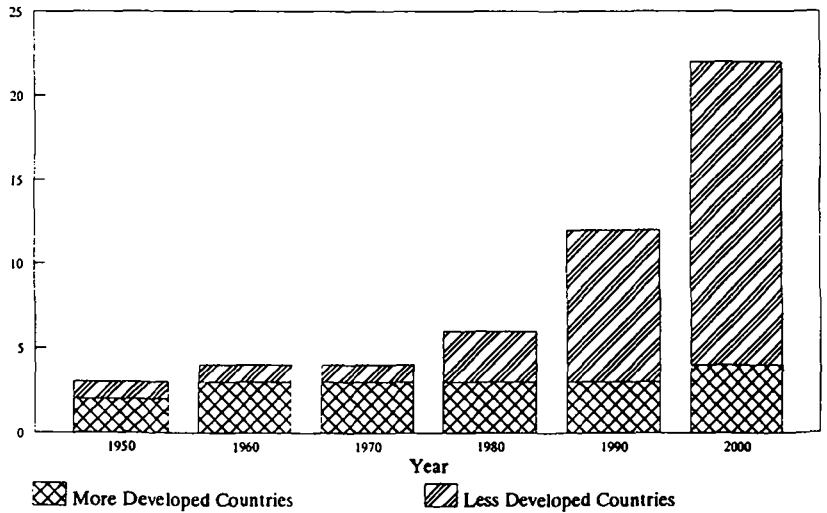
The United Nations family of agencies sought to address these problems in Mar del Plata. The resultant Action Plan (UN, 1977) gave rise to the International Drinking Water Supply and Sanitation Decade of the 1980s.

However, the Mar del Plata mandate extended far beyond a concern only for water supply and sanitation (WSS). It included sound management of water resources for all purposes, including agricultural irrigation, industry, hydroelectric power, fisheries and inland navigation, explicitly, a call for integrated water management. It recommended that, at the national level, water resources data be collected systematically, comprehensive studies of existing and future demands be made, legislation and policy, with respect to efficient and equitable development and management of water resources, be promulgated, an assessment of needs, including human resources, be undertaken, and applied research be inaugurated.

On the positive side, progress was made in WSS during the Decade, particularly in giving this subsector higher international and national priority. Increased attention was given to institutional development, HRD and community participation and management, particularly with regard to the role of women. Applied research programs were initiated under a UNDP/WB Water and Sanitation Program to develop low cost



**Figure 1.1** Actual and Projected World Population (Population in billions).  
 Source: Adapted from UN Department of International Economic and Social Affairs, *World Population Projects*, UN, New York, 1989.



**Figure 1.2** Number of World Metropolitan Areas with over 10 million inhabitants.

technologies. Projects have become operational.

More than 1.3 billion more people were provided with adequate water supply and about 750 million with sanitation, with coverage over the decade increasing from about 45% to 70% of the population in developing countries. While sanitation coverage increased from about 45% to 55%. The principal impact was in rural areas, with almost one billion newly served with water in the decade, an increase of about 140%. However, because of explosive urban growth in developing countries, the urban population **without** a proper water supply **increased** by 15% and 30% **more** of the urban population have inadequate sanitation facilities than in 1980.

Despite this progress, the water sector (especially irrigation, water supply and sanitation) is still faced with outdated policies, inadequate institutions, shortages of well trained people at all levels, inappropriate technology and ineffective financial mechanisms.

At the end of the Water Decade more than 1.2 billion people are still without water service and more than 1.7 billion without sanitation.

To sum up, urban services in the less developed countries, despite the emphasis of the Decade, have not kept up with growth.

### **The Need for Capacity Building**

In 1989 the United Nations Administrative Committee on Coordination, Inter-secretariat Group for Water Resources (ACC/IGWR) initiated the preparation of a comprehensive strategy for the 1990s which was most recently presented in the report by the United Nations Secretary General to the Committee on Natural Resources (UN,1991) entitled "Strategies and Measures for the Implementation of the Mar del Plata Action Plan for the 1990s." The report included capacity building among the seven areas for action within national water strategies for the 1990s: "To enhance the capacity for the development and management of water related programs, greater efforts have to be made to strengthen institutions and develop human resources at all levels." The report further stated that "the provision of adequate human resources, with skills appropriate to many scientific, technical, managerial and administrative functions required for the assessment, development, conservation and management of water resources, is implicit throughout the strategy proposals."

The New Delhi Statement (UNDP, 1990b), prepared at the Global Consultation on Safe Water and Sanitation for the 1990s, contained four guiding principles, two directly related to capacity building: "Strong institutions are essential for sustainable development," and "capacity building is necessary to make community management effective..." The other two, environment and health and financing and technology, depend for their implementation on strong sustainable institutions.

The problems facing the less developed countries in the water sector can be categorized into two closely interrelated areas:

1. **Water Supply and Sanitation:** Inadequate performance in the WSS sub-sector, attributable to exploding urban growth, use of inappropriate technology, inadequate institutions, and too little attention to the people to be served.
2. **Water Resources Management:** Insufficient attention to the water resources sector as a whole. The increase in large urban centers of population, together with the rapid growth in per capita water demands in the less developed countries (resulting from industrialization and improving standards of living) are creating high water demands that compete with increasing demands for irrigation.

In response to these shortfalls in the implementation of the Mar del Plata Action Plan, the ACC/IGWR agreed in 1987 to develop a comprehensive strategy for the 1990s, aimed at addressing the Action Plan.

A Panel of Experts meeting at Challes les Eaux (ACC/IGWR, 1989) recommended that assessments of the Action Plan be prepared and that strategies be developed for the future. The recommendations were influenced at least in part by the large scale problem of water scarcity, which is particularly acute in urban areas. Proposals for several of the recommended assessments and strategies were presented by various UN organizations at the ACC/IGWR meeting in 1989 (ACC/IGWR, 1990). Also at this meeting, participants agreed to conduct a survey of training requirements in the field of water resources as perceived by their organizations. Based on these meetings and preliminary assessments, it came to be recognized that a key element in implementing the M.d.P. Action Plan in the 1990s is the need for capacity building and strengthening of water-related institutions throughout the world (ACC/IGWR, 1991).

What emerged in this study was a consensus that failures in meeting WSS service objectives and in achieving effective water resources management in developing countries, do not lie in the realm of technology nor even in the availability of funds. Ample evidence exists that even where adequate funds are made available and the appropriate technology involves only well established practices, projects and programs, these have not been sustained after ESA intervention ceases. The country must establish the capacity required to receive ESA development assistance such that local programs and projects can be expected to be sustained with indigenous human and financial resources.

### Capacity Building

Capacity building depends on two interrelated concepts:

1. *Strengthening of institutions* at all levels to deal, more effectively and efficiently, with all aspects of sustainable water resources development, including the creation of a favorable policy environment, water resources assessment (both quantity and quality), planning, management, and program and project formulation, implementation and evaluation
2. *Development of human resources* at all levels including education, training, and the creation of working conditions conducive to job satisfaction and performance.

CB seeks to integrate the management of the several subsectors in the water resources sector, particularly water supply and sanitation (WSS) and irrigation (IRR).

The importance of CB for water sector institutions in developing countries is evident in:

1. the substantial demands for water resources that will exist in the 1990s,
2. the technical, financial, and institutional difficulties of planning and project implementation that prevail in developing countries
3. the social and economic deficiencies of developing countries.

All of which combine to indicate the clear need for strong, sustainable institutions.

The demands for water for urban growth as well as for agricultural irrigation will require substantial investments in projects. But the technical conditions under which systems must be planned in developing countries are often more difficult than those in the industrialized countries. For example, water scarcity affects a large part of the developing world. Irregular patterns of rainfall, with monsoon seasons followed by

drought, result in patterns of water availability that are nearly as difficult to handle as where water is lacking. The expected technical difficulties are often exacerbated by inhospitable and inaccessible terrain, and the basic technical data needed for planning, design and construction are generally lacking. Highly variable geographic and climatic conditions limit the use of standardized design so most projects are site specific.

Coupled with high demands and the technical difficulties of planning are the diverse and frequently difficult social and economic conditions in developing countries. For example, populations within the same country are often culturally diverse. The necessary institutions for planning and implementation are often non-existent or ineffective for a wide variety of reasons.

Rural communities are frequently dispersed and not well organized. In some cases, their populations are transient, migrating from one part of the country to another with the season. Residents of these communities tend to be poor and with little education; they are often ignored by central government. Women, in particular, are by-passed although they are the most affected by inadequate services.

The cities, with rapidly growing, often illegal, squatter settlements, are not easily served. Even among the higher economic and social classes, government is seen to have the primary responsibility for water and sanitation services. Industries and large commercial enterprises are generally free to develop their own supplies, without charge, extracting water from streams and underground, the latter often resulting in local shortages and/or land subsidence. Pollution from the cities and their industries has a great impact on the usefulness of water resources.

Agriculture, which uses 80-85% of the water resources in most developing countries, is often perceived as having unfettered rights to any water which is available and, because the water is "free", much of it is wasted while nearby urban settlements are obliged to invest large sums to import water from afar. The need for an integrated approach in the development of legislative and regulatory tools for the use and conservation of freshwater resources regardless of use has been well demonstrated.

Financial and human resources are very limited in developing countries and subsidies are scarce. The lack of adequate training and educational institutions is a major impediment to the development of strong institutions. The absence of information management facilities reduces the benefits that can be derived from experiences elsewhere. The implementation of water resources projects is hampered by the lack of local manufacturing resources, resulting in high dependence on imports for both hardware and technical inputs.

The conditions described above all conspire to complicate the planning, implementation and operation of water resources systems in developing countries. Years of inaction in the face of rapid growth oblige huge investments that in turn require extraordinarily strong institutions if water resources systems are to be well conceived, implemented and operated on a sustained basis.

Elements of CB have, of course, been pursued over the years, but at best with indifferent success and much too often with outright failure. The less developed countries are littered with projects built with funds from loans and/or grants that fail to meet their objectives or that are abandoned. The projects may have made some provision for elements of capacity building but implementing policy change and institutional and human resources development have often had lower priority when a project includes the construction of facilities and/or the provision of instruments and equipment.

Part of the problem results from the perception, in developing countries that the ESAs themselves are not interested in the institutional capacity of the countries to sustain the projects. This perception is easily understood; ESAs are seen to be driven

by the need to meet lending or granting targets; field teams seem far more concerned with the project itself than with its sustainability. Although failures in projects resulting from institutional inadequacies have been well documented, ESAs are loathe to condition, and thereby delay, a loan or grant contingent upon assurance that a national or local capacity exists or can be developed to use the funds properly.

Capacity building requires steps to be taken at all levels, in-country, with the backing of ESAs.

### **Capacity Building in Countries**

The initiative for capacity building in the water sector in developing countries must come from within the country. ESAs might well promote CB but investments in the sector are not likely to be sustained if the countries are not themselves fully committed to CB at all appropriate levels. One measure of this commitment is country readiness to participate in a rapid assessment.

Identification of the policy environment, institutional resources, water resources availability, quality and demand, and human, material, educational and financial resources are key elements of capacity building in a country.

For implementation, country CB activities in the water sector may need to be approached at two levels:

1. The national level: National issues for CB include the policy, legal and regulatory frameworks, integrated water resources and river basin (where appropriate) management, water demand management, information systems, sector organization, and the utilization and promotion of national professional associations. National government agencies often have major roles to play in local projects and their relationships with local agencies influence country capacity. Furthermore, international and bilateral external assistance is generally provided through national governments or, in large countries, provincial or regional agencies.
2. The local level: In the WSS and IRR subsectors, most projects are implemented at local levels generally through municipal water utilities and sewerage agencies, private water companies or irrigation districts, with varying inputs from consumer organizations or farmers associations. External assistance may be given at the local level through non-governmental organizations (NGOs), particularly for rural, village or small community projects. Most large scale funding for local projects will be funnelled through national agencies and their success will depend upon the quality of institutions at both national and, more significantly, local levels. The issues to be examined at the local level include local institutional resources and alternative management models, local water availability and demand, water conservation, water quality, local financial viability including funds for O&M and cost recovery, local human resources development, and consumer organizations. Integrated water management is entirely appropriate between water supply and sanitation agencies and inclusion of local irrigation districts is advantageous, especially where water reclamation for residential, urban, industrial and agricultural non-potable re use is feasible.

### **The Policy Environment**

A tradition of free water for agricultural irrigation and heavily subsidized water for household use, often embodied in policy and law in less developed countries, has

placed heavy constraints on sound water management and the funding of water projects. However, even where such traditions exist, and national governments are in economic and political disarray, local initiatives have sometimes been able to create institutions that plan, finance, construct and manage high quality water enterprises. The development of institutions need not wait for the establishment of sound policies and laws, indeed strong local institutions can often be a stimulus to their establishment.

Examples of the policy issues that need to be addressed are:

1. Water resources, although renewable, are being depleted, limiting development. Measures need to be taken to manage water resources so as to extract the maximum **sustainable** yield feasible. The natural cycles of flood and drought cannot be controlled, but their impacts can be regulated.
2. Water that falls as rain and then flows in rivers, lakes and underground may be free, but making it available for agriculture, residential, industrial or other use is costly; commitments to meet these costs are essential. This situation is little different from providing electricity to consumers, where metering and charging to meet the costs have been fully accepted from the outset.
3. Realistic charges must be imposed on users to meet the costs. To encourage conservation, the charges should reflect the amount of water used. Accordingly, *metering of water produced and used, a sound long-term management practice in any case, is essential.* At the very least, charges should be adequate to cover the costs of management, operation and maintenance of facilities. Because ESA funds are not likely to meet all capital costs for development, transmission, and distribution of water for agriculture, industrial or urban use in less developed countries, charges should begin to include cost recovery.
4. National and local laws and regulations are necessary, and the institutions to implement them need to be effective.

### **Institutional Development**

The essential ingredient in capacity building is institutional development (ID), including the weaving of the essential fabric of all sound institutions, their human resources. Many types of institutions have been successful; but a universally suitable model cannot be prescribed.

Institutions are products of a country's history and social and economic structure; the choice is a local prerogative. A major problem is too many institutions with overlapping authorities infringing on a sector; the "dragons" that dominate Chinese administration.

The intention is not necessarily to add new institutions, but to assess those that exist and be open to, and aware of, other models that have been successful and may be appropriate. Institutions in the water sector include national and administrative agencies such as ministries, and local administrative agencies such as regional water authorities, municipal departments of public works and irrigation districts, regulatory agencies, such as water pollution control and environmental protection agencies, and utility organizations. Community consumer groups are considered separately.



The literature is replete with models for institutions, each with its advocates. They include:

1. National and local government administrative regulatory and operating agencies, the most common. Administrative and regulatory agencies are generally national or provincial, while operating agencies are generally local.
2. National and local quasi governmental agencies or authorities (called "Quangos" in Britain) which are generally financially self sustaining with their own personnel practices. Whilst responsible to some national agency, they often enjoy greater freedom from political constraints.
3. Local public utilities for water supply are the most common models with separate municipal sanitation agencies providing sewerage and waste water treatment. Many advantages accrue when these are combined in a local public utility. A utility type service for irrigation has been proposed and is finding a place in developing countries (Frederiksen, 1987).
4. Private agencies that often own and operate water supply service utilities, with regulation of the services, where regulation exists, by national government agencies. Privatization has extended to a lesser extent into sewerage and irrigation agencies.
5. Another model is the public ownership of facilities with operation and management turned over to private companies under contract.
6. To optimize the potential for effective water resources management, comprehensive river basin organizations have considerable promise. They were successful in England and Wales for some 15 years (Okun, 1977) until they were privatized and many of their functions removed in 1989. Most river basin agencies have limited operational and financial responsibilities but this may well change in time.
7. Planning, design and management of water-related enterprises, while at one time functions of national and local governments, are increasingly the responsibility of consulting organizations. Such organizations are generally privately owned, but in many instances government agencies themselves serve as consultants to other national or local governments that do not have in-house expertise.

Saunier and Nadeau (1989) describe innovative institutional structures that help assure sustainability but they conclude that, even with privatization and provisions for cost recovery, sustainability depends on the quality of the local institutions. All models have advantages and disadvantages which depend to a considerable extent on local circumstances. Given that institutions are essentially people, major changes may be more difficult to implement successfully than a series of small modifications. All that ESAs can do, where institutional structures are perceived as constraints to effective management, is to offer a variety of options for change and support those promising changes that country officials elect to pursue.

Transitional processes may be more acceptable than the upheaval that may result from pursuit of the "ideal" situation.

## Human Resources Development

Capacity building depends on adequate institutions and institutions depend upon human resources. The organization of an institution, the boxes and lines, is less important than the people who occupy the boxes. An ideal institutional structure with poor personnel has less potential than a poor structure with high quality people. Both success and failure have issued from all types of institutions but sound institutions along with high quality human resources are the best assurance of achieving objectives.

The growth in interest in human resources development (HRD) and its identification as more than just training, were contemporary with the Decade. However, an HRD study in the water sector sponsored by the ACC/IGWR revealed a general absence of attention to the assessment of human resources availability, demand and needs (UNESCO, 1987). Various assessment models were presented, including those prepared early in the Decade by WHO (1984), the World Bank, WASH (1988a,b), and the International Center for Public Enterprises in Developing Countries (Ljubljana). The survey report also presented its own model.

Of particular interest was the evaluation of some 22 HRD reports that were identified for DHV, the Dutch consultants who conducted the study, by the ACC/IGWR. Only a few were found to be a needs survey. Some comprise a supply inventory only. Only nine were believed to be relevant, only four of these were proper sectoral HRD need assessments, and only two of these were done on a national scale. Of the two, one was limited to irrigation training needs in Zimbabwe. The only report that met all the criteria for a needs study was that produced by the Australian Water Resources Council "Manpower and Education for the Water Industry" (1981), and its relevance to developing countries may be open to question.

The responses by the ACC/IGWR (1990) to its own invitation at its Tenth Session in New York in 1989 for a preliminary survey of training requirements in the water resources sector indicated that a paucity of data are at hand, especially at the country level, and those data that are available can be characterized as being fragmentary, representing only bits and pieces of what is being done. Data to respond to the final item of the Terms of Reference for the preliminary survey, "An estimate of the order of magnitude of the gap between available and required human and financial resources," are not at hand. Ample numbers of prescriptions and models for national studies are available; implementing these studies for the purpose of developing sound programs seems not to have been done. Further investments in "how to do" should be replaced by "doing."

The UNESCO report stated "...although the need for studies of this kind has been widely stressed, only a few are actually produced..." . The report concludes that "...comprehensive and integrated HRD needs assessments... are vital for the development of policies and for decision-making that affects the position of human resources in the sector..."

The Australian Water Resources Council report, the only thorough national human resources study cited, begins with a detailed description of the water industry in Australia, including lists of the major urban authorities and their distinguishing water supply and sanitation characteristics. Close attention is given to the social and economic issues facing the water industry and the resulting impact these issues have on future planning.

The report includes a detailed supply and demand analysis for five personnel categories: professional, middle level, technician, trade, and operative. All the major categories involved in the water industry were identified with detailed descriptions of their responsibilities. The workforce was surveyed to produce an inventory by category and by region, and future work force requirements were forecast.

The heart of the report is Australia's discussion of the educational system's capacity to supply the forecasted demands, including civil engineering undergraduate and post-graduate studies, continuing education, and operator training. The study includes a list of existing faculties and trainers as well as an analysis of relevant courses. Specific policies are recommended and an administrative structure is proposed for implementing the policies.

The strength of the report is that, although it deals with "broad" issues, it does not avoid detail. Its specific recommendations, assessments, and forecasts are supported by numerous surveys and thorough investigations.

The precision and quality of the report makes it a valuable planning tool for water authorities, educators, and government officials.

Essential elements of HRD are education and training resources at all levels which, along with methods for their utilization by personnel employed or to be employed in the sector, need to be evaluated. Included in these resources should be, in regions where they are available, members of the International Training Network (ITN), now numbering nine in Asia, Africa and Latin America, which provide resources that can assist countries in their own training efforts. A product of the UNDP/WB Water and Sanitation Program, ITN is now devoted primarily to WSS training needs. There is no reason why, possibly in cooperation with FAO, it should not cover the water resources sector, including irrigation, in the future.

HRD is more than just a responsibility for improving the competence of staff. It involves employment practices, career structures, and professional and financial incentives. For example, the setting of a training program may have more impact upon improvement of a trainee's qualifications than the contents of the program. If the training program is seen by the trainee as an investment in him or her, individual self worth is enhanced and the training is more likely to be approached with enthusiasm. If better performance as a result of commitment and/or training is seen to be rewarded by increased pay and by an invitation to a higher level of training and then greater responsibility, the individual will make a much greater effort than if the training and its rewards are perfunctory.

Staffing patterns must be well understood and opportunities for promotion enlarged, commensurate with merit. Expertise in HRD exists and should be employed on the permanent staff of large institutions or as consultants to smaller organizations.

The potential for human resources development in the water sector depends to a great extent on the educational and related resources in the country. While improving literacy and vocational skills and developing a system of higher education are outside the purview of those responsible for HRD in the water sector, much can be done to enhance the quality of personnel through the educational system.

Many water-related educational, research and other tasks can be delegated to local universities and other educational institutions. This helps the educational institutions obtain and retain staff in the water sector. A common practice is to have a utility provide the university with funds for professional students to undertake tasks important to the utility. The university, the student and the utility all benefit.

Twinning arrangements may be encouraged between universities in industrialized and less developed countries, which will have the advantage of providing up to date technical material to one and familiarity with the specialized needs in the sector in less developed countries to the other.

Joint research projects between the two institutions can be funded by a research agency or an ESA in the industrialized country. USAID has long sponsored modest research programs in universities in developing countries when coordinated with a US institution.

Universities in industrialized countries may commit themselves to developing

specialized programs for engineers and scientists from developing countries. The bilateral ESAs fund such programs in specific technical fields or directed to specific countries. Among the most outstanding are the Dutch supported International Institute for Hydraulic and Environmental Engineering (IHE) in Delft which serves globally and the Asian Institute of Technology which serves their region. Finnida supports education at Tampere Institute of Technology in Finland for engineers from Kenya, Tanzania and Ethiopia. France supports CEFIGRE, an active training program. Such programs help the personnel in both industrialized and developing countries.

### **Community Organizations**

Too often decisions on local water-related interventions are made between ESA staff and high level government officials in the capital, neither of whom are knowledgeable about the local population or its wishes. Examples abound where water supply systems have been built with external assistance but where few of the potential customers chose to connect, leading to abandonment of the project. The customers chose for various reasons to continue to purchase water from vendors at exorbitant prices rather than to connect to a system in which they had no input and whose reliability and quality of service were suspect.

Community organizations have been perceived to be important in rural communities, but they are equally or even more important in urban communities. It is not at all inappropriate for a project to include funds for the borrowing institution to support one or more consumer organizations that would institutionalize the assessment of customer needs, ability and willingness of potential customers to pay, and ascertain their preferences with regard to levels and reliability of service. An understanding of the readiness of people in the less developed country to support a project is essential, and the establishment and financial support of a consumer organization would pay for itself by avoiding costly mistakes so common today. Such an organization is particularly important, though its composition might be somewhat different, for sanitation projects.

The role of women in consumer organizations has been shown to be instrumental in their success and in the sustainability of WSS projects. The reasons are easy to understand: *in the absence of WSS facilities it is they who spend substantial portions of their time carrying water and whose quality of life in the home and in the field is most affected by the scarcity of water.* Women have a stake in the improvement of WSS facilities and, in many societies, in irrigation facilities as well. PROWWESS, a UNDP program for the Promotion of the Role of Women in Water Supply and Environmental Sanitation Services, has made significant progress in enhancing the participation of women, but most projects and programs still ignore and even resist the input of women. Capacity building at the local level cannot succeed without the full participation of women. Their leadership has been found to be especially important. In light of the integration of water management and the importance of agricultural irrigation in rural areas, it is not unreasonable to extend the purview of PROWWESS to include the role of women in irrigation projects, especially in countries where women share, with men, the work in the fields.

While most other interventions in capacity building have been appreciated if not often implemented as fully as they should be, a responsibility for the establishment and utilization of community or user organizations is relatively new and requires new insights and (what initially may be uncomfortable) practices, if the full value of the beneficiaries is to be obtained. If fiscal responsibility is to be expected, users need to be involved early in the planning.

The importance of the role of community organizations has been recognized by the UN Secretary-General (UN, 1991): "There is... a promising trend, in some countries,

towards the more positive involvement of local communities in the conservation and management of their natural resources and the environment. This mobilization of the people, particularly women, with appropriate information support, and education and training programs, may offer one of the greatest opportunities for the sustainable management of those resources, and a campaign to stimulate such action could give a strong impetus to the implementation of a national strategy.”

### **Successful Institutions: Water Supply**

Community water supplies were initially local responsibilities, and in most industrialized countries they continue in this fashion. In developing countries, except for major cities, responsibility for water supply has shifted to central government, although a trend towards decentralization is growing.

#### **Mexico:**

a country in transition, moving from centralized direction of WSS to decentralized operation, where municipalities and states are being asked to take primary responsibility for their own water and sanitation systems.

Mexico suffers from the lack of basic data for planning and decision making, water and sanitation systems that are not financially self-sufficient, tariffs that are too low, large shortfalls in receipts that fail to cover costs, university programs in sanitary and environmental engineering that produce only modest numbers of WSS specialists, too few continuing education programs for upgrading technical skills of practitioners, high unaccounted for water (UFW) in many systems, and generally weak institutions. Indeed, these ills are not peculiar to Mexico but are often the norm in developing countries.

Despite these prevailing conditions, the WSS company for the state and city of Queretaro is an impressive operation. Unlike so many WSS companies throughout the world, the Queretaro offices are a beehive of activity. Most desks are equipped with microcomputers that are continually in use. Staff are busily engaged, working either independently or in small groups: no idle conversations, no extended breaks, no newspapers. The key members of management obviously know the details of their system and its operation. They can, for example, produce a recent report, internally prepared, on the operation of private water vendors in pre-urban areas; their costs, receipts and profits; and steps the company has taken to regulate them. With respect to maintenance, the managers readily describe the numbers of vehicles and personnel that are kept in the field and on alert 24 hours per day to deal with main breaks, customer complaints, and other problems.

To better monitor the system, the company developed and constructed its own panel board in headquarters, with lights to show the operation and problems with key items of equipment and a bank of microcomputers recording data on flows, pressures and system indicators. The board is not particularly attractive, but it works.

With so many systems in Mexico suffering from high rates of UFW and revenue shortfalls, the record of Queretaro is a pleasant exception: finances are generally adequate and UFW has been steadily reduced under new company management to less than 30% through an aggressive program of maintenance in recent years. Concerned with the high cost of network expansion, the company has turned increasingly to the use of microcomputers and mathematical optimization techniques for least-cost planning and design.

Why is Queretaro more successful than so many other systems? Clearly, the company has strong leadership, which is in the hands of bright and capable people. Most of the managers admit that it was not through formal training but on-the-job

learning that they developed their skills and expertise. The company obviously enjoys substantial autonomy, largely free from political pressures and appointments, which has enabled it to rise to the challenge of trying to optimize its operation. One of the most impressive aspects of the company is its strong motivation and commitment to serve the public. Many staff members enjoy telling stories about their responses to crises, including the problem at 11 PM on a recent New Year's Eve, which took many of them away from their festivities to deal with an interruption in service. Clearly, the chemistry in Queretaro is "right", and they are an example for their peers.

### **Philippines:**

The Local Water Utilities Administration (LWUA) was established to develop and oversee a system of autonomous Water Districts (WDs) which are directed to oversee water and sanitation projects in provincial towns and cities. Despite LWUA's corporate credo: "We build institutions for you," its early activities focused more on physical development issues than institutional issues. This approach resulted in many WDs lacking the institutional capacity to control and financially manage their projects. In recent years, LWUA had changed its approach and begun to concentrate on important CB issues such as Human Resources Development. LWUA has diverted its resources from the formation of new WDs and construction-related activities to existing WD institutional development.

LWUA has demonstrated its commitment to HRD by constructing and operating an extensive Water Supply Training Center fully equipped with laboratories, a demonstration pipeyard, and classroom area. The WSTC offers numerous training opportunities for LWUA and local WD staff including operator's certifications, cadet training, advanced technical training, and management and policy making seminars. In addition, LWUA has started to play a more prominent role in training throughout Southeast Asia, offering courses in the Philippines for system operators and others from countries in the region as well as bringing their training programs abroad.

In addition to an aggressive training program, LWUA offers its employees attractive compensation packages in order to reduce staff turn-over. LWUA also encourages its employees to pursue graduate work, with a high percentage of senior staff having been sent overseas for further training. This combination of training and employee relations has provided LWUA with a well-qualified motivated staff. While the centralized nature of LWUA has enabled it to develop its training facilities and expand its activities beyond the Philippines, this has also resulted in more political influence over LWUA than in cases where such institutions are more decentralized. Hence, LWUA is an example of a large organization with good facilities, strong programs, reasonably solid funding, but under political influence, which became obvious with the recent change of government. Queretaro, on the other hand, is relatively small, without such strong facilities and programs, but enjoys freedom from outside pressures.

Successful companies have distinctive organizational cultures where managers are held in high esteem which they perceive as a mandate for company excellence (Yepes, 1990). Well-developed companies have good job stability at middle management and professional levels, free from undue political influence which, among other things, results in an institutional memory. The well-run companies are financially strong, free to set their own tariffs, and customer relations are given the highest priority.

WHO and the Swedish International Development Authority have produced a series of case studies focussing on HRD, two of which are mentioned herein. People in Focus (WHO, 1989a) is about SANEPAR, Brazil's WSS company in Parana State. In 1979 emphasis in the company shifted from "producing water" to "serving people", both customers and water company staff. To accomplish this shift, SANEPAR

borrowed concepts from the private sector, e.g. management by objectives and the need for a strong data base for decision making. They adopted various indicators (e.g. number of customer complaints per month), which helped them to judge their performance. Before the shift in 1979, technical issues had been given highest priority whereas afterwards, the focus shifted to financial aspects, especially self-sufficiency. Also, staff training became a key item. Descriptions were written for essentially all the jobs in the company, and training needs were examined individually based on personnel qualifications. This emphasis on the importance of staff resulted, among other things, in increased motivation and improved performance.

### **Successful Institutions: Irrigation**

From the earliest days of irrigated agriculture, the facilities were built and maintained by associations of farmers. Their gravity flow open channels are to be seen throughout the world and the practice is still wide spread. However, with the growth of irrigation to produce increased yields, the large amounts of water required led to the intervention of national agencies with responsibility now largely devolving upon ministries of agriculture or even ministries of irrigation. The International Irrigation Management Institute in Colombo reports on the recent creation of commune systems in the Philippines and farmers organizations in Chile and Argentina. Others are presented below:

#### **Colombia:**

Plusquellec (1989) reports on two successful irrigation systems in Colombia where management was transferred to *Water Users Associations* in the 1970s as part of a national program of decentralization.

While governed by a board of directors from several public institutions and presided over by the Ministry of Agriculture, the management and financing responsibilities lie with the associations. Criteria for success include "highly motivated and trained personnel, good management, and adequate transportation and communication facilities".

#### **Nepal:**

Farmer-managed or communal irrigation systems ranging from several hectares to more than 5000 hectares characterize irrigated agriculture in Nepal. These operate with little or no input from central government or other outside agencies. Yoder and Martin (1991) report on a study of 25 systems in the hill country of Nepal, where farms are small, which revealed that the systems were well-organized and managed, resulting in intensive agricultural production. A diversity of organizations were found to be equally effective; some were informal while others were highly structured with many functionaries. While the functionaries are responsible for execution of the work, major decisions are made only at meetings of all the members.

Two basic methods of water allocation are used. The most common is to allocate the water according to the land area to be irrigated. A more interesting approach is the selling of shares to farmers, with each share representing a fixed portion of the total water available. If a farmer has more water than is needed, and another farmer needs more water, shares can be sold. Additional shares can be sold to obtain funds to increase the yield of the system. This approach provides an incentive for efficient use of the water as well as a mechanism for increasing the area irrigated.

The principal characteristics of these systems are:

1. The irrigation system creates the need for organization, which in effect becomes the basis for a user group;
2. The systems are effective in their timely delivery, allocation, and distribution of water, in their mobilization of labor for maintenance of the system, and in building extensions to their facilities;
3. Ownership of the systems affects the farmers attitudes and behavior, creating a sense of responsibility for the systems and their operation.

Lessons from these systems may well be applicable to community water supply and sanitation systems in Nepal and elsewhere. Integrated water management has a place even in rural areas.

### **Rapid Assessments**

Among the initial tasks of developing countries, with the participation of external support agencies, would be to undertake, where appropriate, rapid assessments of their resources and needs. It is essential that these assessments be based on a collaborative and integrated approach among all the ESAs interested in providing development assistance to the countries. Also, country institutions need to be committed and actively involved. It would be highly desirable to involve community organizations as well, in order to obtain views from user communities. Country readiness to participate, as demonstrated by the identification of a lead agency and key personnel, may well be a criterion for early selection for support by ESAs.

The term "rapid assessment" is used purposely to denote the limited period of time (3-6 months) set aside to carry it out. The assessment is meant to be the first step in the process of planning for the water sector.

It would be beneficial to the country, and the ESAs as well, to institutionalize the assessment process. In view of the different conditions and levels of development, the assessment will vary from country to country. It is particularly important that the assessment team be comprised of specialists provided by both the governments and the ESAs, with the former constituting the nucleus and corporate memory of the planning process in the country.

*Rapid Assessments need to be tailored to the local situation. Among the subjects to be covered are the following:*

- Water resources in the area, including the impacts of pollution;
- Needs for water for agriculture, industry, and water supply and sanitation as well as needs for sewerage and waste water treatment in urban areas;
- Facilities available for providing WSS and agricultural irrigation as well as other water related activities;
- Policy climate;
- Institutional resources at national and local levels, including user organizations;
- The need for human resources and facilities available for their development;
- Legal and regulatory tools and constraints;
- The financial situation with regard to capital and O&M requirements for WSS and IRR, including the potential for cost recovery; and
- Identification and solicitation of ESAs that are likely sources of technical and financial assistance.

UNESCO and WMO have joined in the preparation of a Handbook for National Evaluation for Water Resource Assessment Activities (UNESCO/WMO, 1988). Whilst including very useful methodologies for assessing water resources data,



institutional frameworks and manpower, education and training, it omits any assessment of existing or future water uses or demands which need to be determined at the same time to identify the country needs for CB.

Rapid assessments are intended to identify the situations that are most critical and that need to be addressed while longer-term needs, programs, and projects are being assessed. Gaps in knowledge concerning water, financial, and human resources will be a challenge to rapid assessments, as will the inertia to be overcome in launching such studies.

The steps in undertaking the rapid assessments should include:

1. The creation of a team with representation from national, metropolitan, and/or local agencies based upon the perceived urgency of their problems and their readiness to take initiatives.
2. The team should include representatives from funding ESAs or their executing agencies as well as from ESAs that are prospective participants.
3. Team members should represent the several professional fields necessary to the particular situation, including, especially, individuals with an interest and expertise in human resources and institutional development so essential to capacity building. It may well be appropriate to include representatives from among the constituencies to be served.
4. The team should contact all the national and local organizations with an important role to play in water resources, including the promulgation of laws and regulations and, especially means for their implementation.
5. Criteria should be developed and used to provide a basis for establishing priorities for both immediate action and for longer term studies.
6. Projects should then be prioritized within categories for immediate action and for implementation over a longer time span.
7. Finally, terms of reference should be prepared for the highest-priority projects.

### **Legal Issues**

When fresh water was abundant and sufficient to easily meet all people's needs, legislation for its management was not important. When water became scarce, organized society interceded. Ancient civilizations codified their water management practices where water was limited. Laws are fruits of political systems which are generally dominated by special interests.

Traditionally, water for domestic purposes enjoyed priority, but agricultural interests have become powerful, putting constraints on water urgently required for rapidly growing urban and industrial metropolitan areas. The fact that laws and regulations exist in many places has not resulted in equity; their absence, however, assures anarchy.

A common complaint in industrialized countries is that legislation and regulations have overwhelmed the water sector. Users are in conflict and resolution increasingly lies with the courts. In less developed countries, laws and regulations are often inadequate and, more importantly, where they do exist they are seldom enforced. Laws and regulation are necessary but not suffice to assure sound management of water-related activities. This is a responsibility of the institutions.

However, institutions also have a responsibility for the promulgation of appropriate laws and regulations. They need to have the professional expertise, both administrative and technical, that can advise on legislation and regulations that are appropriate and implementable, recognising existing constraints. Sound and implementable laws and regulations and effective institutions are essential.

A major constraint to water resources management in most countries is that the institutions for water were created to serve particular constituencies such as municipalities, agriculture, flood control, etc. and their objectives may well be in conflict with one another. The capacity building initiative and the rapid assessment may identify such problems and begin a process leading to integrated water management.

An FAO/WHO Working Group on legal aspects of water supply and waste water management "...emphasizes (inter alia) the need to ensure that governments have the legal power to allocate and reallocate water reuse rights..." They suggest a "water rights administration" (WHO,1990a). Many other recommendations are made, among which are:

- Integrated water resources planning
- Mechanisms for community involvement
- Enhancement of the capacity of water agencies and users' associations to manage water systems
- Control of allocation and use of waste water
- Protection of downstream users from upstream withdrawals
- Encouragement of user charges
- Need for institutions to achieve sustainability

The Working Group explicitly recommended that assistance be offered to developing countries for implementation of these recommendations. Extension of these recommendations to agricultural irrigation was implicit.

An example of new legal problems that arise is associated with waste water reclamation and reuse for non-potable purposes in urban areas, industry, and agriculture. Such problems have not yet been adequately addressed in industrialized countries where water reuse is beginning to be well developed.

Who has ownership of the reclaimed water? Where separate agencies are responsible for water supply and sewerage, which one should have responsibility for the non-potable reclaimed water service? Local water institutions will have to be adapted to deal with this important 'new' resource.

Laws and institutions are particularly important today in the less developed countries where water requirements for urban and industrial growth and agricultural irrigation exceeds available resources, which is nearly everywhere. Water for domestic purposes has traditionally enjoyed priority.

However, because agriculture uses about 80 to 85% of water resources, agricultural interests have become the dominating power in water resources management in arid and semi-arid areas. Agriculture agencies hold dominion over water resources in most countries, including the United States, and the provision of water for growing urban and industrial needs has been seriously constrained, despite the fact that the market value of water in urban use is considerably greater than in agricultural use. A major objective of this water sector capacity building initiative is to integrate water management through policy, legislative and institutional modification, to ensure that water resources serve country economic and social development needs most effectively.

### **Information Management**

*Information is a crucial resource for effective water resources management and is essential to any CB activities. For example, design of a water supply reservoir is little more than a guessing game without adequate, long term run off data. Information management systems are necessary to ensure a reference base that allows continuous updating and monitoring of water resources data and integration of documentary*

information on water resources management, both of which are essential to strong institutions. The International Reference Center (IRC) in the Netherlands has been instrumental in helping promote information management systems. The INFO-IMPACT workshops, initiated by IRC at the request of the Steering Committee for Cooperative Action for the IDWSSD to address this issue, resulted in the "Framework for Technical Information Exchange (TIE)" (IRC, 1989). The Framework is based on an incremental build up of information exchange capacity at country and project level, through interaction between four interconnected elements: assessment of needs and resources; product development; capacity building; and promotion.

Following endorsement of the Framework by the Steering Committee, the Water and Sanitation Collaborative Council included technical information exchange as one of the key components to be incorporated in the future water and sanitation projects. Technical information exchange, project/sector information, management information and public information and promotion as elements of comprehensive information management, were affirmed as matters of major importance in CB for the provision of sustainable water supply and sanitation programs in developing countries. IRC has already expanded its coverage and might well incorporate water resources information generally and irrigation specifically in its purview in the future. The Country External Support Information System (CESI), which already enjoys increasing country level interest, can be expanded to include CB and the integration of water management. TIE and CESI are expected to make significant contributions to ESA collaboration in the water resources sector (IDWSSD, 1989).

### **Professional Associations**

National and international non-governmental professional associations have long played an important role in enhancing the capacity of industrialized countries in the water sector. As Rietveld (1991) points out:

- They provide a mechanism for reporting and updating technical knowledge in the sector and making it available to professionals in the field through publications, conferences and short courses;
- They work with national decision makers in defining policy and setting standards of all types;
- They can provide a link between public agencies, consultants, manufacturers, industry and the public;
- They promote national and international exchange and cooperation in training, research, technology, and in sector development.

These professional associations depend upon contributions from their members through payment of dues and, much more importantly, through contributions of time. Manuals of design, operation, and methods of analysis are all products of professional contributions to the associations. Those who participate in the committees that prepare such manuals feel that their professional gains repay more than the value of their time.

Whilst well established in the industrialized countries, professional associations are either non-existent or very weak in most less developed countries. Important contributions, to national capacity building in the water sector, can come from ESA assistance as well as from initiatives by international professional associations which in general are dominated by representatives from the industrialized countries. The International Water Supply Association, through its Foundation for the Transfer of Knowledge, made a commitment to "Building and Strengthening National Capacities for Sustainable Water Supply and Sanitation Coverage" at New Delhi (IWSA, 1990). It is prepared to contribute to the strengthening of national professional associations.

National associations in the industrialized countries can also reach out to assist like types of associations in the developing countries by making special arrangements for distributing their publications which, because of foreign exchange difficulties, are generally not readily available in the less developed countries. ESAs can assist financially in the distribution of publications by working through national associations and they can also help by sponsoring professionals to attend conferences which are not easily accessible because of the limitations on foreign exchange.

While the IWSA is operative in the WSS sub-sector, the International Water Resources Association might well be called upon to address the water resources sector as a whole, assisting in the creation of national associations in the irrigation sub-sector.

### **Twinning**

The growth of the "sister-city" concept, or twinning, can usefully be nurtured and focused on WSS services. Management and operating staff of a utility or an authority, or even a national agency in an industrialized country can exchange visits with their counterparts in a developing country, generally already selected by virtue of some commonality. Visits can be made by individuals or by teams representing a wide range of services. Such enterprise fosters international understanding as well as technical exchanges and have the advantage over project interventions in that they can be long term. Bilateral ESAs can identify and promote such activities in their own countries. Because these efforts are generally individually financed, at least on the industrialized country's side, a little financial assistance can make a big impact.

### **Multinational Corporations**

Multinational manufacturing corporations have production facilities throughout the developing world. They generally require services for water supply and waste water and solid waste management and disposal. Whether they locate in an urban area and receive services from the municipality or provide their own services in a city or in the countryside, they are closely involved with local and often national institutions. They may want to contract and pay for local WSS services but find that the water supply is unreliable and the pollution control facilities are inoperative. If they perceive the problem before sighting their plant, they may opt for a location away from the city despite the advantages that accrue from an urban location. In any event, multinationals have a stake in the quality of the WSS institutions that serve them. If the utility is having trouble with the maintenance of its equipment, a common problem in the less developed countries, the corporation might offer to use its own facilities for equipment repair. While helpful, this intervention has only short-term benefits; a better contribution would be to help train the utility management and operating personnel in the development of preventive maintenance programs. Such large corporations in the industrialized world have close working relations with the utilities that serve them in their home country. They might promote twinning between utility personnel that serve their home country plants and the utility personnel that serve their developing country plants. The engineering consultants they employ from their home country on implant water operations might be asked to offer technical and management assistance to the water related utilities where appropriate.

Multinational corporations are an important presence in developing countries and their resources can be harnessed in their own interest and in the local interest. Professional associations can be a facilitating instrument in such endeavors as multinational companies are major contributors to the development of their national professional associations.

### **Consulting Engineering Organizations**

Consulting engineering firms from industrialized countries are major actors in both WSS and IRR projects. They are generally employed by clients in the developing countries but the ESAs are often involved in their selection when they are the source of funds. Consultants are often selected for their technical competency with little attention to the role they can or should play in capacity building both with the institutions they serve and with local consulting engineering organizations. The "joint-venture" of an expatriate firm with a local firm on a project is often a marriage of convenience, the local firm helping secure the contract and being thereafter involved in "housekeeping" rather than professional obligations.

It should be the responsibility of the ESAs to incorporate in the engineering assignment a responsibility for institution building with particular emphasis on human resources development. The latter should include development of the staff and, in addition, of local engineering and other professional personnel involved in the project. An expatriate consulting firm selected on the basis of its commitment to human resources development as well as its technical responsibilities would be eager to use its professional staff to assist with training and support of local professional associations. They exercise such functions in their home countries as an inherent professional obligation. However, if the ESAs who review the performance of the consulting firm on the project appear only to be interested in the pace and quality of the technical phases of the project, both the consulting firm and the client would be little inclined to give priority to HRD. The lead time for training the staff for a project may be as long, or longer, than the time required for completing the capital facilities, so HRD obligations should be initiated at the outset, or earlier through a separate project. Furthermore, it is good practice to employ the permanent staff during design and construction phases of the project so they can be familiar with the project literally from the ground up.

Expatriate consulting firms can be the key to developing a wide range of HRD-related activities. In the process they might learn something about indigenous resources and practices and so avoid some of the more egregious examples of inappropriate technology.

### **Capacity Building in External Support Agencies**

Applications for loans and grants in the more developed countries, whether from commercial banks, from central government or from private foundations, are accompanied by assurances that the applicant has the capacity to use the funds effectively and to ensure sustainability. When these applications are appraised, the potential lender or grantor examines the applicant to ascertain whether the capacity does, in fact, exist.

Problems arise when the lender or grantor has objectives other than only assistance to the applicant. Among ESAs, the level of lending or granting may have been established to justify the existence and continued funding of the agency itself or to enhance the status of the agency among the family of similar agencies whether international, bilateral, or non-governmental. Among some bilateral aid agencies, and to some extent the international lending agencies, the driving force for granting or lending may be political, diplomatic or commercial, with certain countries targeted irrespective of the expressed needs of the countries. Within agencies, competition among sectors or departments to achieve high levels of lending or granting may result in loans and grants being made without too much concern for whether the capacity exists to use the funds effectively and to assure sustainability. In the event that a loan or grant is evaluated for its effectiveness in meeting its avowed objectives, an oft-

omitted part of the process, this occurs so many years later that the staff responsible will have long since departed.

Other problems with implementing CB projects are that investments in processing a loan or grant for CB are not so rewarding as investments in capital projects which move larger blocks of money. Also, CB is not so visible as capital projects. They are not amenable to dedication ceremonies and plaques nor can they become memorials to national leaders.

### **World Bank Experience**

The World Bank, through its Policy, Research and External Affairs Unit, sponsored a Conference on Institutional Development in December 1989. Participants included Bank managers and staff and representatives from ESAs and the academic community. Paul (World Bank, 1990b) found a positive correlation between project sustainability and ID. Although increased attention has been given to ID issues in Bank projects, the quality is uneven. He attributes the poor record to the mismatch between the complexity of institutional development issues and the staff assigned to it. He recommends that task managers take more interest in ID issues and supplement their ID skills. Institutional assessments should be accepted practice by the Bank and the country.

In a review of 84 Bank projects approved by the Board in 1988 (World Bank, 1990a) it was reported that 33% of the completed projects were weak in ID. Of the people working on ID issues, 44% were technical specialists; 27% were economists; 18% were lawyers, financial analysts, project officers, and country officers; and only 11% had specific ID training. The authors concluded that technical and institutional specialists perform better ID work than economists, and that those with more years of experience outperform those with less experience.

An important conclusion of the report was that the best ID work is done by task managers committed to ID goals. The authors recommended including ID specialists on the staff of country departments.

Sullivan (World Bank, 1989a) analyzed the existing Bank structure relating to its capacity to perform ID work and concluded that "Consideration should be given to preparing an operational directive that would guide the staff in preparing country ID strategies and in undertaking institutional assessments...." and that "Resources are a major factor determining a staff member's willingness and ability to deliver a sound product. Guidelines on budgeting time and resources for ID work, based on different types of ID experience, would help staff plan appropriately for ID-related work."

The World Bank through its Operations Evaluation Department (OED) reviews the strengths and weaknesses of Bank operations annually and evaluates all of its projects after their completion. OED has become increasingly concerned with capacity building issues, such as institutional development and human resources development. In its most recent review, "Evaluation Results for 1988, Issues in World Bank Lending Over Two Decades" (World Bank, 1990a), CB issues facing the Bank are highlighted, with ID and HRD issues being cited as critical indicators of project success. OED concluded that "In a large number of the unsatisfactory operations, the principal determinants of performance were institutional." In terms of sustainability, a measure of project success, OED listed six important sustainability determinants, three of which are related to CB: institutional development, management competency, and level of commitment.

In an OED review of irrigation projects (World Bank, 1990e), McPhail pointed out that, while 80% of 124 projects in 1974-88 had been judged satisfactory, performance dropped to 61% in 1988. In the same periods in the Asia Region, satisfactory

performance dropped from 89% to 41%, with only eleven of twenty-four projects judged satisfactorily in 1989. Because these evaluations were made before the performance of the projects has been fully demonstrated, a series of twenty one impact evaluations were undertaken covering all regions. Projects had been approved between 1961 and 1978 and were completed during the period 1970-86. The following is a summary of several of the parameters.

Parameters	% Satisfactory
<b>Irrigation Performance</b>	
Status of Irrigation Systems	39
Equity in Water Distribution	63
<b>Institutional Performance</b>	
Operations	58
Maintenance	22
Extension Service	53
Agricultural Credit	75
Cost Recovery	32

Several findings regarding institutional issues were instructive. The division of responsibility for the projects among several ministries and poor coordination among institutions were common problems. For example: "Water authorities remained engineering-oriented with little knowledge of agriculture whilst agricultural services were ill-prepared to advise farmers on irrigation techniques." Only about 50% of the projects evaluated achieved even short term sustainability. One important conclusion was that the Bank and the country governments disengaged too early so that "...most of the projects under review will not reach their expected useful life and already require rehabilitation and modernization." On the positive side, water user associations were found to be effective and their adoption is encouraged as an institutional investment for sustainability.

In the WSS sector, recent OED reports illustrate the importance of institutional capacity with CB issues frequently cited in the "Lessons Learned" section of each report. Several WSS projects evaluated in FY 1989, but begun about 10 years earlier, are summarized below:

1. Managua Water Supply III Project (World Bank, 1988b): The project completion report stresses the impact a strong institution can have on success. One of the "Lessons Learned" states: "The completion of the Managua III project demonstrates that when an institution is strong, enjoys autonomy, and has a motivated experienced staff, a project can be successful in spite of great political changes that may occur in the country."
2. Egypt Water Supply and Sewerage Engineering Project (World Bank, 1988a): Unlike the Managua Project which benefitted from an existing strong institution, the Egypt project met with limited success due to institutional problems. One of the institutions responsible for the project (NOPWASD), had six different chairmen over the course of the project. While the project included a major institutional development component, it was judged to be limited partly due to the Bank's

approach to institutional development. One of the "Lessons Learned" advises that "...the Bank should adopt a more pragmatic approach to complex institutional change..." The report also concludes that "...the project appraisal underestimated the complexities of the Egyptian decision-making process in matters relating to contract award and decisions on engineering and institutional options."

3. Cotonou (Benin) Water and Sanitation Engineering Project (World Bank, 1988a): This project emphasized the necessity of addressing institutional issues throughout a project and not just in the early "studies" phase. The initial phase of the project included an institutional study. Follow up, however, was devoted principally to technical areas. Several components of the project had to be dropped due to what the OED described as "...the absence of reliable institutions." In the "Lessons Learned," the report stated "Retrospectively, it appears that the institutional and resource mobilization issues should have been addressed prior to launching ambitious technical studies." The Benin project demonstrated that institutional studies, while necessary, are not sufficient to ensure that measures will actually be taken to improve existing institutions.

Based on assessments of some 125 World Bank WSS projects, Buky (1990) found that adequate management and staffing are essential to success. He emphasized, furthermore, that capacity building needs to occur prior to, rather than during, project implementation. Success was achieved "...where the Bank had the fortitude and patience to prepare the ground... by insisting on pre project action for the build-up of institutional competence."

#### **Lessons Learned - Ten Years of the WASH Project**

The Water and Sanitation for Health (WASH) Project, established ten years ago by the U.S. Agency for International Development as its principal contribution to the IDWSSD, is operated by a private consulting organization, Camp, Dresser and McKee International, Inc. It recently published "Lessons Learned From the WASH Project" (WASH, 1990). Subtitled "Ten Years of Water and Sanitation Experience in Developing Countries," it identifies the major issues which have contributed to WSS project success. The report begins by identifying a four-component project methodology consisting of:

1. skills transfer through technical assistance
2. linkage of related development activities
3. sustainability
4. shared responsibility for development outcomes.

Capacity building issues, including institutional development and human resources development, are important to each component.

The first lesson listed in the report refers to the effectiveness of technical assistance: "Lesson One: Local institution-building is the key to transferring sustainable skills." The problem with many technical assistance programs "...is one of not perceiving institution-building as a major purpose of technical assistance and thus of not structuring the assistance so that this takes place."

WASH cites sustainability as the most important measure of project success. To achieve sustainability, WASH believes projects must address institutional development: "...all of the institutional systems (i.e., operation and maintenance, administration, commercial, technical) should be addressed simultaneously and should involve people at the top, middle and bottom of the institution." This focus on individuals



recognizes that "Dedicated, well-trained people will find a way to get the job done whatever the structure..." and that seemingly sophisticated institutional organizational charts "...will have no impact if the people... do not have the will and capability to implement the program." The report cites human resources development as the key to providing institutions with the necessary "dedicated, well trained" people.

### **Role of External Support Agencies**

The UN organizations, the regional development banks, and the bilateral ESAs active in the water sector must encourage capacity building. Because UN agencies are major actors and often set the tone for new initiatives, their commitment to capacity building should be highly visible.

In large project oriented agencies, there might be a central office and even regional offices; in agencies with more limited water related programs, capacity building might be a focus located in an appropriate office in the agency.

Many of the CB activities will be common to all of the organizations. They may have to develop guidelines and procedures for capacity building and provide oversight of projects. They might take the lead in conducting studies and applied research in institutional and human resources development, and they will have to see to the development of their own staffs.

The UNDP and the World Bank in particular will be expected to play a major role, especially at the outset. They provide multi sectoral funding; they are world-wide; they are the source of major funding in the water sector; and they each have a special focus, the UNDP on human development and the World Bank on poverty. Their tasks would be to provide leadership.

One approach, now being implemented in some projects, is to commit a certain percent, say 5 to 10%, of the total funds to be allocated to capacity building. While highly desirable, this alone might fall short of providing the help needed. In many countries, new projects place heavy burdens on national and local institutions, burdens which they are often ill equipped to handle. To require that CB and ID initiatives be undertaken in addition is a lot to ask. Investments in CB should be made prior to embarking upon implementation of large projects and continued during the project.

If an ESA is to promote CB, it itself must be staffed adequately with knowledgeable personnel in appropriate executive and operating positions. A country is not as likely to implement the CB portion of a loan or a matching grant unless it perceives that the ESA is itself committed and that future investments of the ESA are likely to be dependent upon country capacity in the sector.

In larger ESAs, such as the World Bank (WB), the Food and Agriculture Organization (FAO), the regional development banks and the larger bilateral agencies, there may need to be CB personnel at a central policy or administrative level as well as in departments that operate in the field appraising specific loans or grants. In specialized agencies and in smaller ESAs, a single focus for CB may be adequate.

The Food and Agriculture Organization (FAO) has formulated an International Action Program on Water and Sustainable Agricultural Development (IAP-WASAD) within the framework of the ACC/IGWR (FAO, 1990). While identifying five specific actions, including efficient water use, drainage, water quality management, small-scale programs, and scarce water resources management, attention is also given to institutional development which provides a basis for CB. In arid and semi-arid areas, the Program recognized that "Because of scarcity, rational and equitable decisions on water allocations must be made among various water users and uses. Such decisions can only be properly made and implemented within the functional and institutional frameworks." The document goes on to point out that "There have been many

initiatives in data collection, land use zoning, and control of over exploited water resources, yet many plans remain unimplemented or controls unenforced..." In addition, in arid and semi arid regions where urban and industrial growth has created new water demands, insufficient attention appears to be given to joint efforts with others in the water resources sector. With agricultural irrigation currently using about 80% to 85% of the world's fresh water resources, the bigger burden for sound management falls on agricultural enterprises.

The Program includes important supporting actions including institutional strengthening and human resources development. If integrated water management is to be promoted in a client country by agencies that operate in the water resources sector including both WSS and agricultural irrigation, as of course it should be, CB would require that efforts be made to overcome sub-sector barriers within the agency so that different WSS and IRR policies are not promoted by the ESA within the separate agencies in the country. Such a process has already begun in the World Bank with the establishment of committees representing WSS, IRR and environment, which may well be a focus for CB activity in the regions. The ultimate objective would be to encourage countries to promote integrated water management agencies themselves.

### **Water Resources Management**

Of all the shortcomings in implementing the Mar del Plata Action Plan, the failure to address the water resources issues facing the developing world are the most threatening. The traditional approach to water supply, whether for community or agricultural use, is to estimate demands (if an assessment is indeed made) and to assume that the resource is available for the taking. Over-exploitation of groundwater, by abstracting at greater rates than recharge can take place, this results in the "mining" of water, which means that the supply cannot be sustained, leading to escalating costs for meeting demand. Whoever has the funds is generally free to extract water from underground or from streams virtually at will. In industrial countries, local water shortages have been overcome by gigantic water transfer projects. This approach is beginning to encounter political obstacles because watersheds are no respecters of governmental boundaries. In addition, the threats to communities that are to be flooded by major impoundments, threats to flora and fauna resulting from excessive abstraction from streams, and excessive groundwater abstractions causing land subsidence that threatens urban structures and increases the potential for flood damage are, and should be, inhibiting the easy acquisition of new sources and the over exploitation of existing sources.

Even though water is a renewable resource, fresh water resources are being depleted by withdrawals from surface and groundwater sources at a greater rate than they are being replaced by rainfall, although the amounts replaced on average with each cycle of rainfall are relatively constant. (Obtaining the average is itself a daunting management and technical problem). Except for desalination of seawater, which is beyond the financial capabilities of all but a few countries, there are no "new" sources. All countries will have to live with what they have, or can negotiate from others; arid and semi arid countries and semi arid regions of otherwise humid countries are already facing serious limitations. Even cities in rain-rich countries are now experiencing local shortages.

Up to now, few measures have been instituted to husband existing water resources or to devise mechanisms for effective allocation of these resources. Even in the industrialized countries where these problems have already been widely recognized, the institutional and regulatory responses do not offer much guidance. The paucity of

institutional and human resources and the almost complete absence of governmental frameworks for water resources management require starting from much further back than was the case with WSS.

The challenge is exacerbated by the inherent conflict for domain over the resource between agricultural and urban demands, between country and regional needs, and even between countries. Conventional WSS projects in developing countries seldom stir public or political controversy; on the other hand, many constituencies, most generally at odds with one another, become involved in water resources projects. Accordingly, a priority task is the development of policies, legislation and regulations for management of this resource along with the creation of institutions capable of establishing mechanisms for allocating water, including the development of financial tools necessary for implementation of these policies.

While spearheaded by UNDP, several of the UN agencies have been focussing on these issues. For example, in a report on water management lessons for the 1990s, the UN Department of Technical Cooperation for Development (UNDTCD, 1991a), listed the common problems of water management:

- A dominance of unregulated use of water resources,
- Inadequate and ineffective water resource management,
- A high degree of inefficiency in many water-related public utilities,
- A failure to retain trained staff of all types,
- Over centralization and bureaucratization of decision-making authority, and
- Inappropriate and inadequate water legislation.

The report concluded "...centralized national planning has failed as a tool for achieving optimum use of the water resource..." It stated, further, that "...institutions must be appropriate to local conditions and not centrally imposed... (they) should reflect the overwhelming priority of local responsibility and of the need for local, not just central, coordination."

However, national planning and source allocation may be necessary where water resources are scarce. The report of the UN Secretary General (UN, 1991) cited an example: "The preference of farmers for water-intensive crops, despite an adverse water balance overall, and mandated allocative arrangements and sanctions, is seen in the cultivation of sugar cane in Maharashtra. This crop is favored because it can be sold at a guaranteed price that is remunerative net income per acre was two to nine times higher than that for other crops in the early 1980s. However, the popularity of sugar does not mean that its cultivation is socially preferable.

Data show that this crop takes six to eight times as much water but generates much lower product value per unit of water than alternative crops."

Shortages of water supplies for cities and their high marginal cost have led to development of programs of "demand management" in urban areas of the industrialized world. Demand management involves both technical tools, such as reduction in unaccounted-for-water, water reclamation and reuse, and institutional measures, such as sound pricing policies. The UN Secretary General's report (UN, 1991) emphasizes the importance of demand management: "The low efficiency of water use is a subject of concern to a majority of countries. This relates to all sectors, as it indicates excessive demands on the resource itself and on investment in infrastructure and operational costs. Because of the heavy water requirements of agriculture - for irrigation - this sector represents, for many developing countries, a key to the rational overall use of water. Demand management, even if it gives only marginal savings of water, may have profound benefits when applied to agriculture, in the large volumes it releases for other uses, or in the costs avoided for additional resource exploitation."

As a report by UNDTCD (1991b) points out "Urban water agencies, particularly in

developing countries, often lack many, or all, of the programs and policies ... prerequisite to demand management." Moreover, and what is more important when considering overall water resources management, demand management in agricultural irrigation with 80% of water used for agricultural irrigation, 20% reduction in irrigation use would yield four-fold the amount of water as a 20% reduction in urban use. In fact, in some regions it has been demonstrated that more efficient agricultural irrigation would release sufficient water to meet all additional urban needs.

The International Action Program on Water and Sustainable Agricultural Development (IAP-WASAD), a strategy for the implementation of the M.d.P. Action Plan for the 1990s led by FAO (1990), is an example of this initiative. Among the many elements of the program are institutional strengthening and human resources development with special attention to addressing issues of water scarcity.

In its International Hydrological Program Plan for 1990-1995, "Hydrology and Water Resources for Sustainable Development in a Changing Environment," UNESCO (1989) includes, in addition to research, a major commitment to the management of water resources for sustainable development, education, training, transfer of knowledge, and public information. Within this rubric is the provision of methodological guides for the assessment and integrated management of water resources, including integrated monitoring of soil and water systems in supporting groundwater resources assessments. A cautionary note might be introduced: projects should not be limited to "how to" make assessments, but should include the actual "doing" of selected country assessments.

UNESCO's program addresses the education and training of senior technicians through regional networks of water resources training centers. It also assists with university education at undergraduate and post-graduate levels and with policies for and establishment of continuing education systems.

WMO, has a highly developed program offering regional training courses, seminars and workshops conducted world-wide, as well as short and long-term fellowships supported in part by UNDP. These programs are dedicated to specialized fields for fairly high-level technical personnel in hydrology, meteorology and related areas.

The education and training offered by UNESCO and WMO in various aspects of water resources technology are well documented in agency publications. The persons undergoing this professional development are generally associated with national and local water-related institutions and their ultimate success in applying what they have learned is dependent on the quality and effectiveness of their institutions. Thus, to improve technical performance, training is necessary but not sufficient; attention must be given to institutional development in the sector, a key to capacity building.

Accordingly it would behoove UNESCO and WMO to evaluate the specialized institutions that are served by their trainees. Concomitantly, these agencies should consider offering training in institutional management directed to top-level personnel. A first-class hydrologist who might be selected for management responsibilities in a national water resources institution is not likely to have the management skills needed for fledgling institutions.

### **Urban Water Management - Water Reclamation**

With a 40% increase in the urban population over the last decade, almost all cities in developing countries are experiencing water supply and sewerage problems. The water supply problems arise because of inadequate quantity, exacerbated by leakage and poor accounting of water, and poor quality at the source. Buky (1990) has characterized unaccounted for water as probably the best single indicator of the efficiency of a water utility.

The available economic sources have generally already been exploited. Population growth, increased per capita domestic consumption with higher standards of living, and growing industrialization all combine to increase demand. Developing new sources, even where available, requires transmission of water over long distances at high cost. In the Beijing-Tianjin region of China, for example, with a population of 18 million, 60% of which is urban, water allocations in 1984 were about 200 m<sup>3</sup>/sec, of which about 65% went for agriculture and 35% for industrial and domestic use (East-West Center, 1988).

Studies showed that the most economical sources of additional water for the region would be through reclamation of waste water to be reused for agriculture, industry and non-potable urban purposes with the recognition that the agricultural uses near the cities would be switched to industrial and urban purposes as the cities expanded.

A recent workshop in China (UNDP, 1990a) concluded:

"Water resources and water quality are closely interrelated in water-short areas such as North China. Failing ground and surface water resources are effecting health and threatening social and economic progress. Industrial discharges are contributing to the problem by destroying valuable water resources throughout China. Proper water management for continued development must include water conservation and pollution abatement. Reclaiming waste water can help meet demands and also reduce pollution. Urgent action is needed to prevent irreversible loss of water resources."

A major problem, which is similar to that in other urban areas in developing countries, is that much of the population is not yet served by sewerage and that only about 10% and 20% of the municipal waste waters in Beijing and Tianjin respectively receive treatment. Water reuse requires that the waste waters be collected and be adequately treated. Only simple primary treatment is required for irrigation for crops that are not to be eaten raw, but conventional secondary (biological) treatment and filtration are required for market crops and for urban irrigation, toilet flushing and most commercial and industrial uses. The latter are attractive because they are not consumptive and the waste waters generated can be reclaimed again. Urban irrigation and evaporative cooling are consumptive uses but they offer an opportunity for waste water disposal that does not pollute receiving waters.

The high cost of retro fitting reclaimed water lines in cities where high-rise residential and commercial buildings have been provided with potable water but without adequate sewerage and drainage is daunting. Hence, the use of reclaimed water is best initiated for serving individual large users in or near urban centers and in newly developing urban areas where services can be provided during construction. One advantage does accrue to cities without fully developed sewerage systems; the collection systems can be laid out and treatment plants site with reuse markets in mind.

The potential for reuse does highlight the need for research on urban sewerage to reduce its cost. One promising approach is modification of the design standards developed in industrial countries where heavy capital investments can be justified to reduce maintenance costs. Because of the backlog in sewerage in developing countries, the objective should be to minimize capital costs even if it results in higher labor costs for maintenance. Labor intensive solutions are economically and socially appropriate in developing countries. Extensive studies in this direction have already begun in Brazil.

In Sao Paulo, Brazil, the first unit of a secondary treatment plant (3.5 m<sup>3</sup>/sec) came on-line in 1988 in the western part of the city near rapidly growing urban and industrial developments. The effluent was of such high quality that SABESP has undertaken pilot plant studies for reclamation of the water for industry and urban irrigation (Okun and

Crook, 1989).

The World Bank, UNDP, FAO and WHO are engaged in joint studies for water reclamation and reuse in the Middle East and North Africa region (World Bank, 1990f,g). Among the developing countries where water reuse appears to be attractive are Cyprus, Egypt, Jordan, Morocco, Syria, Tunisia, Turkey and Yemen.

Non-potable reuse of municipal waste waters has been extensive in the U.S. for urban irrigation, industry, power plant cooling, and many commercial uses in the arid areas of the southwest and in Florida, a state with more than 1300 mm annual precipitation. The use of reclaimed water for toilet-flushing has recently been introduced in commercial buildings in California, but has been widely used in residential buildings for many years in Singapore and Japan (Okun, 1990).

Water reclamation for urban, industrial and agricultural use is an option that will become increasingly attractive in urban areas when costs are compared with other alternatives for obtaining new sources of water. In evaluating this option, the policy enunciated by the UN Secretary General (UN, 1991) needs to be considered:

“Water must also be seen as a commodity, with an opportunity cost, not simply as an input to agricultural production. The fact that its value is not truly recognized in most irrigation schemes does not reduce its value for other uses. A reduction of allocation to irrigation may be attainable at a cost to agriculture... which is far less than the marginal cost of developing new supplies for domestic or industrial purposes. Similarly, an exchange of high quality water being used for irrigation, in return for adequate waste water, may be a sound principle of resource management.”

### **New Decade - New Strategy**

Despite major commitments by countries, with the assistance of external support agencies, water resources development, including water supply and sanitation for urban areas and water for irrigation in agricultural areas, are not keeping up with demand. Furthermore, many investments that have been made have not been sustained. The major constraint has not been the availability of water resources technology or funds but an absence of capacity in the less developed countries to develop and utilize the resources available.

Strategies for capacity building for water resources management are proposed as an initiative for sustainable development in the sector in the 1990s. They require that the ESAs themselves establish their own resources for capacity building to insure that timely loans and/or grants can be made to enhance the potential for successful and sustainable interventions in the water sector. The principal thrust of the strategies is to assist the countries to initiate capacity building through rapid assessments in the sector. Improvements in the policy environment and institutional and human resources development would be undertaken based upon the findings. Specific actions focussed on both national and local institutions, as appropriate, would include the enhancement of information, education and training programs in the sector and in utilizing, inter alia, professional associations, twinning, multinational corporations, expatriate consulting engineering companies and consumer organizations in innovative ways to assist in the program. ESA-supported programs would also be major actors in the capacity building process. Particular attention needs to be given to more effective water resources management to encourage integration between water supply and sanitation and irrigation subsectors at national and local levels.



# Procedures and Partners for Capacity Building in the Water Sector

G.J. Alaerts, T.L. Blair, H. Savenije, M.W. Blokland and P. van Hofwegen  
International Institute for Hydraulic and Environmental Engineering

## The Capacity Building Concept

### Capacity Building: What It Is, What It Does

1. A sector needs to be **effective** in the delivery of its "services" or "products" to its customers, and **efficient** in the use of its resources. In the case of the water sector, the services are e.g. tap water of given quality and quantity, healthy river and lake water, and adequate quantities to allow irrigation and shipping. These services are prerequisites to development and therefore must be **reliable**. Thus the sector must aim for long-term **sustainability**.

2. Also on the smaller scale of the individual project (or a number of projects, executed by an organization) **effectiveness** and **efficiency** are called for. These aims are translated into quantitative targets that can be measured to gauge the performance of the project or organization. The past decade however has highlighted a common procedure flaw: usually new infrastructure was only assessed shortly after being brought into operation, whilst, in fact, long-term viability is generally the critical aspect.

This led to the recognition of two other criteria, namely **reliability** and **continuity**. Together they determine the project's **sustainability**.

However, high efficiency at sector level does not guarantee effective service delivery at project level.

The sector's strategy must, in addition, fit in with national policies and economic development plans, and help to achieve targets in public and environmental health and well being. It relates explicitly to environmental and human settlement policies.

3. The sector achieves its aims through (i) application of appropriate technologies (the hardware), (ii) use of financial resources and (iii) an operational institutional framework (the software) (*Figure 2.1*).

Evidence grows that in the next decade the bottle neck in sector development will no longer be the availability of technologically sound answers, nor that of financial resources for investment purposes (see e.g. World Bank, 1990h). Increasingly, development and financial institutions point at the limited capacity of the countries' institutional framework to absorb loan and grant funds and convert them into worthwhile and sustainable projects and actions.

Significantly, the problem identified here seems typical for other great undertakings in today's world: (i) the re-creation of the economic strength of the Central and Eastern European countries does not suffer from lack of available funds but from weak structures in these countries, resulting in few proposals for fundable/sustainable projects, and (ii) large commercial enterprises have recently under-

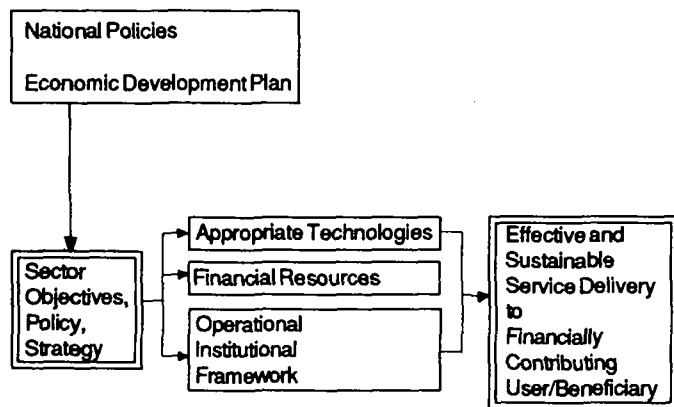


gone substantial reorganizations to be better able to adapt to their swiftly changing commercial environment, and it becomes increasingly hard for them to find, keep and groom qualified human resources suitable for their institutional requirements (Naisbitt and Aburdene, 1986).

Building the capacity of these institutional frameworks is therefore an urgent and necessary task for the nineties.

4. Several **institutions** take part in these frameworks. They are strongly influenced by governments, through policy and regulation, creating an “**enabling environment**” in which the sector and the institutions can develop. Some institutions have **formal** mandates and structures, like governmental departments, professional organizations, corporations, and certain private groups and enterprises. Others are **informal**, in the sense that their role is not precisely outlined, their mandate not spelled out, or their structure unclear. This pertains for instance to user associations, and to the societal “inputs” that lead to a supportive political and legislative environment.
5. To improve sector performance, individual institutions and organizations often need **strengthening (organizational development OD)**. If the mission or structure of one or more institutions needs substantial reformulation or reorganization **institutional development (ID)** becomes necessary. Developing enabling environments and individual institutions on the scale of a sector or subsector is called **capacity building (CB)**. Capacity building thus involves development of institutions, their managerial systems and their human resources, which in turn require favorable policy environments.

As a point in case the International Action Programme on Water and Sustainable Agricultural Development (FAO, 1990) concludes that ‘institutions that deal with agriculture and water development need to be strengthened or restructured to meet, efficiently, the requirements of the farmers and to promote sustainable agricultural development. Principal institutions should have effective linkages with all other related institutions so as to optimize the use of physical, financial and human resources.’



**Figure 2.1** Scheme of the position of the sector and tools through which it operates. Lines indicating feed back mechanisms have been omitted here.

6. At project level, **sustainability** is defined as the capability of the project to continue to deliver service or products in an autonomous manner after the external (ESA) funding agency has withdrawn.

**Sustainable development** can be defined as 'a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and the institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations' (WCED, 1987). Or alternatively, as 'economic change subject to the constancy of natural capital stock - the stock of environmental assets is held constant while the economy is allowed to develop whatever social goals are deemed appropriate' (Pearce, 1988).

7. How can capacity building be translated into projects and other interventions? Firstly, **capacity building** is foremost a **strategic concept**; it therefore calls for the development, or the facilitation and promotion of long-term effective strategies in countries. In other words, countries (or regions) may wish to study where weaknesses are situated, and how existing institutional, legal, regulatory and other constraints to sector development can be removed. They may also like to initiate or further improve their strategies and the organizations responsible for them. Usually such activity requires a very long planning horizon (5 to 20 years). Second, projects (2-4 years) or programs (5-10 years) can be formulated to strengthen the institutional performance of organizations. This pertains e.g. to the technical and managerial capabilities of Ministries (of Public Works, Local Government, Water Resources, Administrative Reform, etc.), of the educational system and of third parties like contractors and quality control organizations. Also the "capabilities" of communities (villages in a district, consumer organizations, etc.) and of their political representatives may benefit from strengthening. The instruments through which this can be done are e.g. management and marketing consultants, training institutes, and twinning arrangements with organizations in other countries. These projects may also require a duration of 3 years and longer.

The traditional approach focuses on the delivery of a mostly technical output through short-term, isolated projects (*Figure 2.2*); it starts from an assumed need. The CB strategy aims explicitly at developing and strengthening the institutions that will essentially become (better) able to provide products and services that meet a real demand (*Figure 2.3*). This demand has to be developed as well.

Finally, the capacity building objective strongly relies on learning by doing. That is, the impact of many investment and implementation projects can be greatly improved by careful consideration of how they could help the local counterpart organizations to become self sufficient. However in many cases this would imply a new mentality and approach towards project execution and target setting. In a sense, in the past our investment projects already contributed to capacity building without us being aware of the capacity building concept. Nonetheless, project initiators and formulators should become better able to include this new objective more solidly in their future initiatives.

To work towards capacity building through whatever kind of projects, will undoubtedly require, of the project officers, a new sensitivity and sense for human relations, management and diplomacy.

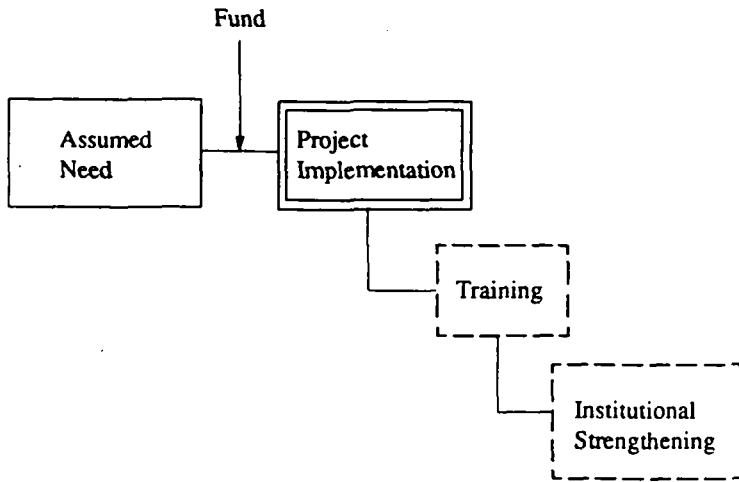


Figure 2.2 Scheme of the short-term project approach, starting from an assumed need.

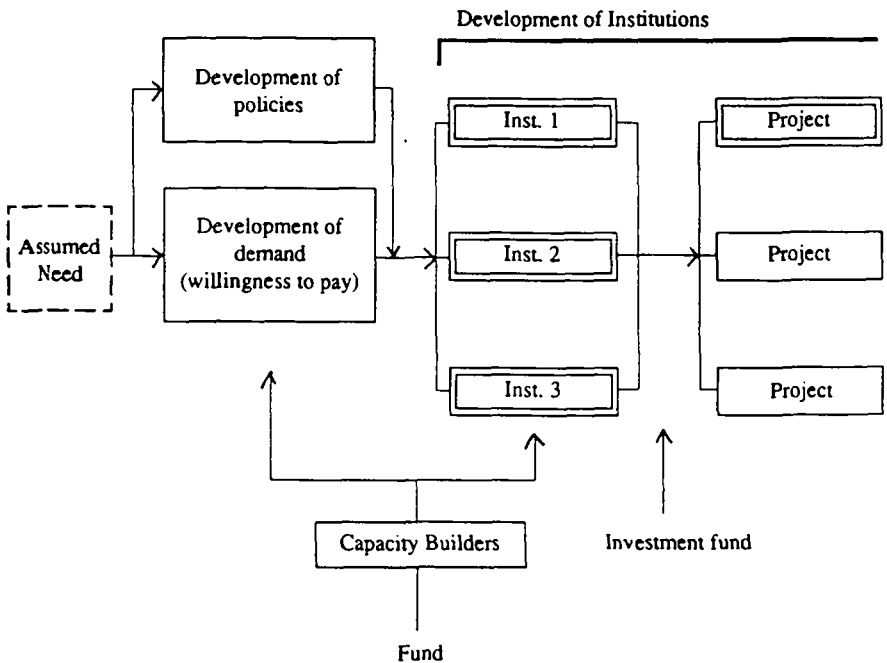


Figure 2.3 Scheme of the long-term capacity building strategy aimed at developing and strengthening institutions (and real demand), so they can eventually deliver autonomously the required services and products in a sustainable manner.

## Water as a Human Settlement Development Tool

8. Strategies for water resources capacity building, should be placed in the broader perspective of human settlements planning and sustainable development.

Today, 800 million people live in settlements without essential public services, like health, education and clean water, and without jobs, improved shelter and nutrition, that could enhance their potential as human beings.

9. The developing countries are confronted with unrestrained urbanization and concomitant industrialization, and, in general, with concentration in human settlements of a completely new dimension. These factors can become the vehicle for economic development, if water is available to make the vehicle run. Human settlements provide the setting in which most economic and social activities take place. Commitments to water supply for industrialization, agricultural improvement, and the expansion of trade, all require an appropriately built environment in the form of cities, towns and villages.

Tragically, the problems of water supply, conflicting uses and pollution are at their most critical state in rapidly growing urban areas. Third World cities and towns already accommodate more than one third of their national populations and produce two thirds of the gross national product.

10. Achieving solutions to pressures for water demand, and the resultant water degradation, is a prerequisite for the well being of communities and the elimination of bottlenecks on the road to sustainable human settlement development and economic expansion. Therefore capacity building efforts should initially identify the issues concerning the supply and demand of water and develop strategies and actions that will enable governments and institutions to manage water resources in a manner that ensures sustained supply of economic and safe water to human settlements.

11. Bringing the human settlements criterion into the discussion implies important changes in perception. The multitude of settlements with their diverse location, composition and preferences has always been a challenge, and headache for the sector professionals, yet they are a powerful opportunity if their support can be rallied:

- the supply of services cannot be sustained without the political agreement of the communities inhabiting the settlements. The sector needs to make further efforts to win their continued and unbiased support. A new 'contractual approach' between sector and communities as equal partners needs to be established recognising that communities have rights but also responsibilities;
- given the above, and the increasing numbers of interventions, the need arises to shorten the communication lines between local beneficiary, planner and decision maker. It is also necessary to decentralize planning and decision making, and devolve power to local governments that will then have the means to become more responsive to local needs;
- because of the multitude of settlement locations the plans and interventions of subsectors need integration to prevent counter productiveness. An integral sector approach at national level is necessary but not sufficient. Integration must be achieved at local level as well. Examples include the Indonesian Integrated Urban Infrastructure Development (IUIDP) aiming at decentralizing project planning, implementation and operation to provincial and local government,

generating more local financial resources, and the Small scale Irrigation Projects (Anon, 1990) in Thailand, in which one, or a few towns, can decide on an integral water use plan suiting their needs.

### **Preferred Changes - Achieving Sustainable Development Towards Building Capacity**

#### **12. Special attention must be given to such elements as**

- Local capacity building;
- Focus on poverty - serving the unserved;
- Meeting demand - providing services people want and will pay for;
- Sharing costs - devising appropriate pricing levels and improving sector performance;
- Appropriate innovations in technology, research and education and training;
- Establishing achievable targets and effective monitoring systems;
- Coordination - building inter-sectoral and collaborative national and international networks.

The groups may wish to emphasize the implementation of their ideas and findings by reference to

- Key concepts and issues;
- Developmental objectives;
- Needs assessment;
- Problem definition;
- Inputs and outputs;
- Sustainability;
- Community management and the role of women and low income groups;
- *Opportunities for funding programmes, research, education and training.*

### **Capacity Building: Issues and Linkages in the Sector**

*Figure 2.4* reviews most key issues currently addressed by the subsectors of WRM, WSS and IRR. Many are common, yet some aspects are specific.

The sector is large and relies on the performance of its subsectors. Interdependency exists with other policies and sectors at national level. The Scheme is composed in such a way as to distinguish these three layers:

- the top layer, at national or state level on which the broad, comprehensive development plans and strategies are defined that together determine the 'general policy environment' which envelops the water sector. This pertains, notably, to economic development plans and strategies, and the more specific industry and agriculture development plans. Also other policies regarding e.g. welfare, public health, state organization and national security are decided here. Of particular interest to the water sector, and therefore separately mentioned, is the management plan for environmental resources, which covers conventional natural resources as well as the spatial and ecological quality potentials.
- a second layer, at which the general and integrated planning and management of the water resources is carried out. This planning exercise involves data collection and processing, and volume allocations. It is carried out in close cooperation (two way communication) with the institutions of the other subsectors. It certainly entails extensive negotiations to accommodate considerable pressure from the side of the implementing institutions who wish to secure their water rights.

- the third, inner layer features the different subsectors, each, again with their own policies, strategies, and implementation structure.

**Intra (sub-) sectoral** problems may occur. These are often caused by differences in mission and managerial culture of the organizations and enterprises involved. For example, water supply enterprises tend to be very conscious of the high commodity value of their product, and of the public health relevance of their work. They therefore are often organized in fairly autonomous enterprises. The fact that they operate as separate entities may render cooperation and joint decision making with other public works departments (drainage, sanitation, etc.) more complicated.

On the other hand it must be borne in mind that enterprises enjoying a relative autonomy, and that are of 'manageable' size, are amongst the most efficient and successful in the sector.

**Inter (sub)-sectoral** problems are more common, as subsectors are not used to cooperating. This leads to the need for integral approaches on national planning level. Because of the importance of effective service delivery at local level, integration there is also mandatory. Such integrated approaches can be found for example in Small scale Irrigation Projects, such as in Thailand. The long and often ineffective communication lines with the respective technical ministries in the capital can thus be shortened, whilst at the same time the highly qualified technicians in these ministries are not any longer obliged to manage large amounts of relatively unimportant information.

### **Actors and Opportunities**

The actors are traditional, their roles must change

### **Changing Roles: The Agency and The Beneficiaries**

#### **Agency management**

In the conventional situation two parties may schematically be distinguished in the preparation, implementation and operation of a project: the (government) agency and the beneficiary community (*Figure 2.5,1*). The roles of these parties are rather straightforward. The agency plays the leading role having insights in policy, managing the funds, possessing the technical expertise and burdened with a generally strenuous task to increase coverage within a limited time. By comparison, the beneficiary is assumed ignorant, incapable and inactive. The role of the community is negligible; the target group is a liability rather than an asset. In the resulting situation "the community is bypassed in the hurry to get the job done" (WHO/SEARO, 1985).

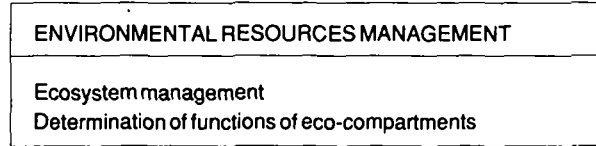
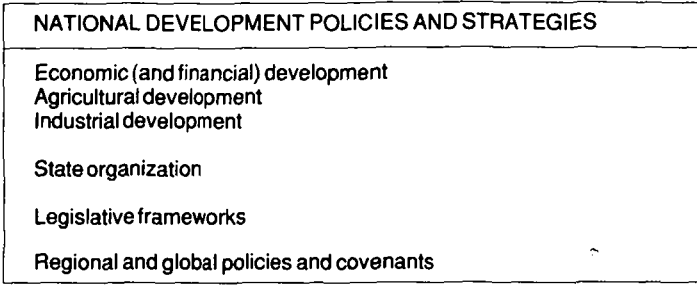
To the surprise of the agencies the systems built with this approach are not very successful: some do not function, others do but are ignored, most are financial disasters and few bring the intended benefits, as local demand has not been developed.

Initiatives and activities in this situation are dominated by a **supply orientation**: higher level government believes it knows, in detail, what is good for the community and transforms funds into (usually) physical facilities from which the people are supposed to benefit.

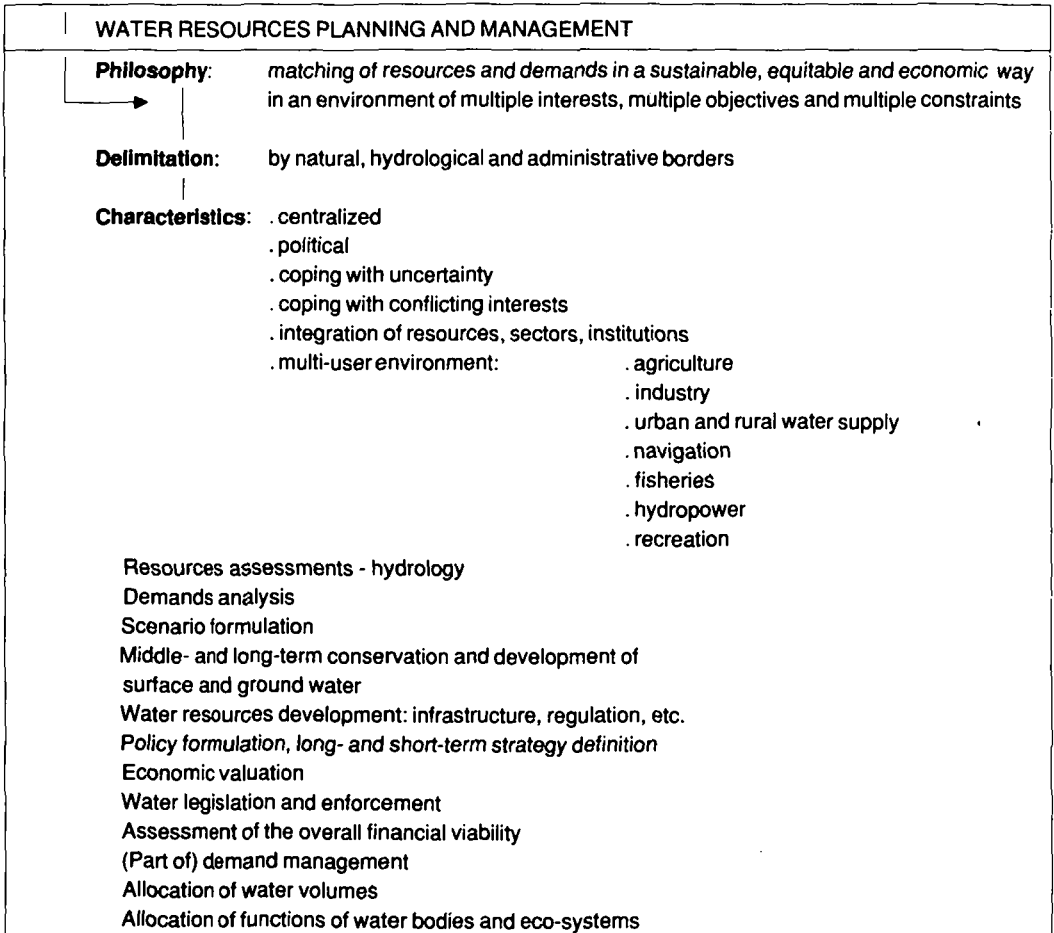
#### **Joint management**

In the intermediate situation, nowadays becoming more common, the parties remain the same but the roles change (*Figure 2.5,2*). Although the agency remains the project initiator, the insight is put into practice, that the community should play a more prominent role, in the entire project cycle, and that, consequently, the agency must take

1. National or state level



2. Sector level: integrated planning



**Figure 2.4** Key issues in the water sector: similarities and differences.

3. Sector level: the implementing subsector

**WATER SUPPLY AND SANITATION**

**Philosophy:** intention to be oriented on demand

**Approach :** determined by administrative borders

**Characteristics:**

- . fair agreement between govt and user
- . centralized staff, of medium size
- . relatively autonomous enterprises or depts.
- . in metered systems incentive for water conservation
- . increasing accountability of enterprise and user through stronger linkage of service and fee

**Water supply:**

- . domestic uses
- . industrial uses
- . other uses
- . physical losses

Availability of water: surface, deep/shallow ground water

**Consumption (market) control:**

- . tariffs, rates
- . regulation (wrt building, wells, etc.)
- . community involvement
- . other

Policy formulation, long- and short-term strategies

**External considerations:**

- . public health
- . human settlements
- . equity re financial burden for service

**Spatial implications:**

- . relation with water source area
- . relation with service area
- . institutional: relation with regionalization
- . land use plans

**Financial/economic plan - cost recovery**

Sector organization: central/regional/local govt. private initiatives (NGO, commercial, community, etc.)

**Drainage, waste water and flood control**

- . domestic
- . industrial
- . (urban and rural) run-off
- . storm water

**Origin, pathways and fate of pollutant flows**

- Impact on**
- . public health
  - . environmental health
  - . water resources availability
  - . eco-system sustainability/development

**Consumption (market) control:**

- . taxes, rates
- . regulation (discharge consents, fines, legal and fin. incentives)
- . reuse and recycling (in-plant, in agriculture)
- . community involvement
- . other

Policy formulation, long- and short-term strategies

**External considerations:**

- . public health
- . human settlement
- . equity wrt financial burden for service
- . national policies wrt govt. role, "consumer/polluter pays" principle
- . industrial development
- . economic loss minimisation

**Spatial implications:**

- . relation with water source area
- . relation with service area
- . institutional: relation with regionalization
- . land use plans

**Financial/economic plan - cost recovery**

Sector organization: central/regional/local govt. private initiatives (NGO, Commercial, etc.)

Inter-sectoral flows of communication, coordination and collaboration

Data collection and distribution

**AGRICULTURE/IRRIGATION**

**Philosophy:** oriented on supply

**Approach:** determined by hydrology and ecology

**Characteristics:**

- . often opposed interests of govt and user
- . large field staff of lower level; organization spatially distributed, more hierarchy
- . strong governmental control, also on agriculture production
- . poor feeling of accountability of board and user; poor linkage between service and fee

**Irrigation:**

- . agricultural use
- . physical losses
- . conveyance to other subsectors

**Availability: surface, groundwater**

Fluctuations in demand and availability  
Conjunctive use, reuse

**Consumption control:**

- . regulation
- . (taxes on land area)
- . (rates, community involvement)

Policy formulation, long- and short-term strategies

**External considerations:**

- . prevention of spreading of diseases
- . human settlements
- . equity, reliability and adequacy
- . erosion control

**Spatial implications:**

- . relation with water source area
- . relation with service area
- . institutional: primary system under govt, tertiary system under farmers;
- . large variety in size, distribution method and management structure

**Cost recovery: usually far below O&M costs;**

often problematic because flow cannot be measured or stopped; fees often concealed

**Waste water and drainage (and flood) control**

- . water logging
- . soil salinity control
- . surface run-off
- . ground water run-off

No consumption control as yet

Policy formulation, long- and short- term strategies

**External considerations:**

- rudimentary as yet, except
- . disease spread control
- . reuse of drainage in irrigation

**Spatial implications:**

(as left column)

**Financial/economic plan:**

rudimentary

Usually water supply has priority



a step back. In this approach "community involvement" and later "community participation" become strategies for more successful projects. The role of the community develops from trench digging, via consultation to participation in decision making. The hesitating agencies like this approach because communities, when accepting an increased share of the responsibility, appear prepared to shoulder a variety of tasks, and most importantly, at least part of the burden of the worrisome operational phase when rapidly increasing operational budgets and excessive manpower demands stretch agency resources to the limit.

### Community management

In a more developed approach the agency's role becomes even less prominent (*Figure 2.5.3*). Communities are emancipating into partners, conscious of the developmental process, and informed about their rights and the various government programmes from which they can benefit. They wish, and can be assisted to become able to decide their own development priorities within the limits of the governmental policies and available resources. Sector agencies help the community choose between options and may be invited to develop and execute sectoral plans fitting an overall development initiative commensurate with available resources.

The participation in priority setting and decision making leads to increased commitment and **institutionalized demand** for which people are more willing to pay. This structural development is basically the same as encountered in governmental decentralization and decision making power devolution to lower level authorities. As the New Delhi Statement formulates it: "Community management goes beyond simple participation. It aims to empower and equip communities to own and control their systems" (UNDP, 1990b).

### Changing Roles: Demand for Institutions at Local and National Level

The fundamental point in the previous Section is that any output from an institution is basically a 'service' to meet an existing demand, which as such can be developed. Consequently, the legitimacy of a new institution at national level depends on how convinced the 'client institutions' are that the new 'services' will meet their real needs. Again, this demand often needs to be identified or uncovered, and developed. Such local demand ensures a capacity which carries the institutions.

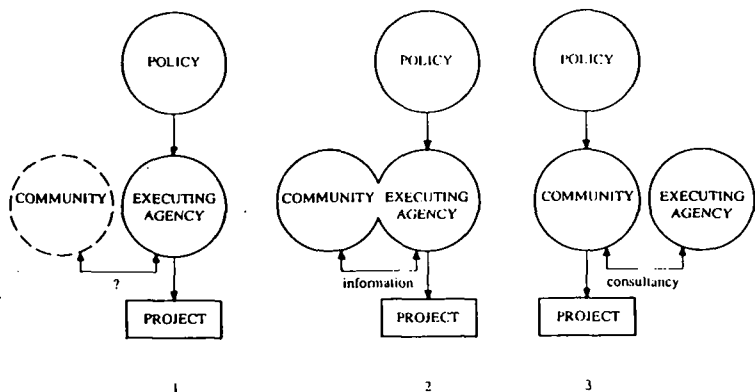


Figure 2.5 Changing structure of Decision Making.

*Demand development is therefore an essential part of capacity building.*

For example, the establishment of appropriate institutions, responsible for integrated water resources planning and management, can only succeed if the existing water agencies, as well as the politicians become convinced of the benefits for their own organization and for the nation as a whole. This implies that they first have to become convinced that a problem exists.

### **Changing Roles: Training Project as Change Agent**

#### **The International Training Network for Water and Waste Management (ITN)**

The International Training Network for Water and Waste Management is a joint initiative of bilateral and multilateral development agencies in support of the International Water Supply and Sanitation Decade. The programme has a long-term objective to improve the efficiency of investments and the extension of water supply and sanitation services to low income groups in rural and urban areas. It aims to strengthen the capacity of sector and educational institutions within developing countries to carry out training and other human resources development activities on low cost water and waste management.

The human resources development activities, in low cost water supply and environmental sanitation in the ITN programme, are directed at a very large and diverse target group incorporating field staff but also decision makers. The activities should cover a variety of integrated technical fields such as water supply, sanitation, drainage, water resources and solid waste, and be based on the multi-disciplinary approach that includes areas like institutional assessment, community development and management, cost recovery, health and hygiene education.

Considering the complexity of the issue, the magnitude of the task, the usually specialized character of individual sector and educational institutions, and the relatively small size of the ITN programme, the approach taken by some of the more successful ITN centers is not to start yet another independent development activity, but rather to identify existing opportunities, and reinforce, mobilize and utilize the human resources development infrastructure to achieve its objective. In this approach the different institutions, that may be investment agencies, government and other sector institutions, universities and NGOs, become participants in a national (or regional) training network in which the ITN Center plays a catalyzing and bonding role.

In this network the participating institutions pool their resources, enabling them to develop and implement more effective training materials, methods and programmes.

The crucial feature is that while carrying out the ITN activities these institutions retain their original mandates and structure. They are not forced or lured into short-term projects that concentrate on physical infrastructure provision. Such projects, with their external financial support have to focus on target achievements and specific project requirements; existing institutions are temporarily reinforced only to help meet the targets. Such projects bring standing, project cars, topped up salaries and other benefits to the institutions at the expense of dropping them again once the project is completed, without necessarily having strengthened them.

In contrast the ITN concept stimulates and professionalize the training capabilities of the institutions, and helps them perform activities simultaneously making the institution itself more professional and respectable. This is most likely to support the sustainable character of that institution.

This activity implies very careful working procedures, establishment of good mutual understanding between the counterparts, external assistance which is primarily geared at policy and strategy development and managerial and generic assistance (e.g.

training of trainers) with a high multiplier effect, and in an evaluation of project progress giving priority to better institutional performance. In general this procedure can be considered a **process** or **programmatic** approach allowing for intensive feedback and in-course improvement.

"The ITN general concept and development objectives are sound and clearly oriented to capacity building" (World Bank, 1991c).

### **What should be done and how?**

#### **Creating a Favorable Policy Environment**

Capacity Building was described above as including the establishment of a favorable, or enabling, policy environment.

A national policy environment is the result of internal socio economic and political factors balanced against external determining factors like policies and working procedures of financing agencies, and international and regional policies and agreements. For the creation of a favorable policy environment for a sector, external and internal factors need to be examined.

#### **National (internal) factors e.g.**

- degree of priority attributed to issues in the water sector at national and regional/provincial level;
- segmentation of responsibilities in the sector over various departments and ministries;
- national political structure;
- political climate regarding devolution of power to more autonomous enterprises and authorities;
- regulation and law structure; law enforcement;
- salary scales and career opportunities for civil servants;
- guidelines for civil service;
- education and training policies;
- degree of organization of water users and their participation in decision making;
- public opinion.

#### **International (external) factors**

External factors are international political, economic and financial parameters that are generally taken into account in the national or internal decision making processes.

Factors of relevance are e.g.

- bilateral, multilateral and regional international agreements concerning the sector;
- policies, financing prerequisites and procedures of ESAs.

To create an enabling environment the objectives of the various interested groups should be made mutually compatible and in accordance with the requirements of the ultimate (planned) beneficiaries.

Special political support and legal control are required where all the objectives and needs of the interested groups can not be satisfied.

### **The Institutions and Factors that Need Strengthening or Development**

*Figures 2.6 and 2.7* provides an overview of the institutions concerned, of the factors determining the enabling environment that allow a sector to set and meet its goals, and of the capacity building agents and interventions.

The institutions and environmental factors can be considered active in three distinct 'shells', of which the outer one includes the international factors, and the inner one those operating in the water sector.

It is important to realize that capacity building implies active intervention and, when applied to the sector, may lead to substantial reorganization e.g. mergers, reassignment of responsibilities, changes in inter and intra sectoral procedures, changes in regulation and legislation, and establishment of new institutions. Similarly, when aimed at individual institutions it may initiate substantial reorganization.

## **How to Build Capacity**

### **A Model for Operational Capacity Building Agents**

The institutions that are to be strengthened or developed are located in the country. A substantial number of institutions are or can become capacity building agents.

A capacity building strategy directed at a country will therefore consist of direct and indirect inputs towards the implementing sector institutions (Fig. 2.8). The direct international inputs comprise projects and programmes in which ESA supported and regional organizations provide the main assistance to the implementing agency. In the direct national inputs, the external or internal financier relies on capabilities and knowledge of a local capacity building agent (e.g. a university, management consultant or information specialist) to support fellow country institutions. In the indirect approach, the ultimate target remains the sector institutions, but the programme's focus lies on strengthening the local capacity building agents. The latter can be termed building the capacity of the local capacity building agents, in analogy with 'training of trainers'. *The indirect approach could be the most sustainable.*

Capacity building institutions should collaborate and mutually reinforce each other (e.g. Chapters of international professional associations and the ITN-type of training network - for the latter see Part III, Training and Education for Capacity Building in the Water Sector).

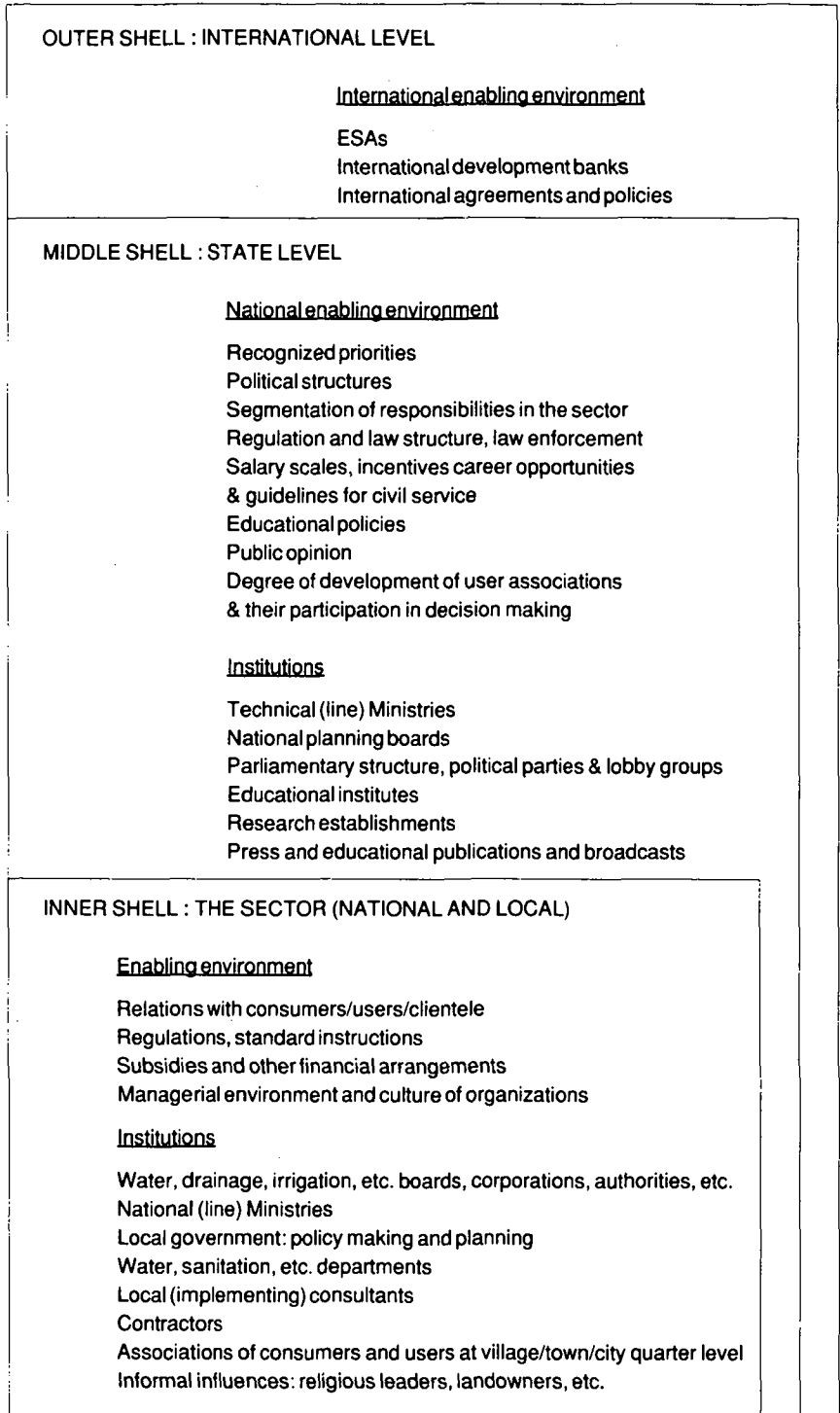
Some types of institution can be active as implementing agency, and as capacity builder, like NGOs.

### **Some Options for Water Resources Capacity Building**

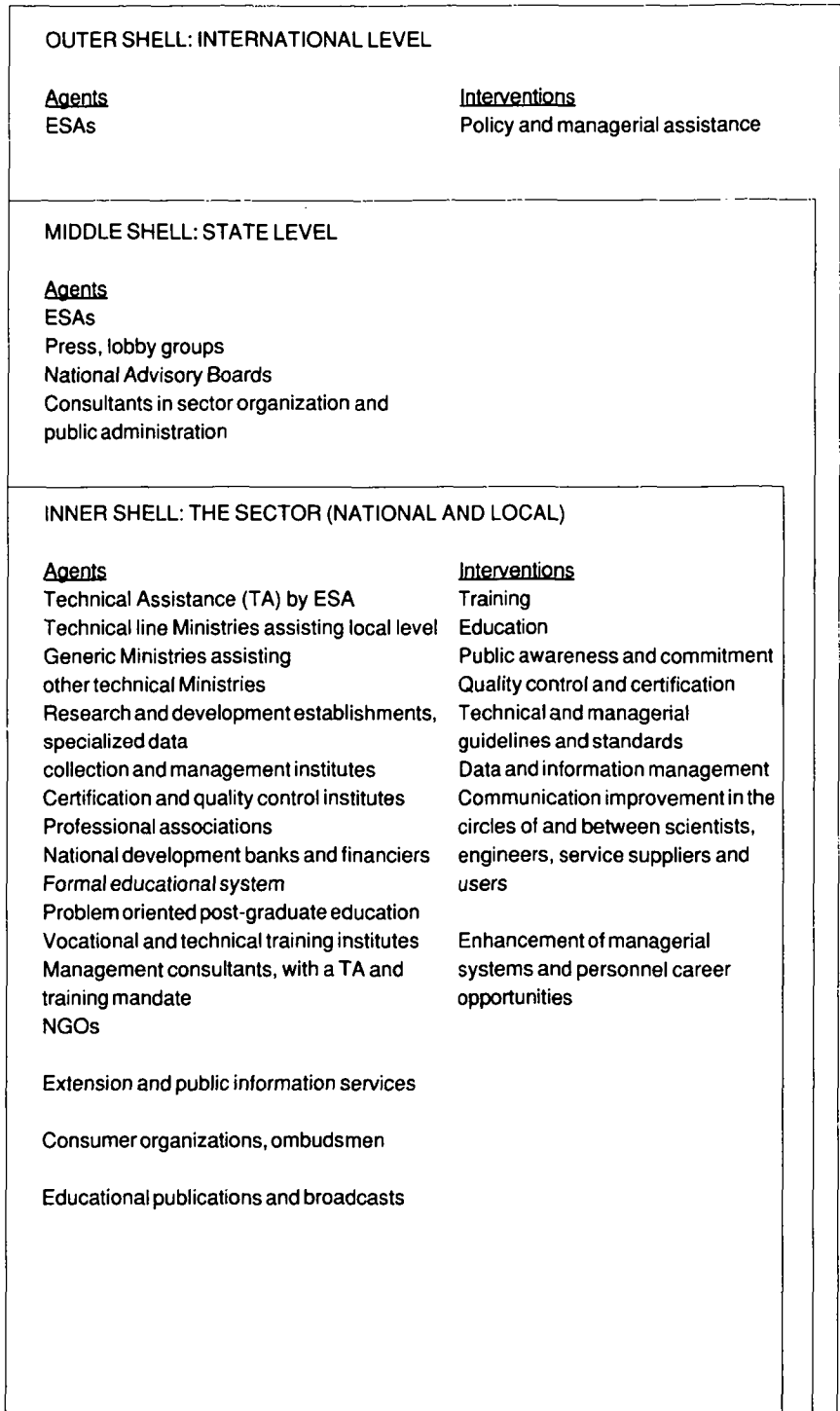
This Section looks at options for ESAs and countries to influence reformulate or initiate common and new types of projects and programmes so that the objectives of higher efficiency and effectiveness in the national water sectors are achieved.

'Common' project types are typically geared towards the supply of a well described physical product like a facility or a piece of infrastructure, for example an irrigation scheme, urban infrastructure (water management and/or supply), or software for the modelling of water quantity and quality in a watershed. Most ESA assistance is presently still involved in these projects, understandably because many countries are in dire need of physical infrastructure for their development. The capacity building measures in these projects are nearly always of minor if not negligible importance in the whole package, are often poorly focused and generally receive little attention from the side of project managers and counterparts. Also, because of the familiarity with, and the predictability and specificity (Israel, 1987) of the activities, targets can be relatively easily defined and are expressed in quantities like percentage coverage, kilometers of drains, degree of rehabilitation, etc.

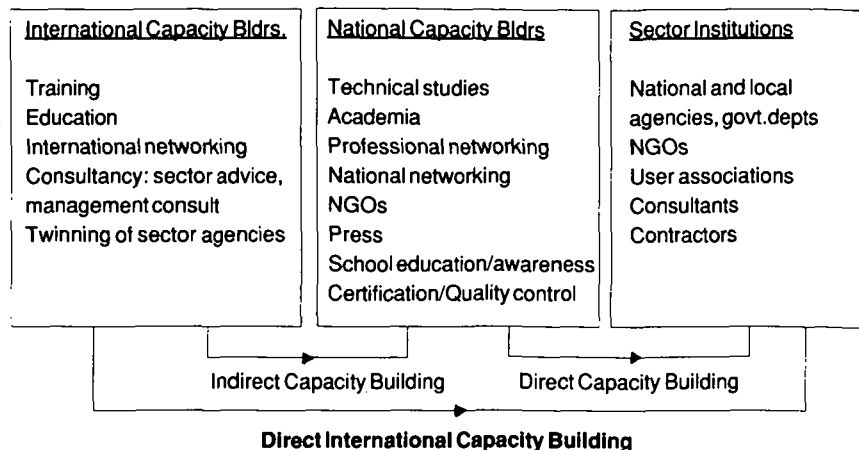
'New' project types would give priority to the development of institutions or a sector. As a secondary aim they may envisage delivering physical infrastructure or



**Figure 2.6** Typical list of institutions and factors that need strengthening.



**Figure 2.7** Enumeration of capacity building agents and interventions.  
 The scheme follows the structure of Figure 2.6.



**Figure 2.8** A model for operational direct and indirect capacity building activities.

other 'products'. This secondary objective is achieved preferably through the activities of strengthened or (further) developed institutions. Because of lower familiarity with and specificity of these activities, targets and criteria, to measure success, are more difficult to define and can hardly be quantified.

However, both projects geared at physical infrastructure provision and those aiming primarily at capacity building can serve the goals of an improved water sector.

Projects need to become formulated as '**change agents**' directed towards influencing the philosophy of the water sector and developing the sector's capacity.

#### **Formulation of operational objectives for the water sector**

1. Any project in the water sector should, as far as is feasible, support the policy of enhanced integrated water planning and management at the national or local level.
2. Any project in the water sector should only receive approval from the country and/or financier if it is based on a sound study of its impact on the local/regional water resources. This should involve quantity and quality considerations.
3. Specific projects/programmes should be devised to help local authorities identify the need for integrated water resources planning and management.
4. Planning agencies should be assisted to improve their capabilities in planning as well as to cooperate more efficiently with other implementing agencies in the sector. This involves improved communication and decision making procedures.
5. Projects, which are specifically designed to improve sustainability, based on the following criteria, should be supported.
  - water resources scarcity,
  - environment,
  - finance,
  - institutions.

### **Education, training, twinning**

6. Education and training remain key aspects of capacity building.
7. To render sector institutions more autonomous, it may be necessary to emphasize more conceptual and innovative thinking. For this purpose more long-term and better focused (postgraduate) education is necessary.
8. To strengthen institutions in their regular activities, on-the-job training is more suitable.
9. Institutions should as a matter of routine allow, in their organization, for training/ education of their technical and managerial staff.
10. Depending on aims and conditions, some types of education and training are preferably implemented in the country itself, strengthening, simultaneously, the local educational capacities.  
However, for educational purposes it remains necessary to provide extensive exposure to experiences in a regional or international context.
11. Education and training programmes should meet specified demands. Using them more efficiently for institutional strengthening or development, implies that simultaneously all relevant levels in the organization need to be exposed (decision makers, managers, engineers, technicians) to avoid deadlocks in newly emerging initiatives.
12. Twinning of similar sector agencies (North-South, or South-South) is a useful channel for highly specific exchange of information and expertise. However, the personnel capacity and twinning experience with the North partner may be restricted.
13. International professional associations need to develop, in a sustainable way, national chapters to generate and support exchange of professional and scientific information at national levels.

### **Technical assistance**

13. Distinction should be made between projects that aim specifically at infrastructure provision, and those that aim, in addition or exclusively, at institutional development.
14. The need grows for projects or programmes consisting, primarily of capacity building or institutional development measures.
15. Consultants should be distinguished by their specialization:
  - as implementing specialists for physical infrastructure,
  - as sector specialists who can assist governments in sector development,
  - as managerial and marketing specialists who can assist in improving the efficiency and effectiveness of organizations and public administration.
 Managerial and marketing specialists should in the future play a larger role in organization and institutional development.

### **Developing demand**

16. In order to strengthen the role of the users/beneficiaries, projects should allow, at the start of any physical implementation project, for comprehensive institutional analysis (one year preparatory phase). This would facilitate involvement of the future users in the planning and decision making process.
17. Enhanced demand should improve cost recovery and hence sustainability.





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## **Part III**

### **Key Issues in Capacity Building**

**from the Perspective of Countries, Institutes and  
External Support Agencies**



# Institutional Analysis and Capacity Building for Integrated Water Resources Planning and Management

G. Le Moigne  
The World Bank

## Introduction

Water resources development has always played a major role in World Bank operations. Until the end of our last fiscal year, i.e. June 30, 1990, over \$16 billion had been lent for irrigation and drainage and \$11 billion for water supply and sewerage, representing 11% of total Bank lending. This percentage increases to about 15% if hydropower projects are included. The proposed Bank program for the next three years also indicates that lending for water resources will remain a major part of Bank activities.

Despite the support for investments in water related sectors, the Bank has rarely taken a comprehensive approach to water resources management. World Bank lending for water development projects is characterized by the traditional division of the water sector into irrigation and drainage, water supply and sanitation and hydropower generation. This fragmentation of Bank activities generally follows the institutional arrangements in most countries where specialized agencies are responsible for the various subsectors.

When there was little pressure on water resources, a project-by-project approach to water resource development was often adequate. However, with increasing competition for limited water resources of acceptable quality at affordable cost, the traditional, fragmented approach has become inappropriate. The Bank has, therefore, decided to reassess its own approach to determine changes it will need to implement to enable it to assist its borrowers to prepare for the challenge of comprehensive water resources management.

## Lessons in Institutional Development

Because World Bank funding for water resources development is channelled through the institutions overseeing of the various subsectors, it may be useful to briefly review Bank experience of Institutional Development (ID). The Bank Operations Evaluation Department (OED) has concluded that poor institutional performance is the most frequent cause of failure both in the Water Supply and Sanitation and the Irrigation subsectors. This conclusion was also reached during a Conference on "Institutional Development and the World Bank" in December 1989. It was pointed out that a *common barrier to good performance in Bank projects during 1980-88 was institutional weakness and, more particularly, the lack of organizational capacity and staff skills*. Equally significant is the finding that the proportion of projects which face institutional problems has increased from 30% to 60% during this period. Reasons for deteriorating performance include: limited institutional capacities, exacerbated by the difficult macro-economic conditions in borrower countries, the growing complexity of project design, and the adverse impact of donor activities in some countries.

The Bank has learned from its past experiences. The number of projects with ID components is increasing. Also, the scope of ID issues and components has widened due to newer policy-based lending instruments. Much greater attention is now being given to the sector or sub-sector level institutions and their structure, whereas previously the preoccupation was solely with a single project implementation unit. There is recognition that more consideration needs to be given to the ID objectives of sustainability and the long-term strengthening of sector wide institutions. The impact of interest groups on the workings of institutions, the likely resistance to reforms on the political or bureaucratic fronts and an assessment of the risks involved in the reforms, needs to be addressed.

There is increasing use of the process approach (joint analysis and consultations with relevant groups) in the diagnostic and design phase. The Bank is becoming aware of the need to focus more towards sustainability by allocating adequate resources to support more relevant upstream diagnostic work and by upgrading the quality of staff who work on ID issues.

At the same time, there are efforts to strengthen local capacities. For instance, in Africa, institutional weakness has been highlighted as a major cause of the economic problems of the last 10 to 15 years. In response, the Bank, together with the UNDP and the African Development Bank, has established the African Capacity Building Foundation. This Foundation will focus initially on public policy analysis and on the development of management skills by strengthening national and regional institutions, enhancing government and private sector capabilities and supporting graduate and in service training.

The effectiveness of ID is influenced by the following factors:

1. The macro economic policies which provide the enabling environmental conditions for ID efforts to succeed;
2. The fit between projects and the sector strategy including the directional changes being planned on the institutional front;
3. The responsiveness of the project to its clients;
4. The capacity of the project institution(s) to efficiently organize its (their) internal structure, systems and skills; and
5. The presence of resources and leadership to manage the project and create the organizational culture (values) and inter institutional linkages required for success.

These factors influence ID over different time frames. Capacity for efficient management may influence performance in the short or medium term. Major changes in the macro-economic and policy environments may take longer.

### **National Assessment of Water Related Institutions**

How can we use our past experience in assisting countries to undertake comprehensive water resources management programs? The first step in this direction is a National Water Resources Assessment exercise, which would provide the basis for an institutional development strategy. There is growing interest in such as assessment, and the UNDP is to be commended for early promotion of this approach. These country specific assessments should review water resources managements policies in the context of a country's development objectives and priorities. Accordingly, they would provide a diagnosis of problems and capacities with respect to the formulation and implementation of a comprehensive and integrated approach to water resources and water sector management. They would then set the stage for the development of a

comprehensive, inter-sectoral program including an institutional development strategy.

To be useful and acceptable, the assessments must be systematic, thorough and be carried out under the leadership of senior policy makers in the countries concerned. Key actors in water related sectors should be consulted in the assessment exercise. In this context, use of the term "rapid assessment" in some of the discussions may err in conveying a hasty and ill prepared investigation.

Water sector development programs take a long time to design, finance and construct, and have long-term consequences. Therefore, a time scale of much longer than a decade is needed. A 30 to 40 year horizon would perhaps be more appropriate. Many estimates for population growth have involved the year 2025 and, in view of the influence of population on demand for water resources, this year could serve as a reference point. Accordingly, capacity building must be addressed from both short and long-term perspectives.

### **Institutional Issues**

The National Assessment should provide an understanding of governments' broad strategic choices, particularly regarding themes relevant to ID such as privatization, commercialization, domestic capacity building, decentralization and empowerment of beneficiaries. These strategic choices have major institutional implications in terms of:

- a) the roles and functions critical to the management of Water resources
- b) the functions which can be delegated or contracted out to private enterprises and ways to ensure their accountability for performance
- c) the support needed by existing institutions to improve their internal management.

Once a government's strategic choices are known it can examine existing institutional capacities to map out alternative institutional and legal arrangements.

Laws and regulations provide an enabling environment for institutional development, and those governing private sector activities, public utilities, water pricing and water pollution would have considerable implications for institutional development in related sectors therefore must be broader than those applicable to particular sectors. Three items require particular attention in any institutional development program: (i) mechanisms for inter-sectoral conflict resolution; (ii) decentralization and privatization; and (iii) comprehensive training for analysis and action,

The different actors in the water related sectors need to be brought together to obtain a balanced assessment of the basic institutional issues involved. Since the changes to be proposed will require their support, it is essential that the diagnostic process also act as a consensus building exercise or at least contribute to an appreciation among the key participants of different perceptions of the problems. The contextual roots and nuances of institutional issues cannot be overemphasized, and their diagnosis will seldom be easy for outsiders, especially short-term visitors. Joint diagnosis is also important for creating a sense of ownership and of commitment within the country that fosters long-term involvement. Professional associations, private consulting agencies and non-governmental organizations can make significant contributions.

### **The Role of Non-Governmental Organizations**

Professor Okun, in Part II, provides useful guidance for the role that organizations such as Professional Associations, multi-national corporations and consulting firms could

play in enhancing the capacity building in developing countries. In this context the irrigation and drainage sub-sector already has well structured Professional Associations such as the International Commission for Irrigation and Drainage (ICID), comprising 80 countries with their own national associations. The Commission participates in a number of activities, and in the past has collaborated on the preparation of guidelines for preparing strategies and programs for "Irrigation Training in the Public Sector" (published by the Economic Development Institute of the World Bank). The ICID, under Professor Constable's leadership, has also prepared, jointly with the World Bank the "Guide for the Preparation of Strategies and Manuals on Planning the Management, Operation and Maintenance of Irrigation and Drainage Systems".

A word on the role of Water Users Associations in the irrigation subsector; there are examples of successful associations in Colombia and Nepal, Taiwan, Mexico, Argentina and the Philippines. Yet in many countries with large irrigation schemes, water users associations are either non-existent or not sustainable. Pakistan for example, has promoted the formation of some 15,000 Water Users Associations and yet a recent review concluded that few of these associations are sustainable, i.e. that as soon as the modernization works are completed on their land, the associations stop maintaining them. Reasons for this failure are being analyzed.

Similarly, very little, if anything, is known about the role of women in irrigation activities. Programs for women to enhance their participation in irrigation organizations, particularly in water users associations, must be supported.

### **Conclusion**

Institutional development programs will only be effective in an environment where accountability, and openness are valued. The need to facilitate the creation and sustenance of such an environment could form a part of the dialogue preceding a national assessment program. Good governance is being given a great deal of attention these days, and the concept implies that governments and external support agencies must concern themselves not only with institutional mechanisms but also with the climate in which the institutions can grow and flourish.

# The Need for Effective Legal and Regulatory Frameworks

S. Burchi  
Food and Agricultural Organization FAO

## Water and the Law

Laws, regulations, and institutions to administer them, play a vital role in the development, use and conservation of water resources in so far as they promote social cohesion by preventing disputes - or resolving them once they have arisen - in fair and predictable ways. They promote the predictability of individual and government behavior, and of decisions individuals and governments constantly make with respect to the resource. They empower governments to do certain things and to undertake certain programmes. The need for effective water sector laws and regulations, and for an efficient governmental organization to administer and enforce them has been illustrated in innumerable governmental and non-governmental fora and need not be elaborated on further.

Also, a large body of literature exists illustrating country-specific and comparative water laws and institutions, discussing relevant issues, and outlining standard approaches to dealing with them. While it is not necessary to deal with this subject at any length, one point deserves emphasizing and bearing in mind in view of its weight on the focus of this Symposium, and of this paper in particular. That is the widespread discrepancy between the law and hydrological realities, and between the imperatives of hydrology and the organizational setup of governmental institutions responsible for the management of water resources. It is common knowledge, not only among water lawyers, that laws may:

- perpetuate uneconomical rigidities, or condone unjustified privileges,
- artificially separate what is whole in nature (surface water and groundwater),
- artificially divide complementary water management functions (water allocation and water pollution control).

Similar patterns are mirrored in the governmental and para-governmental institutional setup for water management, where artificial divisions of responsibility, drawn along end-use or type of resource or functional lines, are commonplace.

## Institutional Inadequacies

This background is of paramount importance when assessing the need for capacity building at country level, and designing a strategy to respond to the perceived needs of countries. Indeed, the perception that the Achilles heel, of External Support Agencies' (ESA) programmes and projects of support to the water sector of recipient countries, lies in the want of **an institutional capability** at country level, is receiving growing recognition, and is indeed one of the leitmotifs of this very Symposium. The lack, or inadequacy, of institutional capacity is decryed by virtually all ESA operators. All have, at one time or another, experienced the well-known constraints at country level associated with inadequate numbers of sufficiently trained professionals, or with



inadequate finances, or equipment. But more and more they have also been experiencing other kinds of institutional inadequacies, i.e., those which stem from:

- the policy vacuum in which ESA projects and programmes fall
- the proliferation of governmental and para-governmental centers of decision making in the water sector and the resulting overlap, conflict and confusion, not to mention the difficulty of identifying a well defined water constituency within any government structure to sponsor a programme approach
- too many, too few, or too old laws and regulations
- slack implementation and enforcement of existing laws and regulations, which breeds disrespect for the law as a whole
- ignorance of customary practices with regard, in particular, to land and water use among the traditional rural communities
- diffuse ignorance by the general public of just what their rights and obligations are with respect to freshwater use, and protection
- ineffective, or simply non-existent, agreements to deal with “shared” water resources issues between concerned states.

Perhaps the most pervasive institutional inadequacies stem from too many, too few, too old, or simply obscure, conflicting and confusing laws and regulations. Besides, existing laws are seldom available in one place for consultation, let alone regularly updated and coordinated. It must be borne in mind in this regard that the field of water law is not homogeneous. Almost never does one find the entire body of laws pertaining to all manifold aspects of water resources management (from exploitation to pollution control, from irrigation use to use for hydropower generation, from waterworks construction to flood damage and erosion control, from regulation of surface water use to regulation of groundwater use) all consolidated in one statute. In all countries, developed and developing alike, water law is a composite body of rules resulting from the aggregate of many statutes and court decisions dealing not only with water resources, but also with other related natural resources (such as forests, cropland, rangeland, fisheries, wet lands, minerals) and with the environment.

### **Inadequate Water Laws and Regulations**

The intricate web of laws and regulations bearing on the management of water resources, or the lack of laws result in uncertainties which may stifle much needed development. Investment in the irrigation sector, for instance, may be stifled by:

1. uncertainty as to the investor's rights in pre-development water
2. uncertainty as to the beneficiaries' rights in post-development water, and as to their obligations to fellow users downstream
3. direct impediments to the recovery of costs from the beneficiaries as a result of water being legally regarded as a free good.

Investment in waste water reclamation and reuse may be stifled by uncertainties surrounding the investor's rights in the waste water he/she has reclaimed, or his/her liability to the general public in terms of public health risks, and to downstream water users in terms of reduced return flows to a stream.

Investment in improving the efficiency, particularly of irrigation water use may be stifled by uncertainties surrounding the diligent irrigator's rights in the water he/she saves. Public investment in river training or flood control structures may be made difficult by the rights of the owners of property on the beds and banks of streams.

Water laws also stifle development in other ways. Investment in the water supply

sector may be made unattractive by the investor's inability to secure water rights which are vested in a third party. Investment in the water supply and sanitation sector may be foregone on account of unattractive legal requirements as to consumer rate structure and destination and handling of sector revenues.

In countries where the water rights of individuals have a strong private property connotation, radically needed changes in the laws governing water allocation and use, may come under the threat of constitutional challenges, under the clauses protecting property rights. The simple possibility of evoking massive compensation claims has the potential for deflecting any government's best intentions.

Paradoxically, pollution control is stifled by overly complicated or overly simplistic laws. The former place unrealistic burdens and goals on governments, and, as a result, implementation lags behind and the law remains dead letter. Overly simplistic laws condemn themselves to widespread disregard and quick obsolescence if they decree outright bans on polluting activities which are impossible to enforce.

Custom, as opposed to written laws, tends to play quite a prominent role in water use among traditional rural communities. Customary rights in both water and land may act as a constraint to water development - particularly irrigation development. If ignored outright, or inadequately dealt with by legislation, serious post-development problems may arise, particularly between customary rights holders and the holders of government-granted, statutory rights to developed land or irrigation water.

Finally, the very special problems, posed by development, affecting the flow and/or the quality of a stream flowing into another country, or a boundary stream or lake should not be forgotten. The need for pre development agreement between the countries concerned is of immediate relevance in the case of boundary water-bodies. The fact of the matter is that, regardless of a country's political agenda, the ESA community is sensitive to the legal implications of development of, or along, a "shared" water-body. The lack, or inadequacy, of agreement between the countries involved will effectively stifle development.

I strongly believe that it is, among others, in all these unconventional areas of institutional inadequacy that the challenge of the 1990s and beyond lies, and that it is to remedying these inadequacies that the Strategy, this Symposium will design, must address itself to. How can this be accomplished?

### **Strategy for Capacity Building**

The **objectives** of the legal/institutional segment of a future Strategy should consist of building up target countries' institutional capacity in the following **key domains**:

- a. policy analysis, with special regard for the legal ramifications of policy options and, wherever appropriate, for the implications of "shared" water-body development options;
- b. conceptual design of laws and regulations for the implementation of policies, and the drafting of comprehensive legislation covering such basic aspects of water resources management as planning, water allocation and use, and pollution prevention and control;
- c. design of governmental institutions, with particular emphasis on mechanisms to ensure consistency, of direction and purpose, in all aspects of water resources management;
- d. implementation and enforcement of laws and regulations, with particular regard for the establishment of procedures for water sector planning, water rights administration, and control of polluting discharges;
- e. where appropriate, systematic surveying of customary practices in the field of land

- and water use among rural populations;
- f. compilation and dissemination of information concerning water laws and regulations, and awareness-raising of the populous as to their rights and obligations with respect to water resources use and protection.

The attainment of these objectives by the ESA community within the framework of a coherent Strategy can be achieved by two complementary modes, i.e.:

1. by providing target countries with approaches, guidelines, concepts and ideas drawn from comparative experiences, with regard to items (b), (c) and (f);
2. by strengthening local capacities in the fields of (a), (d) and (e) through training and exposure to approaches and the experience of other countries.

One essential operational feature of a Strategy for institutional capacity building at country level, will be the early identification of a suitable supporting center of authority in the governmental structure. This center of authority should be able to muster the support needed at policy and operational level for a recipient country to fully and effectively avail itself of the facilities provided by the Strategy, and for the legal and institutional elements of the Strategy to make an impact. Given that policy making and operational authority tends, as stated above, to be diffuse and multi-centered, and with a view to avoiding "forum shopping" - i.e., going around to shop for the institution best suited to host and support the Strategy - one for the prerequisites for extending, to a requesting country the facilities of the Strategy, should be the setting up of a mechanism for effective consultation among all governmental and para-governmental water management operators, including representatives of the private sector. Such a mechanism should be in place for as long as the Strategy is operational in the country. If the Strategy is successful on, among others, the legal and institutional plane, the consultative mechanism could become a permanent facilitator of institutional consistency in managing the country's water resources.

# Towards a Strategy for Water Resources for the 1990s and Beyond

J.C. Rodda  
World Meteorological Organization WMO

## Background

Without water this world would be an entirely different place. Although the global volume of water is extremely large, it has a finite limit. This large volume (mostly saltwater), includes a much smaller volume of freshwater (still a large quantity) and an even smaller volume, which is readily available for use. This is the easily accessible but fluctuating quantity of water in the rivers, lakes, reservoirs, aquifers, glaciers and seasonal snow cover, determined by the spatial and temporal variations of the hydrological cycle. These variations, and other problems, make precise and continuous assessment of the available resource difficult, even on the basin scale. But it is this resource which is harnessed for domestic supply, power production, agriculture and the many other activities where water is essential. These activities, in turn, can have an impact on the quantity and quality of water resources and on the habitats and amenities they provide. As the demand for water increases, the pressure on the resource and on the natural environment builds up, to the extent that both can suffer degradation. Indeed, because of the way in which human activities can alter the physical, chemical and biological characteristics of the hydrological cycle, both directly and indirectly, the monitoring of the variations of these characteristics, in the different bodies of water, provides an excellent measure of the sustainability of these activities and of sustainable development itself. It can be argued that without such a series of measurements, it is impossible to translate the concept of sustainable development into practice.

The task of sustainable development and management of water resources, of course, encapsulates a wide range of problems. These are in the fields of water supply, sewage disposal, pollution of surface water and groundwater, flood control, drought and desertification, on the one hand and are of a social, economic and educational nature on the other. They are all set against a background of a fragile institutional and organizational framework for water, in many parts of the world. For these reasons, and others, the development of a strategy for water for the 1990s and beyond appears timely and appropriate.

## International Initiatives for Water Resources

No nation remains unconcerned about its water problems and a few can afford to consider them in isolation. Those which share international river basins have particular reason to be involved in various aspects of the wide range of international initiatives involving water. These can be global, regional or river basin based and they may operate through the UN system, inter-governmental or via non governmental mechanisms. Such initiatives have a long history, but probably the 1977 UN Water Conference was the most important landmark in their sequence. The Conference was the first inter governmental meeting to consider water problems globally, agreeing the Mar del

Plata Action Plan (MPAP) which addressed eight recommendations and ten resolutions relevant to virtually every endeavor in the realm of freshwater.

The Plan subsequently stimulated a number of activities amongst governments and international bodies, the most noteworthy being the International Drinking Water Supply and Sanitation Decade (1981-1990). It also led to the revitalization of the UN ACC Intersecretariat Group for Water Resources (ISG-WR) which coordinates the work of the 26 bodies and specialized agencies of the UN organization with interests and programmes in water. Among its most recent activities, in 1988 the ISG-WR launched a review of progress in the implementation of the MPAP. This review covered six major areas:

- |   |                 |
|---|-----------------|
| 1. Water resources assessment                     | (WMO/UNESCO)    |
| 2. Water quality and environmental issues         | (WHO/GEMS/UNEP) |
| 3. Water for sustainable agricultural development | (FAO)           |
| 4. Water supply and sanitation                    | (WHO)           |
| 5. Human resources and capacity building          | (UNDP)          |
| 6. Water resources management and policy          | (UNDTCD)        |

The review of area 4, namely the achievements of the IDWSSD, first took place during the Global Consultation on Safe Water Supply and Sanitation for the 1990s which was held in New Delhi in September 1990. Then it was presented to the UN General Assembly at its 45th session. The extensive reports on the other areas were presented to the 12th session of the UN Committee on Natural Resources in March 1991, together with an overview containing proposals for implementation of the MPAP in the 1990s.

### **The UNCED Process**

Following extensive preparations both inside and outside the UN system, in December 1989 the UN General Assembly adopted Resolution 44/228 convening, in Rio de Janeiro in June 1992, the United Nations Conference on Environment and Development. The Conference would, amongst other things examine the state of the environment and the changes since the 1972 UN Conference on the Human Environment, recommend measures to be taken at national and international levels through policies for sustainable and environmentally sound development and identify strategies for national and international action. Preparations for UNCED would be made through a series of four Preparatory Committees open to all Members of the UN with the participation of observers. The Resolution also identified nine salient environmental issues for consideration by the Conference, the second of drawing attention to the "Protection of the quality and supply of freshwater resources".

To address the problems of the world's freshwater, the idea of an international conference on water and the environment (ICWE) was promoted. The Conference would offer a platform for those professionally involved in such fields as: science, engineering, planning, management and socio-economic matters and concerned with its use, husbandry and protection. It would build on the 15-year old framework of the MPAP and its recent review, to indicate the way forward, targets to aim for and what was required to achieve these targets.

The idea of a conference to address the freshwater issue was endorsed by the UNCED Preparatory Committee at its first session, which also accepted the invitation of the Government of Ireland to host ICWE in Dublin, in January 1992. These actions highlighted the role of ICWE as the main vehicle for conveying proposals on freshwater to UNCED in Rio de Janeiro and that of the ISG-WR in organizing it.

The main objectives of ICWE are:

1. To assess the current status of the world's freshwater resources in relation to present and future water demands and to identify priority issues for the 1990s;
2. To develop coordinated, inter-sectoral approaches towards managing these resources by strengthening the linkages between the various water programmes;
3. To formulate environmentally-sustainable strategies and action programmes for the 1990s and beyond to be presented to the United Nations Conference on Environment and Development;
4. To bring the above issues, strategies and actions to the attention of governments as a basis for national programmes and to increase awareness of the environmental consequences and developmental opportunities in improving the management of water resources.

During its second session in March-April 1991, the Preparatory Committee, through Working Group II discussed freshwater matters and invited ICWE:

- a) to consider an action framework on sustainable development and management of freshwater resources, including, where feasible and appropriate, targets, timetables and possibly cost estimates;
- b) to give due account to strategies for rational and efficient use of scarce water resources;
- c) to identify key elements of a strategy for its implementation;
- d) to prepare guidelines for the elaboration of national and, where appropriate, regional action plans for the integrated development and environmentally sound management of water resources.

These responsibilities emphasize, the importance of the Conference and thus the need to ensure a wide representation of interests there. To this end, each Member State of the UN, the water-oriented NGOs, external support agencies and the UN bodies and agencies will be asked to nominate experts to participate in the Conference.

The Conference itself will be divided, after the opening ceremony, into four main parts: an initial plenary session, a session of six working groups, a poster session and a final plenary.

The key areas to be considered by working groups are:

1. Integrated water resources management
2. Water resources assessment
3. Protection of water quality and aquatic ecosystems
4. Drinking water supply and sanitation
5. Water and sustainable urban development
6. Water for sustainable food production.

Because capacity building for water resources management was such an important topic, it should be considered by all six working groups.

The conclusions drawn from the discussions in each group will be brought together and refined as the *Dublin Statement for agreement at the final plenary*.

This statement should outline the initiatives necessary to overcome the inadequacies of the institutions concerned with freshwater, both national and international.

**Outcome**

It is very difficult, of course, to anticipate what will come out of Dublin for transmission to UNCED. It is even more difficult to forecast what will result from Rio de Janeiro for water, beyond the framework for action already discussed. Should there be a move towards improved co-operation and collaboration within the UN family, for example in the fields of water management, linked to environmental protection? Should the present structure of the ISG-WR be strengthened or something new built to replace it? Should a global convention on freshwater be considered, similar to those being developed for climate, forests and bio-diversity? Whatever the outcome, it is important that water resources receive greater attention from governments and international organizations than hitherto. It is equally important that the leading role of those professionally involved in water is not usurped by others.

# Training and Education for Capacity Building in the Water Sector

G.J. Alaerts

International Institute for Hydraulic and Environmental Engineering

## Introduction

Human resources development (HRD) has been recognized in the Mar del Plata Action Plan as prerequisite for an effective water sector. In the eighties it received substantial attention.

HRD covers all actions necessary to develop a qualified and motivated manpower in organizations at all levels. This includes training and education, staffing plans, career and salary development and the creation of a stimulating culture in the organizations. By extension, it is sometimes suggested to include "development" (education) of consumer groups and communities (Melchior-Tellier, 1991); approaches and techniques would in that case be quite different.

Rather than reiterating excellent earlier work on short-term training and career development (e.g. WHO, 1990b), this contribution attempts to describe an emerging new constraint in HRD which is of a more conceptual nature. When HRD is discussed in the context of the water sector, very often it is indeed used as a tool to induce specifically described changes only on the scale of an organization within a relatively short space of time. This is a logical reaction of water experts, who themselves are primarily concerned with the performance of those organizations, and are not necessarily broader education experts. Also, the Mar del Plata Plan in fact recognized that general academic education in the world had to some extent failed to deliver the right type of professional who could ensure that the sector worked effectively.

This paper therefore attempts to take another, two-decade perspective to capacity building on a national scale, while focussing on the levels of engineers and other professional staff.

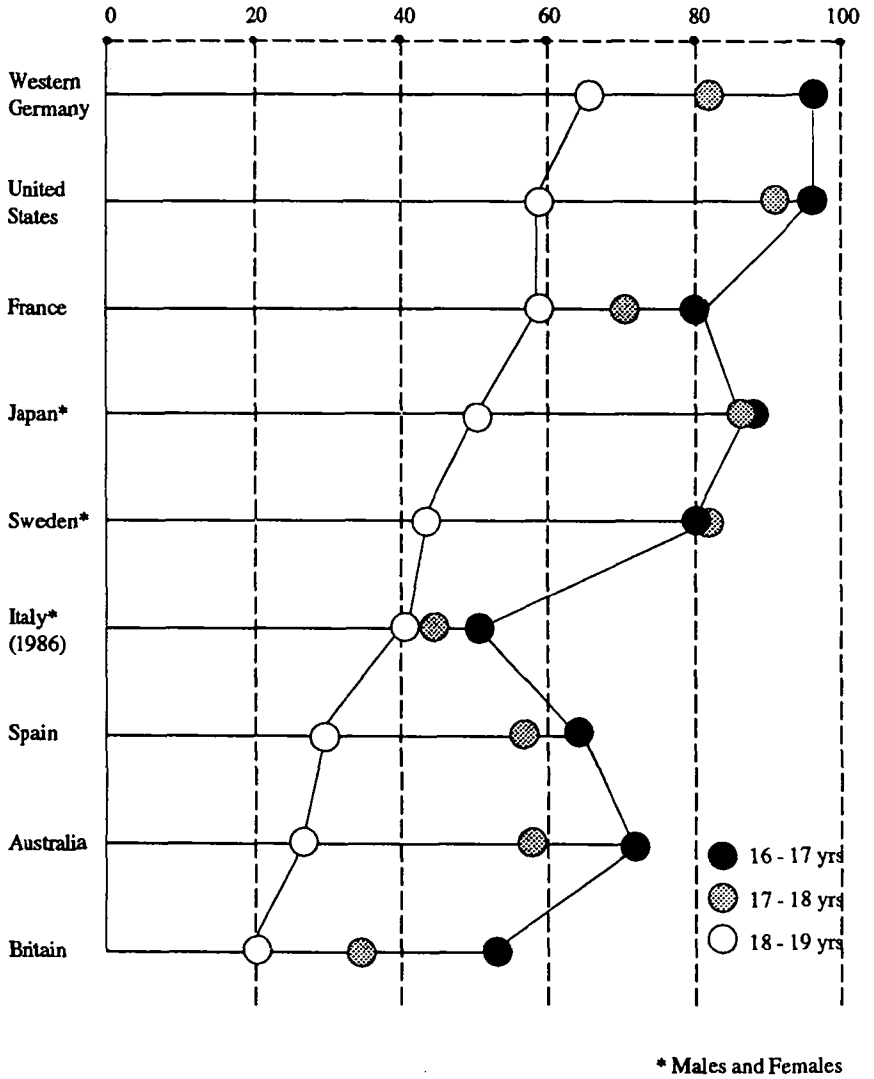
## Education and Training to Build Capacity for National Development

Education is known to be an investment for the future. Typically, the benefit to the society from a profession oriented educational effort in a person's life is expected to last for one generation, say, 20 to 30 years. A national education effort creates the basis for problem identification, analysis and solution.

Training on the other hand serves a different purpose. Whereas education provides the four didactic levels (factual knowledge, insight, applicable methodologies (skills), and professional attitude), training aims at specific problems, implies shorter contact time and attempts to offer directly applicable skills. The life time of its impact is expected to last from 1 to 10 years. Whereas the impact of education can rarely be singled out and should be assessed on the scale of the country or sector, the efficiency of training can often be measured in a straightforward way within the organization.

Education and training are capacity building instruments *par excellence*.





**Figure 6.1** Full-time education and training in 9 market economies. Indicated are % of males of given age groups involved in education and training (1987-88) (Results from a study by the Royal Society quoted in *The Economist*, May 18, 1991, p.37).

Few will doubt that the success of a nation in achieving its goals depends on how well it anticipated the need for a specific educational programme, and how well it managed to impart this education to a sufficient number of its citizens. The amount of education in the different sectors (manufacturing, construction, etc.) in a country, is a major determinant -- or limiting factor -- for the performance of these sectors.

Historical analysis shows strong evidence of the critical role an effective educational system plays in the national development of late 18th century France and late 19th century Germany (Bernal, 1969). More recently, British policy makers started studying ways to enhance Britain's systematically weaker economic performance by strengthening and optimizing its educational system. The British education secretary is about to publish two white-papers on post-compulsory education (i.e. after the age of 16). Though one must be cautious in looking for causal relations, circumstantial evidence suggests that countries commonly regarded as "strong" economies tend to have a larger number of pupils and students in education and training; Britain scores poorly in this respect (*Figure 6.1*). The education secretary therefore wants to encourage students to stay on after the age of 16. Also, one of the characteristics of successful education is the flexibility of its graduates to adequately address the rapidly changing job opportunities that are contained in the new technological, economic and societal developments; other measures are therefore envisaged in Britain to enhance the flexibility of fresh graduates to respond to changed demands.

### **Developments in the Water Sector**

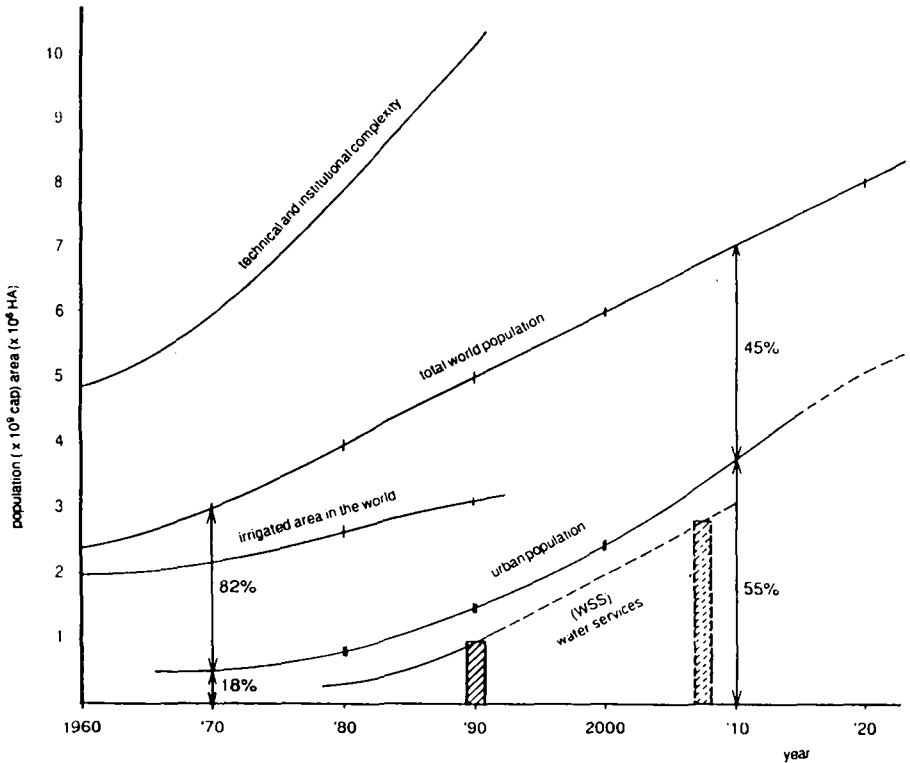
The implication of the above is that development is the result of making use of opportunities created inside and outside the nation. Opportunities can be for example the availability of new markets, funds or resources, scientific discoveries, a sound institutional framework, and the size of the "reservoir" of knowledge and skills. Progress in one of these fields offers a comparative advantage. This remains only potential however, if in the other fields constraining factors emerge which fail to support adequately this new progress.

The water sector is faced with an unprecedented demand for development over the coming 20 years. This demand is not only quantitative, but present society also calls for rethinking and streamlining the sector organization. There are indications that a major constraining factor for this "opportunity for growth" is the lack of skilled staff and capability for strategic thinking.

Rethinking becomes necessary as for a long time it was thought that the public sector operates and is driven in a way fundamentally different from the private sector. Specifically, that it would be free of the limitations connected with a profit orientation, and much less sensitive to external market variations. Yet we realize now that the "modern" water sector is not immune from the pressure to respond quickly and flexibly to the new constraints and new demands, imposed by the social and physical environment. More and more public utilities have to be managed like businesses, even though their purpose is not only to maximize financial profits.

It is useful to catch the spirit of the present and future changes in the water sector organizations through the analogy with large businesses. Most management scientists will agree with e.g. Peters' (1989) characterization of management challenges in the nineties:

- rates of change, in the economic and social environment, increase and lead to unprecedented uncertainty and lack of predictability;
- markets are being fractured and become increasingly customized;



**Figure 6.2** World population, and more importantly urban population, will grow dramatically between 1990 and 2010. This will have a major impact on the strains upon the water sector, as urban populations call for more water supply and sanitation (WSS), food ensured by efficient irrigated agriculture, and water for industry (as process water and to convey waste). In addition, the technical and institutional requirements of the water sector professionals will become more complex. These factors will demand a larger and better trained professional corps. Data (UNFPA, 1991; FAO, 1990) are used not to make hard forecasts but to suggest demand magnitude.

- quality, design and service of the product gain importance and in fact become an integral part of the product. Also the time factor plays a large role, as it determines the delay between the realization of the customer's demand and its satisfaction;
- new organizational configurations emerge, with fewer levels of hierarchy, and more flexible interpretations of organograms;
- the idea of economy of scale is reviewed and partnership of companies emphasized. It is recognized that under many circumstances small companies can be more effective than large ones; large enterprises can gain by cooperative networking, disintegration (splitting up in smaller business units that are more easy to manage) and contracting out;
- internationalization takes root: the regions in the world are growing towards each other; despite local specificity, regions start resembling each other in their challenges and opportunities;
- despite technology, the line worker committed to constant improvement and instantly retrained will become the chief agent for adding value and achieving continuous innovation.

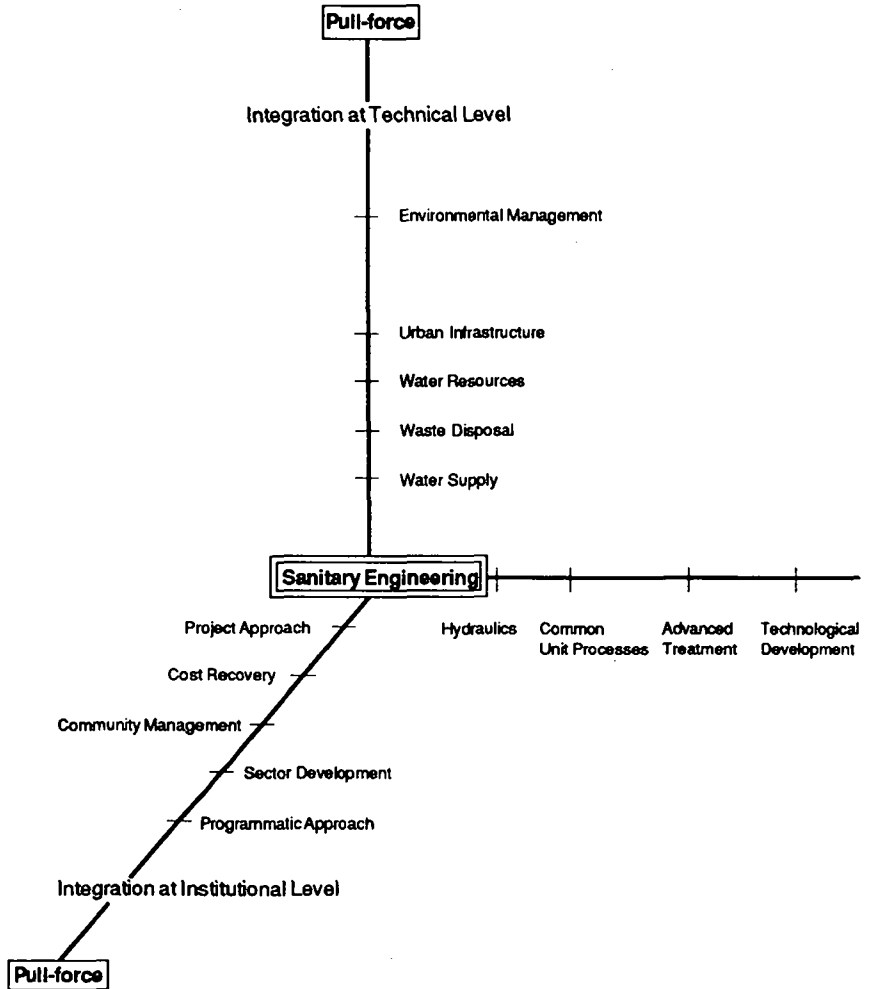
Most of the above nowadays pertains equally well to the water sector.

In this sector, demand for development presents two challenges to its professional corps, of which one is quantitative and the other qualitative. Both obviously have very region-specific implications, but one can get a feeling for the issues by studying global trends.

The quantitative problem relates to the forecasted strong growth in total world population, and specifically in the urban areas (Rietveld, 1988). Nearly all this growth is concentrated in the Third World. As *Figure 6.2* shows world population doubled from less than 3 billion in 1960 to 5 billion in 1990; the UN forecasts a further increase with another billion during the nineties, and a population of over 8 billion by 2010. After 2010 demographic factors are expected to induce a lower growth rate. To aggravate the difficulty, the share of urban population will rise from 15% to 55% between 1960 and 2010. In other words, during the coming 2 decades present urban population will almost treble, adding annually some 130 million new urban dwellers to Third World cities – one new big city every two days!

Precisely in these cities the demand for infrastructure and environmental services (water supply, sanitation, drainage, water management, and solid and hazardous waste management), already strained, will be most pronounced. Given a coverage ratio of 60-70% now, the *theoretical* demand still to be filled before 2010 will be 3-4 times what has already been provided over the past 30 years. Complicating factors are that existing infrastructure needs to be maintained more carefully than happens presently, and that satisfying larger needs in one sub-sector will face increasing competition from the demand in others. Also, the cities will rely on more intensive (irrigated) agriculture at their perimeter to satisfy food requirements.

Without ignoring the continuing plight of rural populations, the urban explosion calls for more attention because of strategic considerations: (i) experience shows that urban poor and government hardly communicate with each other, (ii) the large communities of urban poor are like "unguided missiles" whose control may be taken over by third forces, (iii) urbanization goes together with industrialization and concomitant pollution, (iv) growth is so fast that control over its consequences may be lost, and, perhaps most importantly, (v) as urbanization is positively correlated with economic growth (World Bank, 1988d), urban poor represent a massive opportunity for national development, if provided with suitable infrastructure.



**Figure 6.3** The technical capabilities of sanitary engineers, like that of other sector professionals, are being stressed more and more by new developments and problems. Upward axis: pull force towards more knowledge on technical integration; forward axis: pull towards institutional integration; sideward axis: need to become more specialized in technology.

The qualitative problem relates to the fact that modern knowledge ages quickly. Technological as well as other (e.g. institutional) issues have continued to become more and more integrated and complex. Once graduated, technological and managerial developments demand that a sector professional further deepens his knowledge, but on the other hand he is also required to have a growing degree of interaction with other disciplines and problem areas. This occurs along 3 lines (pull forces) (*Figure 6.3*) of which one is a pull for specialization and updating of the professional's technical knowledge. On the technical integration line, the traditional tasks of for example a water supply engineer, are increasingly becoming reformulated in the light of the newly discovered relationship with sanitation, water resources identification and protection, integrated urban infrastructure development, and the broad environmental issues. On the line of institutional integration, it is recognized that the engineer must grow out of a restrictive project approach and become knowledgeable about cost recovery and community management. More than ever before engineers are expected to be conscious of their role in water sector development. On a more general level still, as also described in Mr. Wickremage's paper in this Volume, engineers must also strengthen their capability to manage people and organizations, think in strategic terms, develop alternatives and work within policy frameworks.<sup>1</sup>

A similar picture can be drawn for the irrigation, hydraulic and water resources engineers.

Part of the solution to this problem is to introduce more systematically other graduates into the sector, like sociologists and limnologists. The engineer will certainly continue to play a major role, and he should remain educated foremost as a "good" engineer. To ensure his effectiveness, however, he should be more educated as a sector professional and notably increase his ability to cooperate with other experts.

There is no doubt that the single most important constraint for providing the required future infrastructure is financing. Nonetheless, much effort must be put into developing new intermediate solutions to help the deprived masses as much as possible. It is therefore clear that the rapid quantitative and qualitative evolutions in the sector also outrace the rate of local capacity building by the common education systems (delivery of fresh graduates and continuous education of older ones).

An important constraint for continued sector development lies with the numbers and the managerial and strategic capacities of university educated sector professionals. Significantly, post-graduate education institutes like IHE increasingly receive requests from governments to provide training of a conceptual nature for engineers, managers and decision-makers in the sector.

### **Training and Education Needs**

The experience with regard to the training and education aspect of Human Resources Development during the Water Decade (IDWSSD) is instructive (WHO, 1990b).

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<sup>1</sup> To cite but one illustrative example, in Indonesia the numerous large river basins have till recently been managed by Project Offices of the Ministry of Public Works. Activities emphasized civil and hydraulic engineering works, with mostly construction and some O&M. Significantly, per February 1990 the Office for the large Brantas basin in East Java was converted into a Perusahaan Umum (public authority) with various central and local governments and third parties represented in its Board of Directors. The new tasks are inspired by the Tennessee Valley Authority, and now include many more expertises relating to water quality and quantity management. Funds are to be recovered from clients (municipal water supplies, irrigation agencies, charges from wastewater dischargers) and used for the overall management, investment and operation of the Brantas catchment.

Problems that appear difficult to overcome include:

- shortage of managerial and supervisory skills at all levels;
- inefficient deployment and utilization of available human resources;
- the bias in the approaches towards the urban situation;
- resistance to change among many decision makers and managers;
- irrelevance of training curricula to real job needs; and
- weak infrastructure for training.

Underlying general problems are:

- poor-quality work and low productivity;
- low agency pride; and importantly
- difficulty in developing policies and procedures to alleviate these problems
- in other words, existing problems risk being perpetuated

This enumeration points at the same quantitative and qualitative deficiencies as mentioned before. A picture emerges suggesting that indeed the conceptual, managerial and strategic capacities of senior and technical staff remain insufficiently developed. The aforementioned WHO report also surveyed the frequency of recruitment problems in the water supply and sanitation sub-sector in 105 Third World countries (Table 6.1).

**Table 6.1** Frequency of recruitment problems experienced in the water supply and sanitation sub-sector in 105 Third World countries (WHO, 1990b).

Skilled/qualified/experienced workers	34
Technicians	30
Engineers	20
Other professionals	17
Managers	7
Accountants/book keepers	3
Stock keepers	1

These outcomes seem straightforward in laying the urgency of training needs rather at technicians' level. In fact, the results may be difficult to interpret, given the fact that such surveys are normally responded to by managers. In the light of the poor performance of the water sector, one may question the statement that professional sector managers are not in short supply. As it is naive to believe that any technician makes a good treatment plant operator, it is even more wrong to think that any administrator is a skilled manager. A wrong action of an inexperienced operator can be remedied quickly, but inappropriate decisions taken by a manager can have detrimental effects for a decade. Also, most Third World countries are presently quite capable of addressing needs for replicable, short-term training of workers and technicians, once recognized. However the education and training of higher level staff, may necessitate a framework and experiences that are not generally available in many countries.

Concluding, it seems indeed that a sufficient number of senior and technical staff with strong conceptual, managerial and strategic capacities is already lacking, and that demand is likely to become even more pronounced.

The new skills water professionals are expected to include:

- how to deal with the poorer communities, particularly in urbanized areas, and select suitable technology;
- how to cooperate with other disciplines: in rural settings professionals commonly work on their own, but need to cooperate with non-technicians; in urban settings, a professional must be able to work with new, more efficient technologies and sciences;
- how to manage technologies, manpower and institutions to provide a better water service in a financially and environmentally sustainable way.

### **Delivery Capacity of Local Educational Systems**

Against this background, the modernity and strength of the local educational and training systems become keys to the future development of the water sector. Yet this capacity is presently not adequate, nor likely to improve rapidly.

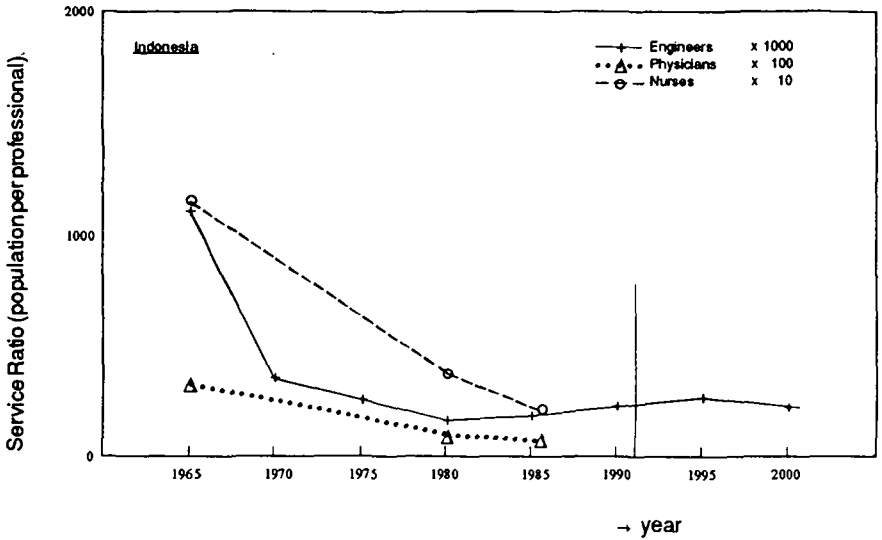
In the First World educational systems have tried to adjust to the fact that young (and older) people need to be prepared for a world that changes ever faster and becomes less predictable. We tend to underestimate the importance of these adjustments. They include:

- The number and variety of specializations (curricula) available in poly-technics and universities have dramatically increased and are also less rigid than they used to be; curricula are revised and updated regularly to meet current requirements and address new problem areas.
- Teaching methods are now more client centered and utilize innovative methods: compared to, say, 30 years ago, they are more interactive, more flexible, and problem oriented (more frequent use of hands-on experience and case studies); teachers use their hierarchical prerogatives less and act more often as facilitators.
- Education and training are no longer considered to be preparation of a young professional for one, specific career type, but are designed to enable the graduate to respond better to a changing society. For example, communicative and general problem solving skills receive much more attention nowadays, sometimes at the expense of purely technical subjects.
- The educational system covers much more than formal school or university activities. A major impact is also provided through e.g. television programmes. In addition, over the past 20 years facilities for continuous education, “recycling” of staff, etc. have soared.

In most developing countries however, education is still conventional. Knowledge rather than skill development is emphasized; education and training take place primarily through the formal channels (like schools), and the teacher-pupil relationship is hierarchical. Moreover, a survey of teaching methods and curricula at universities shows that mostly one-way handbook teaching is practiced, making very little use of case studies designed to reflect real life conditions, and of integrated, multi-problem exercises. In many instances of higher education, teachers tend to value scientific theory higher than application. These personal observations cover many examples in several countries and are supported i.a. by the WHO study (*Table 6.1*).

A common weakness frequently reported is that institutes of higher education often have to, or prefer to, work with handbooks published in the First World or that are based





**Figure 6.4** Service Ratio expressed as population per professional in Indonesia, for nursing personnel, physicians and sanitary/environmental engineers. Ratios for physicians and nurses were calculated on total population basis; that for engineers on population served with water. The Ratio for engineers improved up to 1980, but is in danger of stabilizing at insufficient values between 1980 and 2000. (Data from own survey, and World Bank, 1988d, 1990h).

on its experience. Also curricula and subject selection often reflect First World conditions and concerns, instead of local ones. For example, in developing countries few university curricula for sanitary/environmental engineering attribute priority to teaching integrated low cost approaches and train students to cooperate with health workers, community experts, etc. Yet the technological and urban bias of engineering graduates is known to be a major cause for the numerous failing water supply and sanitation schemes all over the world.

Besides these qualitative concerns, national capacities may not suffice to deliver the required numbers of specialized professionals for the water sector. Though the situation varies with country and specialization, shortages are likely to occur.

This is exemplified by the education of sanitary/environmental engineers in Indonesia. In *Figure 6.4*, the Service Ratio (population per professional) has been calculated on the basis of the total population for nurses and physicians, and on the basis of the population actually served by water supply and sanitation (WSS). All three ratios improved drastically (declined) between 1965 and 1980. Taking into account the forecasted limited number of graduating engineers in the country, and the WSS coverage ratios projected by the Ministry of Public Works, the Service Ratio will cease to improve, or even deteriorate between 1985 and 1995. These values are insufficient to support water sector development, certainly in the light of the widening responsibilities and new problem areas of those engineers (more water resources management, more environmental protection, emphasis on urban development). Admittedly it is hard to interpret comparisons between countries, but it may be significant that the number of sanitary/environmental engineers active in WSS in Indonesia and in The Netherlands are almost the same (800 to 900) -- yet to serve a total population which differs by a factor 12. A recent study (Alizar, 1991) appears to confirm that a general shortage of water sector professionals is one of the main constraints to the on-going decentralization which inevitably causes multiplication of job positions.

Other countries, like India, seemingly have larger reservoirs of technical professionals. However, closer scrutiny reveals inadequate qualifications. For instance, the Indian state of Uttar Pradesh (pop. 120 million) is (for planning, design, construction and some O&M of all water supply and most sanitation projects) served by a large Water Board (Jal Nigam) with app. 6000 engineers holding only a BEng in civil engineering. Only 60 of them can be considered real "professionals" by education, as they also hold higher degrees (MEng) in environmental/public health engineering; the whole Board has to rely on just 2 chemists for water quality analysis. The Board's management (in 1989) considered its staffing appropriate, but this opinion will not be generally shared. A study by the Central Public Health and Environmental Engineering Organization (1987) estimates that an annual output of 3000 engineers at master's level is required to support the sub-sector, whereas presently only a number of 300 can be achieved.

### **Approaches Towards Capacity Building Through Education and Training**

Long-term capacity building, to mitigate the described quantitative and qualitative deficiencies, requires the use of a broad set of instruments within a carefully developed strategy. In most situations we don't yet have an operational insight into how education and training activities should be applied to support sector development.

We can distinguish, with increasing specificity of the training/education, the following instruments; depending on needs and funds, the most appropriate can be chosen:

- short-term training or long-term training of an individual in a generic course,

- together with colleagues from different institutions or countries. This offers a high educational value (because of the broad interaction and the opportunity for “lateral thinking”), but a lower training value (because less specifically related to the job); it is efficient to concentrate education for rarer professional specializations;
- training for more homogeneous groups coming from one level of professionals in (an) organization(s) (e.g. for engineers); this allows for more specificity in e.g. the case studies and exercises;
  - integrated and complementary training for two or three levels of professionals (e.g. technical managers, managers and decision makers) from one organization. This approach prepares the complete organization for the application of newly acquired ideas and methods;
  - comprehensive organizational development (management assistance) involving task oriented training of all professional levels. This procedure is most specific and has a high training value, but lower educational value.

We will suffice here with describing three examples of training and education currently implemented.

### **1. Capacity Building of Local Universities and Training Institutes**

Training of trainers is the key to ensuring a high multiplier effect in HRD. In order to educate large groups of professionals the training activities must be decentralized and a training delivery system (trainers, support staff, facilities, finance) developed. Many of these outlets are already available in the third world countries in the form of the numerous universities, academies, polytechnics and other training establishments which presently provide the kind of education which is not sufficiently optimized as described above. Many of these institutions have underutilized assets (staff, professional connections, etc.) which make them suitable for further development of their training quality and/or capacity. Others however, for various reasons, cannot meet this requirement yet. Outlets which are probably still underutilized are private training initiatives and professional associations (in many industrialized countries these associations organize specialized and appealing operator training).

A major flaw of many existing curricula for engineers is that they still deal exclusively with technical subjects. Yet over the past decade we found that many investment schemes failed because of too narrow a technical approach. For example, irrigation schemes often ran dry or operated grossly sub-optimally because of lack of understanding of and attention for the wishes of its users, the farmer communities. This led to poor cost recovery, insufficient maintenance, and inappropriate design criteria. In the water supply and sanitation sub-sector non-technical issues have become even more critical (community involvement, cost recovery, health education, etc.). Sociological, behavioral and institutional management approaches in many cases predominate over the technical ones. Sociologists take over positions in project offices traditionally held by engineers. Effective engineers therefore will have to be educated accordingly. However, rather than stuffing an engineering curriculum with more new subjects, graduates should remain foremost engineers, but must have been taught how to cooperate effectively with other disciplines. It must be accepted that this may be at the expense of teaching time for conventional technical subjects. Arguably, an educational institute could wish to deliver two types of engineers: one with a broad project-oriented education as described before, and the other exclusively specializing in the technical matters.

“Excellent” institutions with a recognized reputation for adequate education in a particular field can act as associate institute or “sparring partner” for one or a number of the selected suitable institutions. In this partnership a strategy and action plan should be laid out that will lead to an upgrading of the capacity of the assisted institution(s). This upgrading should be allowed to be broadly interpreted, in the light of the pressing local sector problems. In some cases it may focus on the obvious under or post graduate education programmes, but in other cases it may appear that the university can best meet this demand by venturing into programmes with short, intensive recycling courses.

Elements of a plan include:

- development of curricula and subjects which are focussed more on the key sector problems;
- given the specificity of these problems, a wider range of better targeted curricula should be offered; this may imply that curricula in Third World universities will differ to some extent from those in the First World;
- development of conceptual thinking faculties, problem solving approaches, and the ability to cooperate with other disciplines; in general, graduates should be taught to think beyond the correct calculation of a pipe and to work towards effectiveness; some of this education should be done in a multi-disciplinary setting, or in a different country;
- development of appropriate multi-disciplinary exercises in the form of complex real-life case studies;
- assistance to teachers to act as facilitator in the learning process, rather than as *ex cathedra* teacher;
- development of other educational formats than BEng and MEng, notably refresher and recycling courses to meet increasing demand for continuous education; such formats should be officially recognized as career- development criteria, and hence be subject to strict quality control;
- training of the trainers, e.g. by giving them intensive exposure to innovative education methodologies at other institutes, preferably in a different country or different cultural setting.

A generalized procedure for implementation of an assistance programme to a group of universities and training institutions could assume the following sequence:

1. curriculum conceptualization and development;
2. preparation of specific case studies;
3. selection of training delivery system: universities, post graduate and continuous education institutes, training institutes of ministries, local government, enterprises, NGOs, etc.;
4. prepare for local multiplication of delivery: training of trainers;
5. follow up of training, assessment and feedback.

## **2. In-house Post-Graduate Training for Professionals in the Water Sector (Indonesia)**

This case is a unique example of a long-term comprehensive commitment to the building of a nation’s sectoral capacity through post graduate education. The programme focussed first on the sub-sectors irrigation, lowland development, hydraulic structures and river engineering, and in a later stage also on water supply and sanitation.

It started in 1976 at the request of the then Minister of Public Works of Indonesia. The programme involved, as counterparts, the Indonesian Ministry of Public Works

(MoPW) and the Dutch International Institute for Hydraulic and Environmental Engineering (IHE) in Delft, The Netherlands. All those sectoral activities came under direct responsibility of MoPW (though this situation started changing gradually since 1984). At the MoPW the Directorates General of Water Resources (DGWR) and Human Settlements (DGHS) were involved. The effort was financed by the Indonesian Government (partly via World Bank and ADB loans) and the Dutch Directorate General for International Cooperation (DGIS).

The objectives of the programme can be summarized as:

- institutional strengthening of the MoPW by increasing the technical and project managerial capabilities of its staff. This was deemed necessary to support the large investment schemes in the country in the 70s and 80s. After 1987, operation and maintenance and integrated infrastructure development for regions and urban areas were emphasized;
- "professionalizing" the staff to international performance standards;
- creating a quantitative impact on the Ministry. Though no scientific study was carried out to translate this into more precise terms, a coverage of approx. 25% in 20 years for DGWR, and 10 years for DGHS, of the engineering staff was considered feasible and will be realized. Taking into account the selection procedures within MoPW itself, the selected group certainly forms the lion's share of the staff who would possess the highest growth potentials. For DGWR, approx. 850 staff will be trained this way by 1996; an additional 200 will have received other post-graduate education in university MSc programmes (U.K., France, Canada, Australia).

The programme with DGWR went through 4 phases of 5 year each:

- During *phases I and II* (1976-1981, 1981-1986) some 400 engineers were trained in specially developed 11-month courses at IHE. Proposed participants were carefully selected according to standard IHE procedures: minimum requirements are a relevant BSc degree and 3 years field experience. In addition 30 senior engineers followed a 2-month course in project management in Delft. Participants who pass the examinations of the 11 month course, receive the IHE Diploma. The Indonesian Education Ministry considers this Diploma equivalent to the Sp1 degree (similar to an MSc degree). This in turn is an important administrative criterion for a professional's progress in his career.
- In *phase III* (1986-1991) the activities were continued in Indonesia. In-house training capacity in MoPW was established by creating the BIPOWERED institute at which 50 engineers annually take an adapted 11-month course. However, to achieve the number of credits required for the Sp1 degree, participants have to take a short follow-up course in Delft. The BIPOWERED institute reflects very much the atmosphere of professional post-graduate education as it is carried out at IHE: (i) stress on sound basic knowledge and extensive exercising on case studies, and (ii) lecturing by a corps composed of university staff and (part time) engineers with practical, specialized experience. The reservoir of 400 alumni in Indonesia suffices for the recruitment of most high quality external lecturers from amidst local practitioners. This phase also involves training of trainers.
- In *phase IV* it is intended to create a new institutional framework to consolidate the Indonesian framework. Partly because the Indonesian Education Ministry prefers to have local universities take the lead in post- graduate education, rather than

technical ministries, and partly because the Dutch cooperation policy presently strongly favors local “national” education rather than an “international” one, a new institutional set-up was prepared in which MoPW and the Bandung Institute of Technology organize and implement the two-year post-graduate courses. In this phase IHE will provide assistance in course organization and specific parts of lecturing.

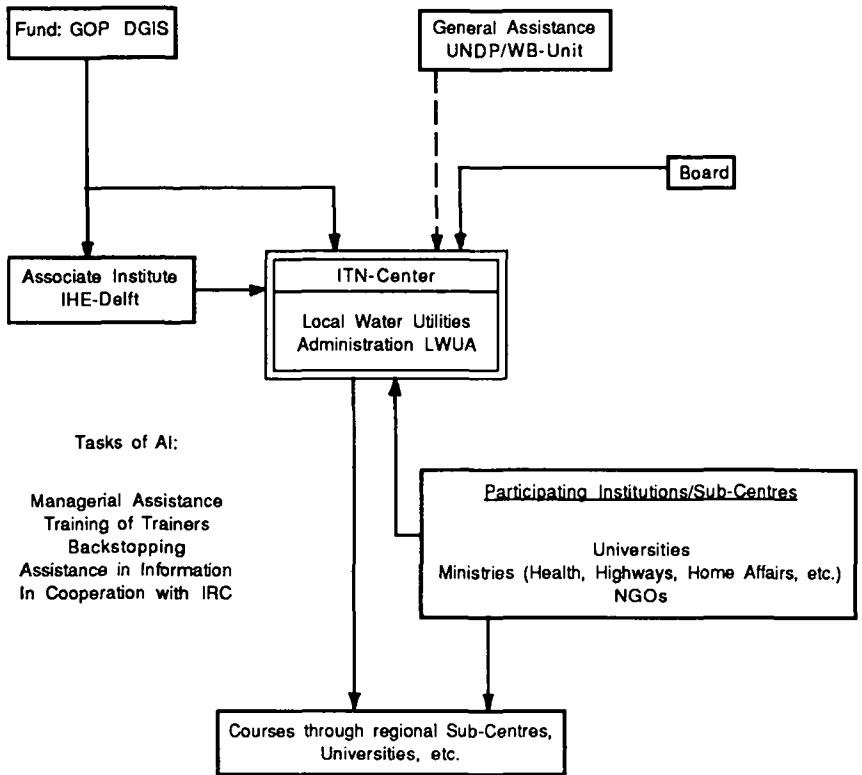
The parallel Diploma programme with DGHS is similar but its contents reflect the evolution in the national development plans, with more attention given to operation and maintenance, managerial and strategic concepts, and the consequences of nation-wide decentralization.

- The first phase (1987-1992) has an nominal output of 125 graduates, a substantial number given the much smaller size of the professional group and the related Directorates for Water Supply, Environmental Sanitation and Programme Development. It was conducted in Delft. Attention was paid to training of trainers in view of the imminent transferral to Indonesia. The course was a special Sanitary Engineering programme, featuring many exercises based exclusively on Indonesian cases. The cases converged into a multi-disciplinary “groupwork” on integrated urban infrastructure development. This groupwork also discussed in detail the strategic, financial, institutional and community involvement implications. Again, the lecturing corps consisted of academic teachers (app. 30%) and selected practitioners (app. 70%). In addition, annually 15 Indonesian senior staff of MoPW, water enterprises and provincial and local authorities, followed a 2 month policy oriented course on infrastructure provision to support urban and regional development.
- The second phase (1992-1997) will build Indonesian capacity, at MoPW and Indonesian universities, to gradually take over the programme.

As is common with education, the impact of this whole programme is difficult to measure with precision. However, little doubt exists about the beneficial direct effects and spin-offs: a large well trained professional staff of international standard, with much self confidence; and a well developed local capacity to provide post-graduate training by academics as well as practitioners. Of the 49 top staff in the DGWR headquarters one third held the IHE Diploma in 1989 (after approx. 400 graduations); 6 others hold MSc degrees from the British and Canadian post-graduate programmes. Many major field project offices are headed by other IHE alumni.

To our knowledge, this programme is the only example so far of a successful “transplant” of a special post-graduate education project, and a powerful illustration of capacity building.

In general, the Indonesian water sector has emerged over the past decades as efficient and effective compared to other South East Asian countries. The fact that IHE alumni are prominently present in the higher echelons of the administration and in project management, has certainly contributed substantially to this. This result could only be created by a long-term commitment and sustained effort of the MoPW in Indonesia, and DGIS and IHE in the Netherlands.



**Figure 6.5** Typical organizational layout for the ITN Center in The Philippines. In time, staff of Participating Institutions will be trained as trainers so that they can become active sub-centers.

### 3. The International Training Network for Water and Waste Management (ITN)

Established in 1984 as a UNDP-World Bank initiative, the ITN promotes a network of local, regional and international institutions in order to strengthen and enhance internal capacity for training, education, information dissemination and research activities on appropriate, low cost water supply and sanitation. The focal points of these activities are the (usually) national network Centers hosted within existing institutions in developing countries. Each Center organizes, in its country, its own local network of participating and resource institutes. Usually the Center collaborates with an "associate institution" in a developed country.

The objectives of ITN Centers are

- to train and educate practicing engineers, students and field staff and to create an awareness amongst decision makers about low cost water supply and sanitation; specifically, to promote the development of more appropriate curricula at universities, polytechnics, health academies, etc.;
- to promote a multi-disciplinary approach, emphasizing socio-cultural and health considerations, in the planning, implementation and maintenance of the systems;
- to collect and disseminate information, and to undertake applied research and demonstration.

A typical feature of ITN are its short courses and seminars of 1 to 10 days. One training session is centered on a slide-and-sound show selected from a set of 50, taking 20 minutes. Each such module describes in some detail a particular subject (like small bore sewerage or cost recovery) and is the introduction to a one-hour discussion around 5 or 6 carefully prepared "hot" questions. The discussion is guided by a practitioner and can be assisted by resource persons. Also guided exercises can be provided. All sessions are highly interactive; conventional lecturing is avoided. Adaptation of existing, centrally produced slide shows, and the preparation of new local ones, are priority activities for Centers.

The ITN training methodology emphasizes problem identification, problem solving, creation of insight and awareness, and action planning. This novel approach has proven its potential as a powerful local capacity builder, provided it is hosted in a favorable and open minded institution.

Nine national and regional network Centers are currently active, mostly in Africa and Asia.

IHE-Delft is the associate institution to the ITN Centers in The Philippines (started 1990) and Indonesia (started 1987). In these countries, the ITN Centers aim at a coverage of 50-75%, in 10 years, of all sub-sector professionals, including technicians, public health officers, NGO staff, etc. An additional objective is to establish a local network of participating or collaborative institutions (universities, local Public Works and Health Offices, NGOs, etc.) which in turn will start providing training to their audiences. *Figure 6.5* shows the organizational layout of the Center in The Philippines located at the Local Water Utilities Administration LWUA in Manila. Generally speaking, only the Center itself requires a large fund to operate (typically \$300,000/year); the sub-centers make use of their existing infrastructure allowing ITN to piggy-back on their regular activities. In Indonesia, experience showed that the Center could achieve a high degree of acceptability within broad layers of society, allowing part of its training and promotional activities to be financed through other sources.

This approach allows a high multiplier effect with progressing years ensuring an effective dissemination of know-how (*Table 6.2*). In addition, the collaborating institutions will emerge strengthened both in their technical capabilities and as local



**Table 6.2** The performance of the ITN Center and its Participating Institutions (PIs) in The Philippines. With progressing time, activities are delegated to PIs.

	1990	1991	1992
<u>Local network</u>			
No. of PIs	12	12	17
<u>Course design</u>			
No. designed by Center+IHE	6	10	3
No. designed by PIs	0	2	17
<u>Trainees</u>			
in courses by Center for PIs	102	250	250
in courses for PI-audiences	0	400	800

capacity builders. Finally, the capability of the Centers to function as a specialized "central" training facility offers the advantage that each ministry should not feel compelled to create its own in-house training facility.

Key requirements for success are that the initiative becomes embedded in the local structures and institutional procedures which allow it to piggy-back and cross fertilize other local programmes. Also, since the Center usually becomes rapidly recognized as expert in the field, it should be able to resist pressure to become a sub-contractor to carry out the training of large on-going investment projects. These projects, because of their sheer size and appeal (special staff cars, better remuneration, status) can drain the whole capacity of the Center, deflecting its attention from its own objective to strengthen the more modest local institutions. Finally, a long-term programmatic commitment of 5-10 years is essential to develop sustainability. Nation wide capacity building can only be achieved if the funding takes a perspective beyond that of projects.

### Conclusions and Summary

Human resources development (HRD) has been recognized already by the Mar del Plata Action Plan to be a critical element in the capacity building of the water sector. During the Water Decade HRD received much attention; several specific training and education needs were identified. Training and education are continuous activities however and the effort in this respect should not slacken.

Training and education have proven to be key capacity building instruments which support long-term development strategies.

To serve the purposes of long-term capacity building it is necessary to take a fresh look at the *educational* aspects of HRD.

Pushed by demographic evolutions in the Third World, the prospects of the development in the water sector are such that they call for renewed attention to increase the number of professionals and upgrade their technical skills as well as their managerial, conceptual and strategic capabilities. The predicted growth in urban population during the coming two decades represents an unequalled demand for

provision of new infrastructure. Simultaneously, the technical complexity of the solutions and their multi-disciplinary scope (also involving many non-technical disciplines) will rapidly increase. This pertains equally well to situations in *low cost* in urbanized and wealthier environments.

Clearly, it is not sufficient to have “more of the same”. Sector professionals will need to be better prepared for the challenges in the sector. This would imply that

- the delivery system for training and education (notably post-graduate) needs to be expanded, by improving the quality of e.g. universities and training institutions, and by developing alternative outlets like the International Training Network Centers, and the local professional associations;
- curricula need to be adapted to make them more responsive to key sector problems; teaching methodologies need to become more effective;
- specifically, graduates should be taught to operate in increasingly integrated environments, and to cooperate with other disciplines. Development of skills and attitudes (problem solving, lateral thinking, etc) may lead to preference for locally implemented courses, or for cross-cultural education environments.

Models for this purpose that have proven their worth, are e.g. the assistance to local university and training institutions, the International Training Network for Water and Waste Management, and the professional post-graduate training for water experts implemented by IHE for the Indonesian Ministry of Public Works. Depending on the specific local needs, many other types of training are available also elsewhere or can be developed.



# The Private Sector and Capacity Building in The Management of Water Supply Enterprises

B.M. Saunier  
SAFEGE

## Introduction

A good water supply is an important basis which enhances development and living standards (*Table 7.1*).

**Table 7.1** Role of Drinking Water in the Social Life of a Nation.

<b>Immediate aims</b>	<b>Stage 1 Benefits</b>	<b>Stage 2 Benefits</b>	<b>Stage 3 Benefits</b>
Improve water:	Save time	Labour release	Higher cash incomes
Quantity	Save energy	Crop innovation	Increased and more reliable subsistence
Quality	Improved health	Crop improvement	
Availability		Animal husbandry innovation	Improved health
Reliability		Animal husbandry improvement	Increased leisure

Source : Feachem, *Water Wastes and Health in Hot Climates*, John Wiley and Sons 1977.

In the less developed countries water supply services attempts to improve service are hampered by rapidly increasing populations and urbanization. *Tables 7.2* and *7.3* provide data for Africa; similar situations pertain to South America and Asia.

**Table 7.2** Rural Water Supply Schemes in Africa.

<b>Country</b>	<b>Number of schemes</b>	<b>Population per scheme</b>
Cameroon	8555	660
Ivory Coast	12733	516
Central Africa	70	25200
Congo	105	9048
Gabon	425	1280
Guinea Conakry	1200	3452
Togo	2700	833
Zaire	1233	16800

Source: UADE 1985 - LOME Congress 1987.

Note: This contribution was compiled by the editors from a lecture delivered by the author.

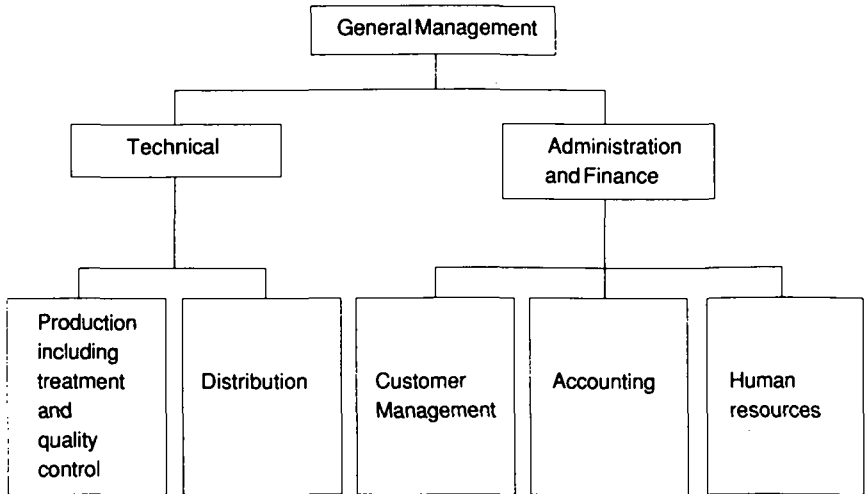


Figure 7.1 Typical organization of a water company.

Table 7.4 Comparison of most serious constraints to water and sanitation programme implementation.

Order Seriousness of Constraint	1980	1985
1	Funding Limitations	Funding Limitations
2	Lack of Trained Personnel	Inadequate Cost Recovery
3	Lack of Trained Support Personnel	Lack of Trained Personnel
4	Inadequate Operation and Maintenance	Inadequate Operation and Maintenance
5	Poor Logistic Support	Lack of Trained Support Personnel

Source: WHO (1987).

**Table 7.3** Urban Water Supply in Africa

Country	Urban population in thousands		Number of persons per connection
Ivory Coast	2951	4190	17
Central Africa	908	1021	146
Congo	1000	1050	24
Gabon	1056	1250	36
Guinea Conakry	1637	2394	95
Mali	1505	1831	72
Morocco	9680	11600	9
Togo	819	1043	59
Zaire	9300	15000	46

Source: UADE 1985 - LOME Congress 1987

Water sector development initiatives, over the past few decades, have been hindered by inefficient institutions. Various problem areas have been identified and this symposium aims to initiate a strategy for improvement.

In different parts of the world drinking water is provided to the public by various types of institutions/organizations, within different organizational frameworks. Capacity building involves providing the means to improve the water supply service through strong, efficient institutions with clearly defined roles and authority, working within a conducive environment (policies, laws, etc.). In some cases these institutions will all be government departments. Elsewhere it may be better to make use of private companies to carry out some of the tasks.

### The Drinking Water Industry

Characteristics of drinking water supply:

- Quantity: resources, planning, management, legislation
- Quality: protection, treatment, monitoring, distribution, maintenance, reliability
- Sustainability: continuity of quality and quantity, re-use

Objectives of the water companies:

- To produce drinking water at the lowest cost
- To supply water continuously
- To collect and to treat waste water

A typical organization of a water company is presented in *Figure 7.1*.

### Inefficiency in the Drinking Water Industry

With some exceptions, the management of public services in developing countries is characterized by (*Table 7.4*):

- **Limited financial capacity:** although water is considered a priority as far as infrastructure is concerned, preference is often given to projects that are more likely to generate immediate income and foreign currency. In the water industry

large amounts of capital have to be invested with very long periods of repayments. The actual return is marginal, security is low while the cost of servicing the debt is very high.

- **Insufficient know-how:** developing countries import nearly all the technology used in water distribution: feasibility studies, design and construction of plants and networks. Operation and local management are often of a poor quality. A real transfer of technology does not exist in these fields.

At the same time, the need to train personnel to design, construct, operate and manage water distribution utilities often seems unsurmountable. The conditions of plants and the way they are operated are indicative of the seriousness of the situation.

- **Inappropriate administration:** water distribution utilities are usually managed by the Administration with personnel having public service status. The prices at which water is sold is not the result of a technico-economic calculation, but rather the result of political considerations. As a result the administrators do not have complete control of account balancing and large deficits are common.

Financial management of Public Utilities, in developing countries, is often one of the main factors limiting their development.

There are three constraints:

- capital limitations
- weak cost recovery
- lack of trained personnel

The shortage of capital investment for water systems is significant and this is not a problem which will be adequately solved, even in the next ten years, mainly because of the rapid population growth in developing countries.

Cost recovery, which is now recognized as a significant constraint, and lack of trained personnel are to some extent linked. In most cases, the key to improving the performance of the public utilities over the short term lies in their ability to recover an increasing percentage of the cost of the service from their customers. Today, most developing country governments are so overburdened with debt and lack of funding that they are unable to subsidize public utilities. With efficient cost recovery, public services should cover their operating and maintenance costs, and this will facilitate adequate salaries and improved working environments to attract and retain trained personnel.

For international donors and lending institutions, the cost recovery issue is becoming increasingly important, and funding is now available for assistance of public utilities to reorganize their financial management.

## The Role of ESAs

### Coordination

Coordination between the international donating and lending institutions should be a *leitmotif*. This is absolutely necessary if the technical assistance given to the public utilities in the developing countries is to be useful.

One particular international institution should be in charge of coordinating the aid and technical assistance for a particular public utility. This will also facilitate the use of

funds from different origins for financing complementary parts of a single project.

### **Financial Management**

Donors often provide financing for the construction of Public Utility projects, but there is rarely a commitment to meet ongoing operating and maintenance costs. These costs are expected to be covered by the sales revenue of the utility, and therefore the inability to collect sufficient revenues does not allow the Public Utility to meet such expenses. The money frequently must come from tax revenues, with the disadvantage of diverting resources from more productive uses, and possibly of subsidizing indirectly the largest but also the richest consumers.

Among ESAs the cost recovery issue is becoming increasingly important in investment analysis. Self sufficiency should also be an issue in the analysis of each Public Utility, and a part of the aid should be devoted to the attainment of this goal.

### **Capacity Building**

ESAs should allow funding for capacity building alongside capital investment:

- institutional aspects: in developing countries, public utilities are usually managed by the Government through national companies. There is much interaction between public service and political power, which is often a handicap for the decision-making process vital for good management. It is desirable to clarify the relationship between (and the responsibilities of) the State and the management of its public utilities; in some countries this is done in the form of specification sheets, a contract plan or even by delegation of privatization of the public service. The funding agencies have an important role to play in sensitizing governments to the institutional aspects of management of public utilities.
- training of personnel: bearing in mind the expansion with which public utilities have had to cope in recent years, the personnel has to be trained to carry out the tasks specific to its profession. The recruitment of highly qualified managers must be a priority, to direct the training of personnel.
- technical management: the mixture of equipment used by public utilities (generally due to bilateral aid under the terms of which the donor country imposes its own manufacturers) complicates both the training of the personnel and the supply of spare parts. A budget for the management of plant supplied by the donor countries should always be part of the aid package.
- customers management: the financial management sets out to organize the cash flow of the public utilities. Although the monopoly situation and the financial autonomy, which these bodies enjoy, should be favorable elements for an easy financial management, in reality this is not at all the case, essentially because:
  - the State, principal client, does not pay its bills regularly
  - the raising of tariffs is too often delayed
  - the low salaries paid to the operatives do not encourage them to do a good job
  - the subscriber portfolio is often badly organized
  - the proportion of debts collected is low.

The setting in order of the customers' files should be the top priority operation financed by the funding organization before any other type of aid to public utilities. Assistance to the management of the customers' files and follow up of debt collection should be the second priorities.



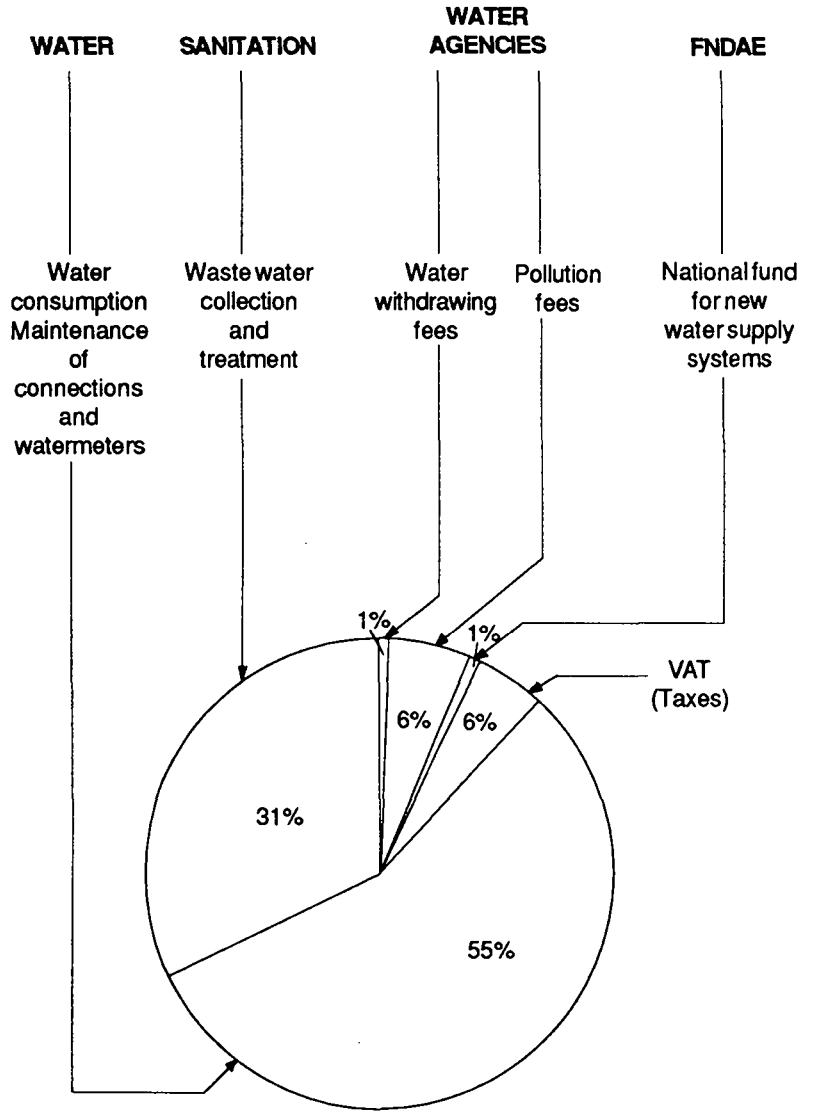


Figure 7.2 The Price of Water (in France).

- charging: it is useless to carry out a review of the tariffs unless the management of the customers is itself done correctly. Too often tariff reviews have been carried out on empirical bases. Nevertheless it is now obvious to all that the fixing of the prices of water is not covered by market mechanisms. It depends on technical, economic and political considerations. The end result is often a price which is too low to allow the maintenance of a good service (Table 7.5).

It is now well established that, contrary to earlier convictions, low tariffs have generally a socially negative effect. They constitute a subsidy to a well fed, high consuming minority of the population and deprive the public service of the resources needed to extend the service to more needy groups.

**Table 7.5** Non-revenue approach for improving management

Water Production	=	Water Sales	+	Non Revenue Water
Non Revenue Water	=	Physical Losses (Leakage ...)	+	Non Physical Losses (legal free use illegal free use under-metering under-billing ...)
Three actions:		- Metering policy		
		- Leak detection and repairs		
		- Improving Customer Management		

### Paying for Water: Key Facts

#### Potable water distribution is very capital intensive

- the ratios assets/turnover are very high and near those of steel works and car manufacture
- the annual costs of the system are mainly limited by the level of repayment of loans
- not possible to adapt the system to short-term situations

#### Potable water distribution is an industry with a strong political visibility

##### Economic reality of potable water cost.

- $COST = ANNUITIES + OPERATION + MAINTENANCE$
- Cost at the micro-economical level: variable according to proximity of resources, level of treatment, age of equipment, etc.
- Cost at the macro-economical level:  
region, nation: 0.4 to 1.5 USD/m<sup>3</sup>
- e.g. In France (1985), without taxes and waste water costs:  
average cost in rural areas: 0.9 USD/m<sup>3</sup>  
average cost in urban areas: 0.7 USD/m<sup>3</sup>

Figure 7.2 illustrates the main components of the price of water within France.

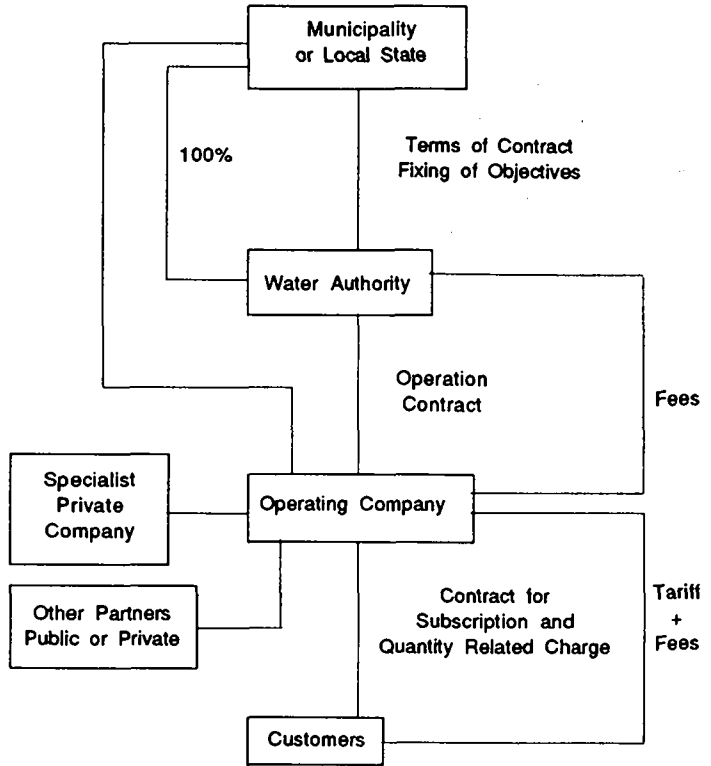


Figure 7.3 Privatization of Public Utilities.

### **Basic principles for water charges**

1. The water service must be considered as an industrial and commercial service and no longer as a social service.  
This means that the water tariff must include all the operating costs and a major part of the investment costs.
2. The water service must be mainly financed by the consumers living within the zone serviced by the system and not through an increase in the tax burden.
3. The consumer must be guaranteed a regular good quality supply at the least possible cost.

### **Management efficiency**

- Tariff determination is waste of time without good management of installations and customers
- Unidentified losses are over 50% in many distribution networks
- Collection of consumers' debts is less than 50% by many water companies

The State must set a good example and pay its bills

## **Privatization: a Possible Solution for Upgrading Public Utility Management In Developing Countries**

### **Contribution of private companies**

The privatization of the public water companies would make it possible for the public utilities in developing countries to benefit from the know-how of large international companies specialized in public services management. The immediate consequences could be:

- Reduction of operating expenses: personnel, equipment, products, premises
- Improvement of the efficiency of installations
- Decrease of the deterioration of equipment, by regular maintenance and replacement of faulty parts
- Reduction of outstanding payments through rigorous attention to client portfolios and monitoring customer files.

Three kinds of measures could favor the privatization of public utilities:

- organization of the public utilities in two separate companies, one for the assets, a second one for the daily operation,
- participation of the international institutions as shareholders in the capital of the operating company,
- incitement of local authorities to privatization through conditional project funding; the international institutions tie up their financing to the condition that the user sign a contract with an experienced private group for an extended period.

*Figure 7.3* shows a typical organization of a public utility in two companies. In this scheme, the public utility company keeps the global responsibility of the public service, but delegates to a private company the daily operation concerning production, operation, maintenance and customer management. This organization shows many advantages:

- local Government keeps through the public utility company, its prerogatives concerning the development and control of the public service,
- the public utility company remains the owner of the equipment and assumes the strategic choices concerning the selection and funding of new equipment,

**Table 7.6** Fixing Water Tariffs.**Tariff fixing:**Free water ...

- the poor not connected to the public supply buy high prices from water sellers
- the rich are even richer
- encouragement of waste
- development of a mentality of an "aided" population
- no resources other than state subsidies
- who will pay for sanitation tomorrow?

Water sold at its real price ...

- can be too expensive for the poorest people
- setting up of socially minded tariffs, the richer subsidize the poorer, urban populations subsidize

Water sold below its real price ...

- receipts cover operating and renewal costs
- receipts cover operating and renewal costs and new investments

A political choice ...**Water Tariff:**

Normally a Binomial system

- fixed part
- variable part
- fixed costs of connection
- volume related costs

## Elements in tariff

- Water Supply } Operating Costs
- Sewerage and sewage treatment } Amortisation
- Water Supply Tax } Interest
- Pollution Tax
- National Water Supply Tax (Municipal Charge)
- Value Added Tax

**Tariffs examples:**

- MOROCCO (1985)
 

Consumption < 30 m <sup>3</sup> /term	0.09 USD/m <sup>3</sup>
Consumption 30 to 60 m <sup>3</sup> /term	0.23 USD/m <sup>3</sup>
Consumption > 60 m <sup>3</sup>	0.32 USD/m <sup>3</sup>
Industry	0.20 USD/m <sup>3</sup>
Price paid to ONEP for production of potable water,	0.14 USD/m <sup>3</sup>
  - IVORY COAST (1985)
 

Consumption 0 to 10 m <sup>3</sup> /month	0.36 USD/m <sup>3</sup>
Consumption (meter 15 mm)	
Consumption 0 to 30 m <sup>3</sup> /month	0.95 USD/m <sup>3</sup>
Consumption 31 to 100 m <sup>3</sup> /month	1.2 USD/m <sup>3</sup>
Consumption > 100 m <sup>3</sup> /month	1.7 USD/m <sup>3</sup>
- Financial autonomy of the water service

Source : Cost and Price of Water, ENP, December 1988, Paris

Redistribution by water sellers can lead to charges of 10 to 20 times the price of direct sales. Provisions for prices increase must be made to take account of inflation.

- the public utility company delegates daily management to a specialized company, but continuous to ensure its control, according to the rules fixed in the contract,
- the financial implication of the specialized company in the capital of the operating company is a guarantee for good management.
- the payment of the operating company is directly related to the amount of its cashing, so its efforts will benefit the public utility company which will receive payment for its investments,
- the set up of an autonomous operating company allows for a clarification of the relationship between the public service operator and its main customer; the State,
- the presence of a specialized partner offers opportunities for a wide opening towards:
  - new technical information
  - new products
  - personnel training.

However, privatization of public utilities in developing countries is difficult, from a private investor's point of view, because of the risks arising from the political, economic and legal conditions. This makes any long term programme (which is the only guarantee of a real and long lasting transfer of technology with costs at an economically acceptable level) both difficult and uncertain.

#### **The Risk factor: main limitation to the extension of privatization**

The risk factor constitutes the main obstacle to privatization. Any investor must be prepared to take risks, and even more so if he invests in developing countries, however the risk is much larger in public utilities than in any other activity for two main reasons. Firstly, since the utilities have great social impact, the political authorities in some countries may be tempted to take authoritarian and arbitrary action. Secondly, investments in the utility field are programmed for much longer periods of amortisation than in other activities, say industry or real estate. Time is a major factor in increasing risk.

#### **Direct or delegated management?**

##### **Direct Management by local authorities:**

- Direct administration
- Autonomous administration

For technical reasons, and often for political reasons, a balanced budget is often difficult to attain.

##### **Delegated management:**

Types of contracts binding the public authorities and the private operators

- Concession\*
- Leasing\*
- Administration with financial interest
- Management
- Service

\* In these two cases the private operator manages the service at his own risk. The results of the company will depend on his capabilities to run the service efficiently while fulfilling his contractual obligation to the public authority.

Table 7.5 Privatization Contracts

Type of Contract	Concession	Lease	Administration	Management	Service
Who finances new works ?	operator	public authorities	public authorities	public authorities	public authorities
Who provides operating capital ?	operator	operator	public authorities	public authorities	public authorities
Who sets rates paid by the consumer ?	public authorities according to contract	public authorities according to contract	public authorities	public authorities	public authorities
Client bound contractually to	operator	operator	operator	local authorities	local authorities
Contracting party's income	included in rates	included in rates	% of cost plus productivity bonus	set rate depending on physical parameters	according to contract
Cover of public authorities' expenses	surcharge	surcharge	receipts	receipts	receipts
Responsibility of private operator	very high	high	average	average	minimal
Financial commitment of the private operator	very high	high	average	average	minimal

Source: I. Cheret, World Bank Seminar 1985.

## Different types of privatization

*Table 7.5* summarizes the different types of privatization contract. A look at this table shows that risk is very high in the “concession” type (or Build, Operate, Transfer, BOT) and very low in the service type. In the lease type, the operator finances the operating capital, but does not finance new works. In the administration type, the operator does not finance the capital, and gets a bonus according to productivity rules. Those two contracts are believed to be the most appropriate ones for privatization in developing countries.

### Operational or leasing contract:

- Infrastructure financed and owned by municipality
- Operation and maintenance contracted to private operator
- Operator provides management, working capital
- Frequently operator also finances specific categories of repair and maintenance
- Operator bills customers
- Duration is normally 10 to 15 years
- Existing staff normally offered employment with operator

### Concession Contract (Build operate transfer):

- Private operator finances the creation of infrastructure
- Private operator provides working capital
- Private operator designs, constructs and commissions the new infrastructure
- Private operator operates and maintains the system

### Tariffs

- Operator bills and collects revenue from customers
- Tariff per m<sup>3</sup> covers operating costs, interest and amortisation of capital
- Tariff is formula based on official indices

### Control & Duration

Build, operate, transfer B.O.T.

- Municipality controls quality of service provided
- At the end of the contract period all property and infrastructure reverts to the municipality
- Length of contract period normally 20-25 years
- Existing staff normally offered employment with operator

### Regulation

- Regulation under the contract
- Regulation under state law
- Self-regulation by operator

### Flexibility

- Great advantage of the approach
- Both “Lease” and “Concession” contracts can be easily adapted to specific local conditions
- A hybrid of Lease and Concession is becoming increasingly common
- A group of municipalities can create a syndicate which contracts out its services to a single private operator
- Ownership remains with public sector



- Contract provides:
  - Clear objectives
  - Clear standards
  - Strong control
  - Regulated price
- Control firmly in hands of public sector
- Operational responsibilities delegated to private sector

### **Benefits**

Benefits flow from the combination of:

- A formal contract
- Clear separation of regulation and operation
- Competition
- Commercial incentive
- Statutory framework
- Accountability and responsibility of municipality
- All of which lead to a strong focus on service

Benefits:

- Cost effectiveness
- High standard of service
- Customer satisfaction
- Investment in efficiency
- Direct relationship between service and payment
- Cash flow
- Innovation - Research & Development - Technology Transfer
- Strong regulation & control
- Career opportunities/training
- Optimization of capital and operating criteria
- Speed of implementation
- Increase in overall investment

### **The Contract**

The private sector operator is bound by contract to the public administration to provide clearly defined operational services. The operator is paid for the results in accordance with a pre determined pricing structure.

Ownership and control remain firmly in the hands of the public authority.

The main areas covered in the contract are:

1. General definition of scope, duration, responsibilities and peculiarities;
2. Object and scope of contract;
3. Conditions of operating the service;
4. Employment conditions of staff;
5. Conditions for undertaking physical works;
6. Financial Conditions - Prices and Payment;
7. Indexation and modification of prices;
8. Tax clauses;
9. Guarantees, Penalties and Disputes;
10. Conditions for hand over at end of contract period;

11. Technical definition, inventory;
12. Technical operating parameters;
13. Technical aspects of new works;
14. Application of Financial Conditions - terms of payment etc.;
15. Production of Accounts - financial reports, technical reports etc.;
16. Drawings and Appendices.

#### Is Privatization a solution?

- No, for resolving investments problems in developing countries: the water industry consumes capital, there can be no short-term returns on investments, there is no guarantee of political stability, only a low level of investment is possible
- Yes to improve the economical productivity
- Yes to improve the quality of service
- Yes to improve the level of receipts
- Yes to improve or even balance (with appropriate tariffs) the budget for water supply services.

#### Advantages of the private sector

- Water supply companies have to develop on a continuous basis:
  - engineering techniques
  - water treatment techniques (design and management)
  - distribution techniques (operation and maintenance)
  - efficient customer management.
- The private operators are motivated:
  - to reduce operating expenses (employees, equipment, products, premises ...)
  - to improve the efficiency of installations
  - to avoid deterioration of equipment by regular maintenance
  - to limit the problem of outstanding payments through monitoring of portfolio and customer files.
- Other advantages with the private sector:
  - permanent obligation
  - flexibility in investments
  - training
  - research

#### The French system

- 99% of the population is supplied through a public network
- 60% of the 36394 municipalities are supplied by private operators
- 70% of the distributed water is supplied by private operators
- 56% of the privatization contracts are of the "Lease" type
- Unlike in the United States or in the United Kingdom, the private operator is never the owner of the water service in perpetuity. The concession contracts grant ownership by the private sector for 25 to 30 years only, and afterwards there is renegotiation.

#### Reasons for increase of the private sector in France

- know-how of specialist companies
- decentralized organization of private sector
- efficiency is an obligation for the private sector
- no monopoly: the community can choose

## **Steps Towards Privatization**

Define the objectives

- investment
- management

Define the roles of the private and public sectors

Analyze the main constraints

- Social and political aspects
- Tariffs in accordance with the consumers' revenues
- Social aspects of human resources

Select a privatization scheme

## **Conclusion**

Technical assistance for upgrading the financial management of public utilities, in developing countries, is now frequently included in international aid programs. The hiring of experts to place in the local public utilities is still the usual method of technical assistance. The limitations of this practice are now well recognized.

More and more the international institutions finance private "turn-key" contracts for upgrading customers' inventories and bill cashing. As we have shown, this can give good results; however, the continuity of these results depends on the quality of the local management.

In the future, it is likely that technical assistance will consist of privatization of the operation of the public utilities. More and more international institutions favor this solution. From the private operator's point of view, this can be acceptable only if the risk factor is lowered. To set the risk at an acceptable level, international funding institutions should be prepared to enter into the operating companies. This might appear cheaper than technical assistance programmes, and provide the opportunity of getting some return to finance other programmes.

The private sector can contribute to capacity building in the management of potable-water companies by:

- training local people
- improvement of financial management
- optimization of the use of local equipment
- providing a constant service to the customers, in terms of quantity and quality.

# Proposed Capacity Building Strategy for The Irrigation Subsector of Ethiopia

M. Tafesse  
Water Resources Development Authority, Ethiopia

## Introduction

Ethiopia has a population of 51 million people, of which about 90% live in rural areas. A large proportion of the population does not have access to potable water supply and sanitation services. The country is also deficient in food production. There is, thus, a need to intensify agricultural development (including irrigated agriculture) as well as water supply and sanitation services. To meet challenges it is believed that institutions should be strengthened with sound management, trained and motivated man-power and an enabling environment. Institutions should adopt a demand oriented and bottom-up approach.

## The Water Sector

Ethiopia is bestowed with a large surface water resource and a limited amount of ground water. Flows of rivers are seasonal requiring regulation works for large scale development. The rivers are located far from areas of high population density. The physical features of the country inhibit large scale contiguous irrigation development due to high unit costs. Out of an estimated 3 million hectares of irrigation potential, present development amounts to 150,000 hectares.

The following are the main organizations involved in water supply and sewerage, irrigation and water resources management.

- Water Resources Commission (WRC)  
Responsible for policy initiation, water legislation, training and co-ordination/supervision of sector activities.
- Ethiopian Valleys Development Study Authority (EVDSA)  
Prepares water master plans, basin plans, feasibility studies of irrigation schemes.
- Water Resources Development Authority (WRDA)  
Provides design, construction supervision, operation and maintenance, water management for irrigation, drainage, flood control and hydropower.
- Water Supply and Sewerage Authority (WSSA)  
Study, implementation, operation and maintenance of water supply and sewerage services for all urban and rural areas except the city of Addis Ababa.
- Ethiopian Water Works Construction Authority (EWWCA)  
Construction of all water works.
- National Meteorological Services Agency (NMSA)  
Collection and dissemination of all meteorological data.
- Addis Ababa Water Supply and Sewerage Authority (AAWSSA)  
Planning, implementation, operation and maintenance of water supply and sewer-

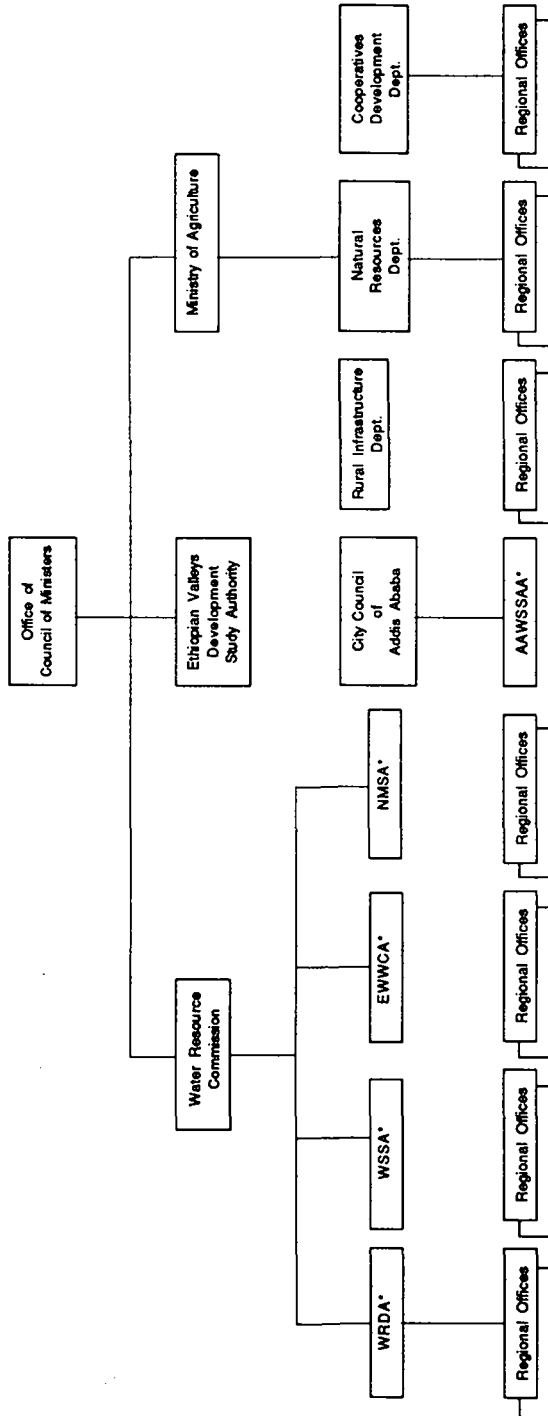


Figure 8.1 The water sector in Ethiopia. \*For meaning of abbreviations see first page of this paper.

- age services for the city of Addis Ababa.
- Ministry of Agriculture (as related to water works)
  - Identification and implementation of small scale irrigation schemes; operation of large scale irrigated farms (through parastatal organizations).

The interrelationship of these organizations is shown in *Figure 8.1*.

### **Opportunities and Constraints**

In order to meet the challenges of increased demand for potable water and sanitation services and food/cash crops, the water sector has undergone major reorganization in the last ten years. A fair appreciation of the importance of properly developing and managing water resources has been achieved at the policy making level. A new specialized institute of water technology has been established for the training of technicians and engineers.

A good number of technical staff has been trained and deployed.

In spite of enhanced activities and outputs especially in the provision of water supply to rural communities, much more needs to be done in order to meet the growing demands for the services of the sector. Like other sectors of the economy, it has suffered from the poor economic performance of the country in the last decade. Budget allocation did not match the expected outputs. Shortage of foreign exchange, construction material, fuel, etc. hindered progress of initiatives taken. The development policy based on very limited private participation hampered progress. The main constraints that contributed to the weakened outputs of the irrigation subsector as related to capacity of organizations are outlined as follows:

#### **Environmental constraints**

- inability to carry out water resource assessment and development in areas with extended civil strife
- recurrent droughts that resulted in shifting of priorities
- limited programmes for private involvement
- delays in promulgation of water codes
- weak economic performance, in the decade, at the national level.

#### **Institutional matters**

- problems related to mandates of some organizations resulting in activities overlapping or not being covered.
- inflexible management systems
- unstable leadership (frequent changes)
- lack of sound training programmes for management skills at all levels.

#### **Manpower development**

- civil service conditions of employment need to be improved to attract skilled workers
- training of O&M staff and extension workers (irrigation) needs to be strengthened
- ineffective or non-existent professional associations.

#### **Community participation**

- water supply and sanitation subsector is better developed with established units to handle community participation. None are yet provided for the irrigation subsector.

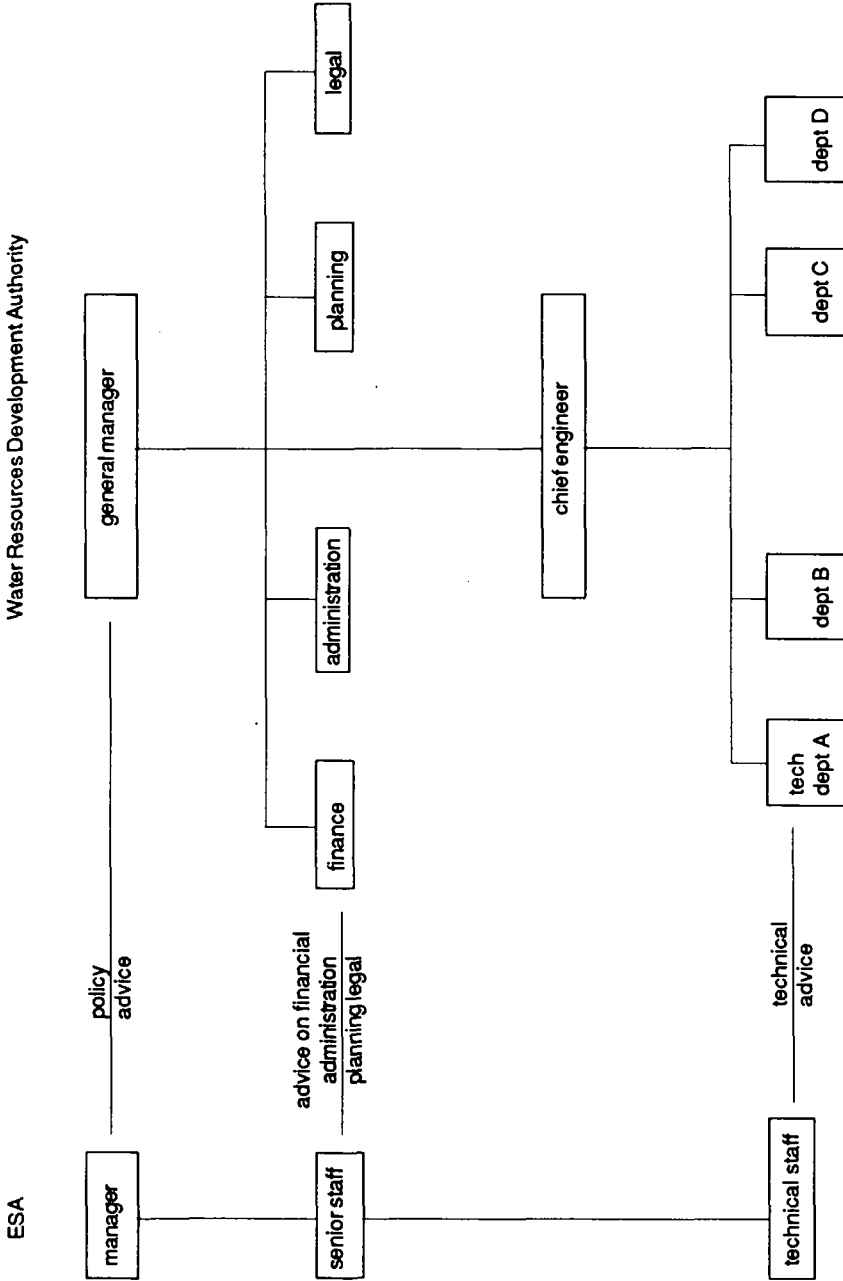


Figure 8.2 Role of ESAs.

### Finance and other resources

- budget allocations fall systematically short of requirements
- there is a need to introduce water charges commensurate with ability to pay.

## Implementation of Capacity Building

### General

Aspects of capacity building have been included, in some form, in a number of projects. For example there is an ongoing project (supported by UNDP and executed by FAO) called "Strengthening the Design Capabilities of WRDA", which addresses capacity building at the agency level. In view of the recognition of the important role of capacity building, there is a need to incorporate the newer concepts and strategies so that improvements can be made at all levels (national to local) of development.

There is a need to appreciate that the irrigation schemes will be sustainable only if community (user) participation is enhanced. The views of the target population should be taken into account at the planning stage and a strong users' association, with some autonomy and responsibility, is desirable.

There is also a need to reduce government intervention in development schemes. The role of the private sector should be examined and provisions made for enhancement. Local consultancy firms should be encouraged to develop and be engaged in Technical Assistance programs wherever the capacity exists.

The usefulness of restructuring organizations to implement water resource development projects should be looked at in great detail together with the possibilities for linkage of technical assistance teams. Different alternatives for organizational set up should be prepared and carefully evaluated before selection is made.

### Irrigation subsector

Implementation of capacity building may be carried out in four phases. These are described as follows:

#### Phase 1:

- Nominate interdisciplinary national task force to conduct rapid assessment; chaired by the Ministry of Planning but including staff from other subsectors and universities.
- Obtain External Support Agency (ESA) assistance to back the task force.
- Review national development policy and sector policy (role of irrigation).
- Review legal basis for subsectoral activities and institutional mandates.
- Review institutional set-ups (adequacy, weaknesses and strengths) with a view to strengthening, rather than creating new organizations, as far as possible (and appropriate)
- Review work procedures, including approach (top down or bottom up) and level of community participation.
- Evaluate human resources and training programmes.
- Examine financial resources and expenditure, including capital and recurrent costs and the level of subsidy.
- Prepare draft rapid assessment at national and local levels.

#### Phase 2:

- Conduct seminar to review findings of the task force and finalize report.
- The invitees may include:
  - senior officials from the policy initiating sectors



- staff of target organizations at all levels
- representatives of ESAs
- representatives of beneficiaries, inter-sectoral groups
- staff of associated educational institutions.

**Phase 3:**

- Prepare cost action plans with clearly defined targets.  
Based on the report of the task force, projects, costs, schedules. The plans should be realistic, set preferably measurable targets to be met and, as far as possible, be self financed (except for large investment works). Provision should be made for continued evaluation, and a responsible organization identified to carry out this task.

**Phase 4:**

- Implement Capacity Building  
Once the action plans are approved, capacity building could proceed at all levels.

**Role of the ESAs**

The report of the assessment of water resources development will identify the role of ESAs in capacity building. Some points are highlighted as follows:

- ESAs should appreciate the long term institutional goals over short term project goals.
- Twinning arrangements with a similar organization should be considered as one of the options for technical assistance. Selection should preferably be handled through competitive means.
- ESAs should take the role of mobilizer rather than substitute.
- ESAs should be willing to participate throughout the beneficiary's set-up. This is shown in the schematic outline of *Figure 8.2*.

# Organizational Development - A Sri Lankan Experience

M. Wickremage

National Water Supply and Drainage Board, Sri Lanka

## Introduction

Organizational Development (OD) is the development of an institution's effectiveness within the confines of the institution's stated mission and culture. Institutional Development (ID) seeks, in addition, to take account of the wider institutional ramifications, such as linkages with other authorities, sectoral goals and policies and possible modifications of the role of the institution within the external environment. In the case of the NWSDB, a strictly OD approach would concentrate on improvements in internal organizational procedures, technical, task-specific target development, upgrading management effectiveness, operational planning and performance monitoring.

By comparison, ID would also include analysis and changes in national sector policies, laws and goals, sector planning in the context of sector needs, external stakeholder priorities and liaison mechanisms, including interaction between key agencies operating in the external environment, particularly government Ministries and external support agencies (ESAs).

The Institutional Development programme funded by the US Agency for International Development (USAID), took place at the National Water Supply and Drainage Board (NWSDB) between April 1985 and August 1991. Institutional Development is an expansion of Organizational Development (OD).

The NWSDB was formed out of the Department of Water Supply and Drainage in 1975 as an autonomous body under the then Ministry of Irrigation, Power and Highway and from 1977 under the Ministry of Local Government, Housing and Construction (MLGHC). It was charged primarily with developing, providing, operating and controlling efficient water supply facilities, to distribute water for public, domestic or industrial purposes and to charge for the same. Other duties of the NWSDB included such functions as the provision of pipes sewerage facilities, research and training. Today the Board has a staff of 6,932 and manages 199 schemes serving 3,400,000 people.

## Pre-project Setting

At the time of the project preparation in late 1983/early 1984, the NWSDB was functioning reasonably well in terms of construction of new schemes but performance was less than satisfactory in the areas of scheme operation and financial viability. In 1983 for example, collections represented only 12% of O&M cost and the ratio of billed consumers to staff ratio was only 8:4.

The basic problems with the NWSDB at the time of project design was that it had not been able to come to grips with the very significant shift occasioned by its change from a Government Department to a public corporation. The new role demanded that its

focus of attention be changed from capital projects to O&M and consumer orientation. This change in focus represented a radical redirection of emphasis, one that the NWSDB was not in a position to easily adapt to.

The operational deficiencies resulting from the change in emphasis could be summarized as follows:

- Negligible emphasis on O&M
- Minimal commitment to financial viability
- Negligible accounting/budget discipline
- No corporate planning
- Little attention to community/user considerations
- Reliant on Government subsidies
- Totally reactive to direction from MLGHC, local authorities and Members of Parliament

These deficiencies could not be overcome without a change in basic NWSDB staff attitude, supported by new operational skills and procedures.

### **Project Objectives**

The project had two elements, a comprehensive institution building component and a programme to improve health education and rural sanitation services through the integration of NWSDB activities with the Ministry of Health (MOH).

Three basic objectives of the institution-building element were:

- consolidating the NWSDB organization responsible for a major World Bank-funded infrastructure project
- decentralizing management to the regional offices
- changing the overall organization structure, attitudes and actions to make the operation and maintenance (O&M) activities of the NWSDB the most important mission

The principal objective of the health education, sanitation and community participation elements was to ensure (through a process of formal coordination among the NWSDB, MOH, participating Non-Governmental Organizations (NGOs) and beneficiary communities) that health education and sanitation services would be delivered to the communities simultaneously with the provision of new or upgraded water supply facilities.

The total estimated project cost at the time of inception, excluding contingencies and inflation allowances was \$13.85 million, of which TA costs relating to the OD and health components were estimated to account for 25%, at \$3.52 million.

This data is presented to illustrate that although OD (and also health education) are essentially "software" projects, associated "hardware" non-Technical Assistance costs represented no less than three quarters of the total project costs.

### **Technical Assistance**

The prime contract was signed between Engineering-Science Inc. (ES) and USAID in February 1985 with an effective start date of 1 April 1985. The prime contract was amended on a number of occasions throughout the life of the project, the net result being that the original project duration was increased by 93% from 40 to 77 months, and the professional input (on-site expatriate and Sri Lankan) was increased by 79%

from 440 to 786 person-months.

In accordance with the philosophy of serving as process consultants, change agents or catalysts, the TA team basically operated in a pivotal role, facilitating and monitoring the OD process. Of course, when it was necessary to secure the support of external stakeholders in order to sustain OD momentum, a more prescriptive mode was adopted.

The decision to move into the prescriptive mode was not taken lightly, it was discussed in detail with the external actor concerned and great care was taken to ensure that the pressure was in accordance with the stated OD goals, supported by the wider sectoral goals of government.

Although the use of external stakeholders became a recognized and indeed an essential element of the OD process, it was never openly discussed, probably because it was seen, by all parties, that its net effect on institutional change was generally positive.

One of the fundamental facets of the NWSDB culture was that it was an engineering-dominated organization. The OD project introduced a different emphasis, on for example O&M and commercial awareness, functions that were alien to traditional civil engineers and were seen as a threat to their power base. The project, therefore, generated a feeling of insecurity on the part of the engineers. The ranks were closed, and resistance to the project grew until sacrifices had to be made through implementing major changes in key personnel in both the TA team and NWSDB executive management towards the end of the first year.

The changes had the desired effect on the WSSSP. Most of the TA team members gradually came to understand and respect the institution's culture, whilst at the same time the culture of the institution gradually changed as the project progressed.

### **The Organizational Development Process**

The process of OD is dynamic, cyclical and subject to all the positive and negative forces at work both within the institution and in the external environment. The process has a range of positive forces being brought into play to counter and overcome pressures acting against change. The need for "hardware" inputs such as equipment, facilities and overseas training tours is recognized, not just to upgrade the asset base of the institution but also to provide incentives to accept changes.

An OD project is usually commissioned at the behest of the institution. In the case of the NWSDB the real impetus for change came initially from the donor community who wished to see an increased level of accountability and a greater return on their investments.

Traditionally, an OD intervention proceeds along a carefully balanced path, specialist consultants are called in (assuming that there is no in-house OD/ID capability) to assess the weakness, and over time strategies are developed, in collaboration with the staff of the institution, to bring about change. In accordance with the theory of process consultation, reforms must be developed with the full involvement of the staff so that the OD process is "owned" by the institution.

In the case of the NWSDB, the sudden-shock approach was used for project start-up. Many consultants questioned numerous areas of the Board and recommended changes. There was a reaction by staff, but over a few months the project tended toward the more traditional philosophy of gradual change. The positive result of the sudden-shock approach was that the institution was forced into addressing the change issues.

As the project progressed and the initial resistance began to subside, a strategy was mapped out to arrange the consultant input in such a way that success could be achieved in key areas which would in turn generate increased support for further

changes. Six principal pathways to institutional strengthening were identified, not all at once, some only became apparent in the second year of the project.

The primary initiatives undertaken during the project were:

### **1. Decentralization**

This was the most significant initiative because it resulted in so many other positive spin-offs which assisted the OD momentum. The Board had created 5 Regional Support Centers (RSCs). Although these offices existed, they tended to be headed by relatively junior engineers and any substantive decision-making was made at the Head Office level.

The degree of Head Office authority delegation achieved was far in excess of that envisaged at the start of the project. One of the key components of the decentralization effort was the delegation of financial responsibility. The level of financial authority enjoyed by the RSC senior managers at the end of the project was twenty times greater (Rs.500,000 compared to Rs.25,000) than that enjoyed by the managers responsible for regional operation at project inception.

Additionally RSCs became responsible for:

- planning, design and construction, supervision of extensions and minor new and rehabilitation projects
- groundwater development
- operation and maintenance/water quality monitoring
- community support/sanitation
- billing/collection
- financial management/budget control
- personnel functions
- local purchases
- local and on-the-job training
- performance evaluation
- MIS
- liaison with decentralized government agencies
- training
- regional data bank

It is pertinent to note that decentralization is a time-consuming process. It required about 2 to 2 years to achieve 50% decentralized status and from 3 to 3 years to achieve 80% .

### **2. Management Development**

The management profile of the NWSDB in 1985/1986 tended to show the following characteristics:

- Unwillingness to make decisions
- Limited delegation of responsibility, most decisions, even of an operational nature, were made by executive management
- Power and influence held by civil engineers who had a strong bias toward capital works
- Limited group management skills, meetings dominated by individuals, generally the most senior managers present
- Lack of accountability and suppression of initiative, reluctance to be innovative
- Absence of basic management systems (MIS, performance indicators, budgets)
- Strong sense of pessimism and criticism of the institution

- Strong resistance to change, although there was an awareness that change was required

The management development intervention comprised a series of interconnecting levels and continued at varying degrees of intensity for the duration of the project. The basic strategy was to actively follow up the formal training courses with day-to-day coaching by the resident TA team. This follow-up manifested itself in two ways, through facilitating and assisting in every-day operational issues and through workshops designed to address specific issues. These workshops ranged from half a day to three days in duration and whenever possible were held away from the office, usually in a resort hotel. As for senior management training, the workshops were preceded by an intensive series of surveys designed to clarify needs assessments, to uncover problems and to secure the involvement of the NWSDB staff in the design and actual implementation of the training event.

Building team spirit was a hidden agenda in almost every management development initiative. The TA team labored the point continually, constantly showing how the manager could profit from the support and experience of their peers and how a cohesive group was better able to establish a positive identity and thereby demand and receive additional resources.

A retrospective evaluation of managers' performance over the life of the project showed that only those who had been involved in active day-to-day coaching by the TA team were able to adjust their management styles to suit different work situations.

### **3. Corporate Planning**

The initial project objectives envisaged the formation of a corporate planning committee as a key step in the institutionalization of the process. Early in 1986 a committee was formed, based in the Ministry of Local Government, Housing and Construction (MLGHC) and chaired by a senior Ministry officer at the Additional Secretary level. The committee comprised the NWSDB Chairman and GM with co-opted members comprising the USAID Project Officer, the TA Project Manager and others as necessary depending on the agenda. The committee met monthly to review and decide on policy and procedure recommendations submitted by various task forces and working groups. Useful as these meetings were it soon became apparent that the committee was not actively helping the creation of a corporate planning process in the NWSDB.

During the first half of 1987 when the rapidly deteriorating financial status of the NWSDB became recognized, the decision was made to disband the corporate planning committee and to form a Management Cell which would report directly to the Secretary/MLGHC on OD progress. Although the Management Cell served an essential role in the policy development area, particularly with respect to preparation of Cabinet Memoranda on performance improvement strategies, deliberations on tariff reform, extent of decentralization etc. it still did not meet the needs of establishing a truly participatory in-house corporate planning capability.

Early in 1990 the Corporate Planning Division (CPD) was established, headed by an Additional GM. The CPD had a high visibility, on a par with the operations area, and was well-positioned to enhance the status of corporate planning within the organization. Throughout 1990 the CPD spear-headed a programme of workshops designed with the specific purpose of securing total NWSDB management involvement in the corporate planning process.

By September 1990 the individual area-based action plans were compressed into a NWSDB-wide action agenda with specific goals and more short-term targets were

established for the key areas of:

- Decentralization
- Service coverage (population served, new schemes/rehabilitation. policy on capital investment)
- O&M (reduction in unaccounted-for-water, improvement in water quality, preventive maintenance)
- Management improvement (staff optimization, employee evaluation, overtime control)
- Financial issues (cost recovery, billing/collection targets, tariffs, decentralized financial autonomy)

Based on the outcome of the September 1990 'institutionalization of corporate planning' workshop, the CPD prepared the 1991 Corporate Plan which was issued in the first quarter of the year.

#### **4. Financial Viability**

The key project objective, to turn the NWSDB into a financially viable organization, was approached through a combination of the following ID initiatives:

- Billing and collection improvements
- Performance budgeting (development of financial consciousness)
- Management development (initiate performance-based operations)
- Corporate planning (raise visibility of financial viability goal through interaction with external environment)
- Financial procedures (upgrade existing systems)
- MIS (provide timely financial information)
- Cost containment measures
- Tariff reform

The basic strategy was to awaken an interest among NWSDB management (at all levels) for financial discipline and improvement, to develop the mechanism to enable financial information to be made widely available in a timely fashion, and to develop collaboratively financial targets supported as necessary by key actors in the external environment (notably ESAs, MHC and the Ministry of Finance).

The introduction of performance budgeting drastically improved cost-control and management effectiveness overall. The introduction of an efficient billing and collection system was seen as a fundamental key to improving the financial status of the institution.

An in-house microcomputer-based billing system was installed initially in Greater Colombo and gradually extended to cover all the regions (except the North-East RSC) by the end of the project. The billing lag time (time between meter reading and receipt of bill by consumer) which had averaged 6 months when billing was being carried out by a private bureau was reduced to 30 days. Because of the improved service, consumer billing complaints fell dramatically from over 10% of billed connections to below 2% by 1989. Current collections ratios improved also as the consumers became accustomed to having to pay for water and the NWSDB became more aggressive in its collection practices. For example, during the first half of 1991 Colombo collections within 2 and 6 months of bill posting averaged about 60% and 74% respectively, compared to about 15% and 50% in 1986 when in-house billing and record-keeping commenced.

With the gradual development of a financial consciousness among NWSDB managers both the attitude to waste and the lack of cost control changed, with the result that operating costs as a whole were held below inflation, a significant achievement

which vindicated the emphasis placed on performance budgeting as a management development tool.

With the approval of tariff increases in 1990 and 1991 and the implementation of a staff cost reduction programme (based on overtime control, use of scheme caretakers and pensionable retrenchment) the financial situation of the NWSDB at the end of the project was vastly improved from that existing at project inception.

### **5. Human Resources Development**

The development of an expanded training competence within the NWDDDB was based on a strategy of Training of Trainers (TOT)/On-the-job training (OJT) and the extensive use of other training resource centers available in Sri Lanka. As the project progressed there was a significant change in emphasis from formal classroom training to OJT using NWSB officers as trainers.

Some of the most impressive skills training was in upgrading the basic management competence of middle managers and supervisors. These formal courses proved to be very successful, being carried out throughout the regions on a rotational basis. Networking was used extensively in an attempt to secure replication of achievements in one area across the whole institution. Throughout the project great stress was placed on learning from water authorities in other less development countries (LDCs), particularly those in similar conditions (climate, socio/economic status). Study tours were arranged to Singapore, Penang (Malaysia) and Sanepar (Brazil), the latter two authorities were recognized as being highly efficient models of utility agencies in LDCs.

The development of an employee performance evaluation system was a key component of the upgrading process. A two-pronged strategy was used to build up an acceptance of the principles involved, this strategy comprised stimulating the demand and defining the procedural details. A period of 4 years was necessary to gain widespread acceptance.

The OD initiative was a good example of how careful coaching, backed up with sound, collaborative demonstrations can realize success. The approach was gradual, not rushed, and any increase of pressure was carefully controlled to parallel the frustration among NWSDB officers resulting from the inadequacies of the traditional method of staff assessment and promotion.

### **6. Community Participation**

Community participation was a principal component of the project element striving to improve health education and rural sanitation services. A specific unit was established early in the project with the following functions:

- To help other sections of the NWSDB in identifying and solving sociological problems in water supply and sanitation
- To assist appropriate agencies in understanding people and promoting self-help and self-reliance so that people could actively participate in water supply and sanitation projects
- To ensure proper use of water and sanitation facilities
- To provide orientation and training in health education, environmental sanitation, control of water and sanitation related diseases, community organization and participatory approaches to NWSDB employees, field level 4, 4 officers of related government departments and personnel of the NGO sector.

Community participation, health education and latrine construction, all proceeded on schedule. A health education curriculum was developed and utilized and 5400 adult latrines constructed. An additional 1300 pre-school latrines were also constructed



which had a significant impact on childhood diarrhoea episodes. Approximately 370 volunteer village health workers were trained to carry out health education activities. By the end of the project an element of community involvement was included.

### **Strategies for Organizational Development**

Four key strategies were adopted to achieve successful OD. These were inculcating ownership, developing a team spirit, establishing a corporate identity and involvement of the external environment. By themselves they would not have had any impact on institutional upgrading. All four strategies operated within and around a web of discrete interventions.

- Corporate planning - introduced an operational analysis and action planning capability
- Financial management - through performance budgeting and new billing/ collection procedures a financial consciousness was developed
- Public relations - widened the vision, built confidence and narrowed the gap between the institution and its customers
- Community participation - involvement of the community in the project cycle
- O&M - changed the emphasis from building new schemes to providing the consumer with a better quality service.

### **Measurement of Progress**

Monitoring and evaluating the progress of an ID/OD project is vastly different from monitoring a more conventional intervention which has clearly defined physical outputs. The inherent difficulties of monitoring the project were recognized by USAID right from the start and the Project Paper contained specific sections highlighting the critical questions, key indicators, data collection and analysis necessary for project monitoring and evaluation. An innovative and highly successful approach which was also adopted by USAID was the annual project monitoring carried out by a two-man team from the Water and Sanitation for Health Project (WASH). The team leader remained unchanged throughout the project and since he had also been involved in the initial project preparation he had a comprehensive appreciation of project needs. The second member of the team was selected to reflect a current priority area at the time of project monitoring.

The procedure used was as follows:

- Monitoring team interviewed counterparts to assess their reaction to the project, review progress and define problem areas and perceived priorities
- Monitoring team interviewed TA team to assess problems and progress since last visit
- Monitoring team interviewed USAID officers, parent Ministry officials and ESAs (if in-country at that time) to ascertain any positive/negative feedback or suggestions for priority shifts
- Five-day workshops in an out-of-town location to address key OD issues and to develop an action plan for the next year. The workshop was attended by counterparts and the TA team
- Presentation of final report with debriefings to USAID/Colombo, NWSDB executive management, Secretary/MHC and TA Project Manager

The TA team certainly found the annual event highly profitable since it enabled priorities to be re-focused and helped prevent the consultants from becoming institutionalized themselves.

The operational action plan was the chief monitoring tool used by the consultants to quantify progress on a regular basis. The plan was flexible, in that new tasks were added as they evolved, and it covered the following main areas of activity:

- Project management
- Corporate planning
- MIS
- Decentralization
- Billing and collection
- Public relations
- Engineering
- O&M
- Community support and sanitation
- HRD/training
- Colombo master plan update

**Table 9.1** A review of key operational indicators for the before-project situation (year ending December 1984) and at the end of 1990. (There can be no argument that in almost every case the NWSDB was in a far better position in 1990 than in 1984.)

Indicator		Before Project (1984)	End of Project (1990)
Piped water produced	(M m <sup>3</sup> /y)	155 (a)	219
Billed connections	(thousand)	79 (a)	185
Billed connections to employees ratio		13	26
Billings	(Rs million)	224	503
Billing lag time	(days)	180	30
Collections	(Rs million)	56	422
Collections	(% O&M cost)	31	99
Consumer complaints	(% connections)	>10	3

Notes: (a) Average of 1983/1985 data.

## Lessons Learned

### Consultant Team Selection

- Prior regional experience in a long-term resident capacity is a highly desirable prerequisite for key team members
- The team should comprise a mix of technical (functional area) specialists and OD/ID experts. The technical specialists should have a good manner of presenting their expertise to local staff and should be amenable to being coached in such skills by other team members if the need is apparent
- The Project Manager should have the same professional leaning as the key institution managers since this helps to strengthen the trust bridge between consultant and institution.
- The Project Manager must continually evaluate his team's performance, be attuned to the undercurrents of negative feedback and be prepared to remove a team member immediately it appears that his continuation could jeopardize progress
- A team member will be more acceptable if they have had prior experience in an agency similar to the institution elsewhere.

### **Transferring Ownership**

- All change strategies, new procedures and other project interventions must be “owned” by the counterparts. From ownership came acceptance and commitment which in turn lead to sustainability
- The potential benefits of implementing new systems must be highlighted in order to engender enthusiasm and support for the systems
- Training in technology-transfer should be arranged early-on in the project for the OD team members.

### **Delegation Breeds Confidence**

- Positive delegation of authority is essential for ensuring dissemination of new systems and ownership throughout the institution
- Regional decentralization is a valid means of achieving delegation and is highly suited to a service agency which has a large area of jurisdiction
- Promotion of delegation programmes must be backed up with initiatives to increase management and technical skills and to provide the necessary systems and procedures
- The increased degree of confidence resulting from delegation manifests itself in a measurable, improved operational performance and a willingness to take on more responsibilities.

### **Internal Performance Review**

- Performance indicators must be developed within the institution and must be seen to be relevant to the operations being measured
- Performance targets must be achievable
- Initially all functional areas should be involved in performance criteria development, even though some areas will never use them. This strategy supports institutional cohesiveness and prevent some areas from feeling that they have been singled out for monitoring
- Performance review meetings should be held regularly, concentrating on specific functional areas. The meetings should be attended by top management (to show support for both the procedure and for those taking part) and peer review of area performance should be encouraged.

### **External Monitoring Process**

- There is a real risk, in a long-term OD project, for the TA team to become caught up in the minutiae procedural detail rather than focussing on the overall vision
- An external monitoring team visiting the project on a regular basis will help to counter the adverse tendencies mentioned above
- The monitoring team members must be well versed in OD concepts, with a highly attuned cultural sensitivity
- The monitoring team must interact not only with the internal OD/ID protagonists (consultants and counterparts) but also the key actors in the external environment (parent Ministry, ESAs)
- The team should focus continually on the issue of sustainability and not hesitate to recommend even major changes in project approach, resource inputs, project duration, etc. necessary to achieve this goal.

### **Involvement of External Environment**

- Political forces exists in the external environment which can be used to accelerate the overall OD/ID momentum
- Efforts should be made to consciously involve in the OD process those ESAs who

- are committed to linking funding to evidence of operational performance improvement
- Using the external environment to support institutional upgrading is a valid strategy, but the OD team must always be conscious of the fact that this strategy must remain secondary to that of helping the institution develop itself from within.

### **Sustainability**

Sustainability can be defined as the ability of the institution to perform effectively after the OD team has departed and after donor assistance has been terminated. Factors which suggest a strong likelihood of sustained performance at project completion were as follows:

#### **Institution Related:**

- Decentralized structure (responsive to consumers)
- Strong financial consciousness
- Acceptance of employee performance evaluation process
- Acceptance of community participation process
- Financial viability
- Corporate planning/policy development capability
- Competent management skills
- Potentially attractive for privatization

### **Conclusions**

The major lesson learned on the WSSSP has been that OD is possible to achieve in a public sector organization, in a developing country, provided that enough time is allowed for the changes to take effect. It is suggested that six years is a minimum period on which to base a project design for this kind of intervention.

Highly specific activities such as regional operations (O&M, billing and collection, consumer service) were generally at the forefront of performance improvements, compared to the less-specific activities such as support services and the project development cycle. This observation supports the premise that specialized organizations (RSCs) tend to outperform generalized organizations (Head Office) because a specialized organization concentrates on what it has to achieve whereas a generalized organization has to spend time continually adapting to changing environmental circumstances.

Institutional change is usually more complicated than it appears initially and requires great willingness to revise plans and strategies in accordance with events. The OD project for the NWSDB has demonstrated that OD concepts can be put into practice provided that a tailor-made (institutional and external-environment specific) approach is adopted.



# Summary of Discussions at the Dutch Water Sector Day

H.M. Oudshoorn  
Delft University of Technology, The Netherlands

On 15th May 1991, the Directorate General for International Cooperation (DGIS/ DST/TA) convened a meeting of Dutch professionals in the water sector and representatives of Dutch institutions involved in water resources management. The objective of the meeting was to supply, through brainstorming, inputs to DGIS in refining its policy towards water resources management in general and water sector capacity building in particular. The conclusions and recommendations of the meeting provide inputs to the UNDP Symposium "A Strategy for Water Resources Capacity Building".

The day was opened by Ir. K. Kuiper, Director DST of DGIS, who emphasized the importance which DGIS attaches to sustainable and equitable use of water resources, and to environmentally sound development in general. These items are focal points of DGIS's policy, which implies that the DGIS policy towards water resources management and water resources capacity building should be seen as **sustainable and environmentally sound use and development of water resources**.

To stimulate the discussion, seven speeches were given by representatives of Dutch organizations on a number of topics that relate to capacity building in water resources management. Short abstracts of the papers are presented below. The speeches address the subject of capacity building from different angles and at different levels in the hierarchy of institutions. *Figure 10.1* is an attempt to locate the speeches in an institutional framework.

## 1. "Capacity Building in Water Resources Management, an introduction"

by H. Savenije & E. van Beek, IHE/Delft Hydraulics, The Netherlands

This paper is an introduction to the concepts of Integrated Water Resources Management and Water Sector Capacity Building and attempts to define and explain the terms used.

Different people perceive 'water resources development' in very different ways.

### What is Water Resources Development?

- to people in arid countries:
  - drought relief
  - irrigation
  - jobs, food
  - flash flood control
- to people in wet countries:
  - water works
  - navigation
  - flood protection
  - hydro power
- to the water engineer:
  - dams, reservoirs
  - flood protection
  - river training
  - water treatment

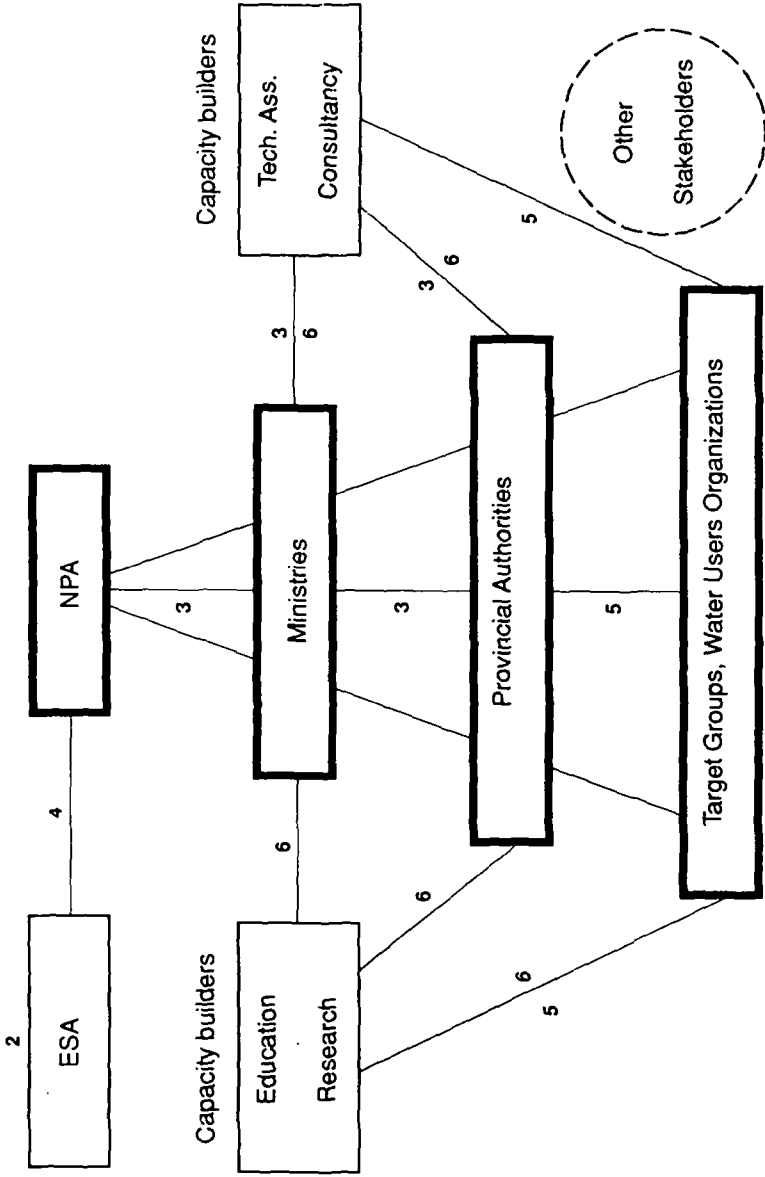


Figure 10.1 Hierarchical framework in the water sector showing institutional links and scope of papers presented. (Numbers denote scope of papers).

- to the environmentalist:
  - habitat deterioration
  - deforestation
  - pollution
  - destruction of wetlands
- to the lawyer:
  - legislation
  - international law
  - water rights
- to the economist:
  - stimulation of economic growth
  - poverty alleviation
  - employment generation

To ensure sustainable development, it is essential that common ground is found and solutions agreed upon. The various aspects should be complimentary, not antagonistic.

Integrated water resources management takes full account of: all sectors of the national economy that depend on water, all water resources, the full set of national objectives and constraints, and the institutional framework. Water resources management should be sustainable in a technical, environmental, financial, social and institutional sense. Capacity building is a major instrument to attain sustainability.

## **2. "Review of DGIS sponsored programmes in the Water Sector"**

by H. Pesman, DGIS, The Netherlands

The involvement of DGIS in the water sector over the last years was analyzed and a number of recommendations were made with regard to DGIS's future involvement.

The need for an integral approach was stressed. Government must be eager to implement the necessary reforms within the Water Sector. Initially an 'enabling environment' (suitable laws, policies, etc.) should be created, the donor can then concentrate on bottlenecks within the institutions.

Evaluation of projects and information feed-back, to improve future project planning, is often found to be lacking. Simple monitoring and feed-back systems could be introduced. It is essential in institutional assistance to develop good personal relations between the counterparts, hence Technical Assistants should dispose of diplomatic qualities.

## **3. "Water as the linking factor in regional planning"**

by J. de Sonnevile, TNO-IGG, The Netherlands

The fact that almost all sectors of the economy make use of the same scarce resource is often the stimulus for the establishment of institutional links, of organization of these links, and of competition leading to better management of the resources and of their use. In Kenya this effect is clearly present and has led to decentralized planning which involves all interested sectors. Capacity building is a long-term process involving assessments, definition of responsibilities and targets, re-organization, multilateral communication and training.

## **4. "Dynamics of the donor recipient dialogue, opportunities for change?"**

by A. Hordijk, Matrix Consultants, The Netherlands

In their response to the growing need for water related goods and services, donors have been supply oriented. As a result, projects were often not sustainable. The



benefits derived from the projects stopped when the donor involvement stopped. The answer to this problem lies in a balance between supply and demand for goods and services. The "market" should be the principal feed-back mechanism to the primary production process to maintain this balance and to guarantee the quality and the quantity of the produce.

Demand feed-back, forming a closed, corrective, system, is a requirement for sustainability. Responsibility and motivation for continuity is part of an institutional interest, which is normally based on the demand for services.

The major condition to be fulfilled before starting any project is to establish an institutional interest to secure continuity. Hence an institutional analysis is required that analyses all actors involved in the process, the roles they play and their levels of intervention.

**5. "Capacity building and the relevance to user groups"**

by R. Oppermann, DHV Consultants, The Netherlands

On the basis of experience obtained in the irrigation sub-sector, conclusions were drawn with regard to capacity building in general and the involvement of user groups in particular. In this respect it was concluded that capacity building should be a continuous process, instead of a project-by-project activity.

Sound organization is vital to irrigation schemes. Decentralized management eases communication and eliminates some bureaucratic delays. Capacity building is important, right down to the lowest levels.

**6. "Options for transfer of knowledge through twinning"**

by J. van Winkelen, Water Company Friesland, The Netherlands

Twinning is where an institution of the developed world cooperates with a similar institution in the developing world, in the field of institutional organization and transfer of knowledge. Although based on a bilateral contract, it is often a noncommittal activity, since it is not based on a commercial relationship. A more businesslike approach, on a commercial basis could be followed to expand the twinning concept and to make it more efficient.

This paper raises the issue of private companies carrying out tasks, or providing services normally associated with government institutions.

**7. "Options for transfer of knowledge through education"**

by G. Alaerts, IHE, The Netherlands

The number of people that depend, for their water-related services, on professionals in the water sector grows faster than the number of professionals. Thus the need for education is growing fast.

Education is an essential component of capacity building. A well trained professional is able to function even in a poor institutional setting. A good institutional setting can only work if qualified people are available.

## Conclusions and Recommendations

Out of the wide range of items discussed, a selection has been made of the most relevant conclusions and recommendations and are listed below:

1. The sustainable use and development of water resources requires an integrated and coordinated approach, taking into account the interests of all relevant water-related subsectors and the potential of the water system, within the framework of the required multi-layered institutional setting. This is a complicated multi-disciplinary activity in which trade-offs are made between multiple interests with respect to multiple objectives and constraints.
2. Consequently, there is a need for a coordinating national body, of high level patronage, to make good mutual agreements on the allocation of water resources.
3. Water resources management can be considered as a closed system where demand, and the interest attached to the demand, justifies the allocation of resources. Often these decisions are of a political nature.
4. In many countries there is an urgent need to make national assessments of the state of affairs in the water sector, and to evaluate the requirements for capacity building. Such an assessment should be made in coordination with UNDP and with support of the other ESAs. It should result in a plan supported by donors and recipients. This plan should also give the framework for defining the needs for institutional strengthening and capacity building.
5. In capacity building, maximum involvement should be obtained from the existing institutions. The local operating agencies as well as local government administrations and the national, sectoral development agencies.
6. The management of water resources should follow both a top-down and a bottom-up approach. The top delivering the general framework for the execution of demands from the bottom, transferring means and responsibilities to the bottom.
7. Transfer of knowledge for a training purpose is in many cases most effective when coupled to an operational project (whether in the field of management, planning, design or execution), to allow "on-the-job" training. A project which includes transfer of knowledge should have separate objectives and criteria to evaluate the effectiveness of the transfer of knowledge, and adequate funds. Training and education serve different purposes, the latter supporting broader goals and giving long-term effects.
8. Institutional development is no short-term activity. A long-term commitment is required when tackling an institutional development project.
9. Twinning between two water resources management authorities, can be an option for transfer of managerial know-how if the two authorities are comparable in size and structure and have to deal with problems of a similar nature.
10. Adequate education is a condition without which capacity building cannot exist. In addition to on-the-job training, directed at strengthening well-specified tasks, educational programmes are necessary to increase the capacity of staff to think in a conceptual manner, and to learn to better adapt to changing conditions (educational programmes are "change agents" for institutions).



## Closing Address

G.A. Brown  
Bank of Jamaica

### **Good hopes for the future, based on knowledge of the present**

Other speakers, and many of you who don't know me, may wonder what on earth the head of a central bank, is doing at a seminar on water, where we have mostly engineers and people working in this field. I have been associated with the steering committee of the water and sanitation decade for many, many years and when I left UNDP in 1989, Frank Hartvelt and other friends asked me if I would continue to be chairman of the steering committee. So I still have an interest in water. I have dealings with the water sector at home too in the financing of the national water authority.

The subject that we are promoting in this seminar, and which I am glad to see has been accepted by the group, is that of capacity building. However we must recognize that capacity building is of long lineage and that when we speak of sustainability, human resources development and self reliance, we are expressing the same ideas, the same hopes; namely that in developing countries we will have the institutions and the people who can manage, in an appropriate way, the water resources which are available and the allocation of these resources amongst the competing uses. And it is important always when we get caught up in some esoteric discussion to bear in mind that this really is the objective. How can we ensure that minimum quantities of water, of a sufficiently high quality, are available to satisfy requirements for human consumption and at the same time satisfy the requirements of all the other competing uses, such as irrigation, hydro power, transportation, recreation, fishing and all the other purposes for which water is needed.

Countries differ. There are many, many countries where the strategy has to be one of dealing with scarcity. There are others, such as this country, where you are coping with abundance. Indeed, when I drive along in Holland I say to myself, if only some of this water could be made available in Tanzania, Kenya, Niger, or Chad. Just what these places could be. But when I stop and reflect there are other places in the developing world where there is a lot of water, maybe as much per capita as in The Netherlands, but of course they are not The Netherlands. We therefore come back to this question of the essential human element which is needed to make sure that these God-given resources are exploited and made available for people in a sustainable way. Sustainability has become the buzz word with the environmentalists. But because it is a buzz word, it doesn't mean that it is not an appropriate word and an appropriate objective. Whatever we may do, if it merely provides a solution for a short period we have failed. We have to ensure that generations not yet born, will be able to be provided with the amenities that come from a proper use of water. I am supposed to be talking to you about good hopes for the future, but in the introduction to the Delft Declaration there are some horrendous facts which make one afraid to speak about good hopes. Between 1950 and 2000 the world population will have more than doubled and by the year 2000. Of 22 of the metropolises with more than 10 million people, 18 will be in the developing countries of Asia, Africa and Latin-America. Can you imagine the

enormous, complex task of organizing a water supply in a third world country for a city of 20 million people. That's a daunting prospect.

Looking back at the water decade, we are all disappointed that the high hopes, which were expressed at Mar del Plata that there would be water for all by the end of the decade, has not been achieved. It is estimated that approximately one billion people do not have access to good quality potable water and that approximately double this figure, two billion people, remain unserved in respect of disposal of human waste.

These are the figures that we are starting with in 1991 and when we speak of what we can achieve by the year 2000 we have to remember that we start with this huge deficit. But lurking always is the devil which defeated us in this decade just passed, and that is simply the fact that although large numbers of people were supplied with water and sanitation, we were overtaken by population growth. As long as population continues to increase at the same rate, we are going to be running fast, just to stand still. Really the problem that we have to deal with, is that an increasing proportion of the world's population will be found in the developing countries and these are the very countries where resources are inadequate. This is the challenge, and this is why we need capacity building, which I see as the reciprocal of self-reliance. What we are really trying to achieve is the ability of peoples in the developing world to solve problems themselves and to establish self-sustaining water operations.

Many changes have taken place, in this field, over the last thirty years. For example, it must have been difficult for you engineers to accept that the solution, in many cases, to the water problem would not be derived from large dams and very expensive works, but from the humble hand pump. Many of us have had to accept that for sanitation, water closets cannot always be used and that, sometimes the fly-free latrine is the most appropriate solution. And I think that has been a revolution in thinking, for this group of people, to have accepted that simple technology, appropriate to the circumstances of the people in the country, is the direction in which we should move.

Now there are estimates that if we are to serve 90% of the population in the year 2000, the capital investment which will be required on an annual basis, will be three times, in real terms, the investment which was undertaken in the last decade and this assumes the use, where appropriate, of simple technology. Had this change not taken place amongst the engineers in their thinking, then the cost of the solution would have been out of sight.

The second area, where I think progress has been made, is in recognizing that one cannot look at one water related sub-sector in isolation. We cannot look at drinking water without looking at the competition for the water for small stock, for watering gardens, and by gardens I mean vegetable gardens, and at a higher level the competition with irrigation and industrial use.

The wastage of water, especially in irrigation, water logging and desalination problems (arising from irrigation schemes), pollution and environmental changes must also be considered at regional and national levels.

If, in capacity building, we were able to pass on to people in the developing world who are using irrigation water, a better approach to the use of this water in which the lesson is: less is more, because this is really the lesson that we have to put forward. *Use less water to achieve the same crop production but with less damage to the environment.*

The third area, where I think there has been progress, in thinking and in action, is in moving from the simple view, driven by the heart, that water is a free commodity. When I started in this area I listened to many, many speeches about the absolute necessity for poor people to be provided with a minimum quantity of water. To illustrate how

important water is, the story was told of the young activist who decided to make his point by going on a fast and he very foolishly believed that Gandhi, and the other traditional faster, did refrain from all food and water. In fact, Mr. Gandhi refrained from food, and all those people who engage in fasting refrain from food, but not from water. This is the point that he was trying to make, to show how absolutely vital water is to the sustenance of life. However studies have shown, that the idea that water is a free good has been counterproductive in so far as providing water for the very poor. In some cases the very poor have been entrapped by vendors of water who overcharge for providing them with minimal water requirements. That could have been avoided had there been better organization of the water distribution and some charge made. It has been a tremendous intellectual leap to have accepted that some element of cost recovery is absolutely vital if water is to become universally available.

If you say that all your health services are free and you have just one hospital to serve a hundred thousand people, you would have no service at all. The doctors would allocate two minutes to every patient and prescribe some pills and that's not a health service. And so it is with water. In developing countries it is not possible to organize, centrally, the collection of taxes or charges sufficient to provide supplies of this essential commodity. What is more, the imposition of some charge results in conservation and prevention of misuse.

The fourth area is a recognition of the need for conservation. When we had the oil-crisis everybody said we had to be concerned about conservation. Here, in the case of water, when one looks at the future demand and potential supply, it is obvious that we will need technological break-through to ensure, particularly in urban areas, that consumption of water per head is reduced. If one moves from a rural setting to an urban setting one finds that consumption per head triples and sometimes quadruples, because of the way in which water is used.

One now has to think in terms of different types of supply. Only a small proportion of the total water used has to be purified and chlorinated to potable quality. Perhaps we should examine the possibility of having restricted supplies of potable water, with appropriate charges, with one piping system, with the rest of water used in the household coming from another system. That system could essentially be a recycle system.

The fifth area is an area which has been discussed over in the past four or five years and which prior to this no respectable water administrator would even be seen to be talking about. That is the possibility of privatization of water supplies. You may not wish to go to the extreme of Mrs. Thatcher and hand over waterworks at knocked down prices to privately owned companies (I noticed in the papers that The Thames Water Authority earned something like two hundred million pounds last year. They are going to be paying a big dividend.) but some private interest may be appropriate.

There are various levels at which the private sector can be involved and here, I am not speaking just about consulting services because we have had that. I am speaking of a range of options, from ownership to delegated management. These are possibilities that have to be examined, particularly in countries where skills and competence available to the government are short. There are many, many countries where skills exist in the country, but are not available to the government and what one does by bringing in private sector operation, on contract or through other scenario's, is to utilize, the available skills. I regard this as an expansion of capacity building.

I have just seen for example in my own country, that, as an integral part of resort development, where hotels and housing for workers are built, waste disposal is contracted out to a private firm which then makes a contract with the users. However

it must be recognized that once we go the private route it doesn't mean hands off as far as the government is concerned. The government needs to have the capacity to regulate and to enforce standards. In a country like ours for example, it is absolutely vital to ensure that any effluent going into the sea is of acceptable standard. Otherwise our tourist industry would disappear overnight.

Finally let me make one other point and that is that the environment has now become the sort of unifying area which the impact of all water use now has to be judged against.

It is evident that dams, drinking water extraction, irrigation schemes, sanitation systems, solid waste, farming techniques and industrial processes all cause changes in the environment. There is a growing need to establish a committee or institution to monitor all these activities and their combined effect.

The actions, or policies, of one sector or sub-sector are frequently detrimental to the goals of another. Improved communication and a 'watchdog' with a general overview should foresee serious clashes of interest and allow joint-planning. I think that this is an area in which developing countries should be moving in order to ensure that what we are doing is not counterproductive and contradictory.

I would like us to conclude by recognizing one of the developments that we have seen in the water sector, the active involvement of non-governmental organizations and the co-operation which has taken place between NGOs and government at the local community level. In fact much of the progress which has been made at the local level would not have been possible had there been centralized administration of water extending down to the village level. The NGOs, together with women in the village, who take charge of the provision of water, make a tremendous difference to availability of water at the village level.

So, Ladies and Gentlemen, thank you very much for this opportunity to say something to you. We will make some further progress as a result of this Symposium, because this is how progress is made. We go from this thinking group to Dublin, to the conference on environment and the bigger the audience, the further the messages are sent. Hopefully the end-result of all of this is that the peoples of the developing world will be able to benefit from better use of the water resources, that God has commended to us.

## Summary of the Proceedings

Between 1950 and 2000, the world's population will have more than doubled. By 2025, 60% of the world's population, more than 5 billion people, will be living in cities. Water directly affects their public health and economic development opportunities.

The challenge to satisfy the water needs of the exploding cities, and the rural areas, is daunting, given the equally increasing need for water for irrigated agriculture and the problems arising from urban and industrial pollution. In addition, to do this in a sustainable way, measures have to be taken to protect and conserve water - a major resource and unifying element of our environment.

Experience shows that institutional weaknesses and malfunctions are a major cause of ineffective and unsustainable water services. Pressure for improved local delivery of water services suggests that institutional capacity should be developed to be more demand-responsive. Also, the need to manage overall water resources coherently and more efficiently, and facilitate allocation of water among all users, suggests a need for expansion of integrated, strategic planning.

Countries and external support agencies (ESAs) increasingly accept the importance of the capacity building process for sustainable development. Capacity building consists of three basic, interrelated elements:

- creating an enabling environment with appropriate policy and legal frameworks;
- institutional development, including the development of sector organizations, as well as that of community participation; and
- human resources development and strengthening of managerial systems.

The Delft Declaration which emerged from the UNDP Symposium outlines several strategic approaches which are expected to lead to improved management of water resources.

A proposed first step is the development of long-term strategies for water sector capacity building in countries or regions. It must be recognized that each country and region has its specific characteristics and requirements with respect to its water sector and resources situation, and its institutional framework. To ensure a tailor made strategy it is recommended that **water sector assessments** (including technical, financial, social and economic aspects) be carried out, as soon as possible, to provide a basis for decision making and planning. The assessments are expected to identify requirements for capacity building and sector development. -

It is vital to establish a monitoring and coordination system to ensure that the various actors are aware of the interests of other parties. Activities and development initiatives, initiated by different organizations, sectors or sponsors, should be complementary, not antagonistic, and fit within the agreed capacity building strategy and development plan.

The capacity building initiative may involve major changes in policies, organizations and education systems. Decentralization and privatization are amongst the issues which need to be addressed. Major changes at all levels and in different sectors can only be realized if full support, if not the initiative, is forthcoming from within the country and sectors.

To quote from the Delft Declaration: "If we are to satisfy the acute needs of hundreds of millions of people today, and those of billions tomorrow, we must take a quantum leap by doing things differently and start doing them now."





# Members of the Symposium Committees

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H. Savenije	Associate Professor of Hydrology
P. van Hofwegen	Lecturer in Irrigation
A.S. Ramsundersingh	Head of the Project Office
E.H. Schaap	Assistant



## List of Participants, Speakers and Contributors

- A. Affia**  
 Chef Division Production  
 Office National de l'Eau Potable 6  
 bis Rue Patrice Lumumba  
 Rabat  
 Morocco
- tel 212 7 762729  
 fax 212 7 731355  
 tlx 36071
- Prof G.J. Alaerts**  
 Deputy Director  
 IHE  
 P.O. Box 3015  
 2601 DA Delft  
 The Netherlands
- tel 31 15 783465  
 fax 31 15 122921  
 tlx 38099 ihe nl
- D. Anton**  
 Senior Program Officer  
 Earth Sciences Program  
 Plaza Cagancha 1335  
 11100 Montevideo  
 Uruguay
- tel Ottawa 1 613 236-6163  
 tel Montevideo 598 2 922032-42  
 fax Montevideo 598 2 920223  
 tlx 22377 uy
- Dr Apichart Anukularmphai**  
 Managing Director  
 A&R Consultants  
 71/5 Setsiri 2 Road  
 Samsen-Nai  
 Phya-Thai, Bangkok 10400  
 Thailand
- tel 66 2 282-9302, 282-7841  
 fax 66 2 271-3967
- W.T. Lincklaen Arriëns**  
 Programme Officer  
 Pibultham Villa  
 Kasatsuk Bridge  
 Bangkok  
 Thailand
- tel 66 2 225-0029  
 fax 66 2 225-2796  
 tlx 21322 mekong th
- J.A. Austin**  
 Environment Engineer  
 AID  
 S+T/H/CD  
 Washington DC  
 20523-1817  
 USA
- tel 1 703 875-4613  
 fax 1 703 875-5490

- Nii-Boi Ayibotele** tel 233 21 775351/2  
Director fax 233 21 773068  
Water Resources Research Institute  
P.O. Box M32  
Accra  
Ghana
- Dr N.H. Biegman** tel 31 70 3486486  
Director General fax 31 70 3484848  
Directorate-General  
for International Cooperation  
P.O.Box 20061  
2500 EB Den Haag  
The Netherlands
- Mrs A. Bahri** tel 216 1 717 801/951  
Rural Engineering Research Center tlx 13630 ofelpa tn  
B.P. 10  
Ariana 2080  
Tunisia
- Prof T.L. Blair** tel 31 15 787183  
IHE fax 31 15 122921  
P.O. Box 3015 tlx 38099 ihe nl  
2601 DA Delft  
The Netherlands
- Ir M. Blokland** tel 31 15 783429  
IHE fax 31 15 122921  
P.O. Box 3015 tlx 38099 ihe nl  
2601 DA Delft  
The Netherlands
- Drs J. Blom** tel 31 70 348-4357/5751  
Water Advisor fax 31 70 348-4848  
Ministry of Foreign Affairs  
DGIS  
P.O. Box 20061  
2500 EB Den Haag  
The Netherlands
- G.A. Brown** tel 1 809 922-0858  
Governor fax 31 70 348-4848  
Bank of Jamaica  
P.O. Box 621  
Kingston  
Jamaica

- S. Burchi**  
Legal Officer, Dev. Law Service  
FAO  
Via delle Terme di Caracalla  
00100 Rome  
Italy  
tel 39 6 57973959  
fax 39 6 57973152/57974408
- C. Carnemark**  
World Bank/IFC/M.I.G.A.  
Head, INUWS  
Washington D.C. 20433  
USA  
tel 1 202 477-1234  
fax 1 202 477-6391  
tlx rca 248423
- H.J. Colenbrander**  
Secr. General IAHR  
P.O. Box 6067  
2600 JA Delft  
The Netherlands  
tel 31 15 646798  
fax 31 15 584801
- D. Constable**  
Director  
Center for Int. Irrigation  
Training and Research  
University of Melbourne  
Parkville 3052  
Australia  
tel 61 3 344-4512  
fax 61 3 348-1524  
tlx aa 35185 unime1
- P. Cross**  
UNDP/World Bank  
Water and Sanitation Program  
World Bank, INUWS  
1818 H St N.W.  
Washington DC 20433  
USA  
tel 1.202 473-3475  
fax 1 202 477-0164
- H.M.G. van Damme**  
Director  
IRC - Int. Reference Centre for Water  
and Sanitation  
P.O. Box 93190  
2509 AD Den Haag  
The Netherlands  
tel 31 70 331-4133  
fax 31 70 381-4034  
tlx 33296 irc nl
- Mrs Do Hong Phan**  
Director Resources Dev. Division  
Mekong Secretariat  
Kasatsuk Bridge  
Rama I Road  
Bangkok  
Thailand  
tel 66 2 225-0029  
fax 66 2 225-2796  
tlx 21322 mekong th

- Dr K.A. Edwards**  
UN-DTCD  
Natural Resources and Energy  
Division  
1 UN Plaza  
New York NY 10017  
USA  
fax 1 212 963-4116/8542  
tlx 22311 un ui (outside USA)  
tlx 126171 unations ny (within USA)
- H. El-Habr**  
Programme Officer  
UNEP  
P.O. Box 30552  
Nairobi  
Kenya  
tel 254 2 333930  
fax 254 2 520711  
tlx 22068 unep ke
- K. Erbel**  
GTZ  
P.O. Box 5180  
D 6236 Eschborn 1  
Germany  
tel 49 6196 791265  
fax 49 6196 791115  
tlx 415230 gtz d
- S. Garabedian**  
Technical Adviser  
National Water and Sewerage  
Authority  
P.O. Box 104  
Sana'a  
Yemen Arab Republic  
tel 967 2 216120  
fax 967 2 251536
- H. Garduño V.**  
Director  
Mexican Inst. of Water Technology  
IMTA  
Apartado Postal 235  
Civac, Mor. 62500  
Mexico  
tel 52 73 194241  
fax 52 73 193422
- H.A. Garn**  
Senior Economic Adviser  
World Bank, INUWS  
1818 H St, N.W.  
Washington D.C. 20007  
USA  
tel 1 202 473-7515  
fax 1 202 477-0164  
tlx rca 248423 worldbank
- J.S. Gladwell**  
Programme Specialist  
UNESCO SC/HYD  
75700 Paris  
France  
tel 33 1 4564-8999  
fax 33 1 4567-5869

- Mrs. E. Gorre-Dale** tel 41 22 798-5850/798-8400  
Coordinator fax 41 22 798-7524  
Communication & Information in WSS tlx 415464 UDP CH  
UNDP  
Palais de Nations  
CH-1211 Geneva 10  
Switzerland
- B. Gunadi** tel 62 22 75421  
Head of Housing Div. West Java fax 62 22 57146  
Provincial Public Works Service  
for Human Settlements  
West Java Province  
no 2 Cianjur Str  
Jl. Lengkong 10  
Bandung - Indonesia
- F.J.A. Hartvelt** tel 1 212 906-5000  
Deputy Director fax 1 212 906-6350  
Division for Global and Interregional  
Programmes, UNDP  
One United Nations Plaza  
New York NY 10017  
USA
- Dr R. Helmer** tel 41 22 789-1676  
*UN Conference on Environment* fax 41 22 789-3536  
& Development  
160 Route de Florissant  
P.O. Box 80  
CH-1231 Conches  
Switzerland
- Ir P. van Hofwegen** tel 31 15 786949  
IHE fax 31 15 122921  
P.O. Box 3015 tlx 38099 ihe nl  
2601 DA Delft  
The Netherlands
- C. Imaz Jahnke** tel 52 73 194241/193742  
Coordinator Professional fax 52 73 193422  
Development  
Mexican Inst. of Water Technology  
(IMTA)  
Paseo Cuauhnahuac no 8532  
Progreso, Jiutepec, Morelos  
Mexico 62550



**J.G. Janssens**  
Technical Director  
IWSA Foundation  
c/o Zegersdreef 46  
2930 Brasschaat  
Belgium

tel 32 2 518-8894  
fax 32 3 238-7678

**E.S. Jensen**  
Ministry of Foreign Affairs  
Asiatisk Plads 2  
1448 Copenhagen K  
Denmark

fax 45 31540533

**T. Joench-Clausen**  
Water Quality Institute  
11, Agern Alle  
2970 Hoersholm  
Denmark

tel 45 42 865211  
fax 45 42 867273

**R. Jost**  
Int. Secretariat for Water  
169, Rue Saint-Paul est  
Montreal, Quebec  
Canada H2Y 1G8

tel 1 514 866-1773  
fax 1 514 861-2367  
tlx 055 61789

**J. Khouri**  
Director Water Resources Division  
ACSAD  
P.O. Box 2440  
Damascus  
Syria

tlx 412 697 sy

**Mrs R. Klees**  
USAID  
S+T/H/CD  
Office of Health  
Washington D.C. 20523  
USA

tel 1 703 875-4993  
fax 1 703 875-5490

**E.B. Lake**  
Irrigation Engineer  
CIDA  
200 Prom. du Portage  
Hull, Quebec  
Canada K1A 1G4

tel 1 819 997-3556  
fax 1 819 953-4676

**D.T. Lauria** tel 1 919 966 3751  
University of North Carolina fax 1 919 966 7646  
Chapel Hill  
School of Public Health  
210 N. Columbia Street  
Chapel Hill, N.C. 27599  
U.S.A.

**G. Le Moigne** tel 1 202 477-1234  
Senior Advisor Water Resources fax 1 202 334-0568  
World Bank  
Agriculture and Rural Development Dept.  
1818 H St, N.W.  
Washington D.C. 20007  
USA

**Prof L. Lyklema** tel 31 8370 89111  
Wageningen Agricultural University fax 31 8370 84411  
Nature Conservation Department  
Ritsema Bosweg 32A  
6703 AZ Wageningen  
The Netherlands

**Dr D.A. Mashauri** Dar Es Salaam  
Senior Lecturer tel 255-51-49192  
University of Dar Es Salaam tlx 41561 univip  
c/o Tampere University of  
Technology  
PL 527  
33101 Tampere  
Finland

**Mrs S. Melchior-Tellier** tel 1 212 906-5000  
Programme Manager fax 1 212 906-5862  
UNDP/PROWESS  
One UN Plaza  
New York, N.Y. 10017  
USA

**A. Milburn** tel 44 71 222-3848  
Executive Director fax 44 71 233-1171  
IAWPRC  
1 Queen Anne's Gate  
London SW1H 9BT  
U.K.

- M. Nadar** tel 20 2 354-5530/354-9124  
Chairman of Irrigation Sector fax 20 2 354-9124  
Ministry of Public Works  
and Water Resources  
Asr El-Ainy Str  
Cairo  
Egypt
- P. Najlis** tel 1 212 963-4800  
Sr. Economic Affairs Officer fax 1 212 963-4116  
United Nations Intersecretariat Group for  
Water Energy and Resources Branch  
DIESA, DC2-2022  
Two United Nations Plaza  
New York, NY 10017  
USA
- Prof D.A. Okun** tel 1 919 966-3751  
University of North Carolina at fax 1 919 966-7646  
Chapel Hill  
School of Public Health  
CB# 8060 Page Building  
210 N. Columbia Street  
Chapel Hill, N.C. 27599  
USA
- Prof ir H.M. Oudshoorn** tel 31 15 782995  
Department of Urban Planning fax 31 15 785263  
TU Delft  
Stevinweg 1  
2628 CN Delft  
The Netherlands
- P.C. Pinto** tel 55 61 223-9125/315-1303/111-3133  
Chief of Staff fax 55 61 226-5937  
National Sanitation Secretariat tlx (61) 1015 mas/sns  
Ministry of Social Action MAS/SNS  
Esplanada dos Ministerios  
Bloco 1 - 3-Andar  
70054 Brasilia DF - Brazil
- J.E. Prins** tel 31 15 569353  
COWAR (Delft Hydraulics) fax 31 15 619674  
Rotterdamseweg 185  
Delft  
The Netherlands
- Ir A.S. Ramsundersingh** tel 31 15 787161  
IHE fax 31 15 122921  
P.O. Box 3015 tlx 38099 ihe nl  
2601 DA Delft  
The Netherlands

- Sitaheng Rasphone**  
Vice-Minister  
Ministry of Agriculture and Forestry  
Vientiane  
Laos  
tel 2738/2363  
(or: via Mekong Secretariat, see  
Lincklaen Arriëns)
- A. Reed**  
Technical Adviser  
OXFAM  
274 Banbury Road  
Oxford OX2 7DZ  
UK  
tel 44 865 312355  
fax 44 865 312600
- J.C. Rietveld**  
Principal Sanitary Engineer  
(Asia Region)  
World Bank  
1818 H Str.  
Washington D.C. 20433  
USA  
tel 1 202 458-2924  
fax 1 202 477-3129
- D. Robert**  
Director General  
CEFIGRE  
B.P. 113  
Sophia Antipoli  
06561 - Valbonne Cédex  
France  
tel 33 92945800  
fax 33 93654402  
tlx 461311 f
- Dr J. Rodda**  
World Meteorological Organization  
41, Avenue Giuseppe Motta  
Case Postale no 2300  
CH-1211 Genève 2  
Switzerland  
tel 41 22 730-8111  
fax 41 22 734-2326  
tlx 23260 omm ch
- C. de Rooy**  
UNICEF  
3 UN Plaza  
New York, N.Y. 10017  
USA  
tel 1 212 326-7121  
fax 1 212 326-7438A
- N. Rotival**  
Chairman WSS Collaborative Council  
UNDP  
Palais des Nations  
CH 1211 Geneva 10  
Switzerland  
tel 41 22 733-2543  
fax 41 22 798-7524

- B. Saunier**  
President  
SAFEGE  
76 Rue des Suisses  
92000 Nanterre  
France  
tel 33 1 47247255  
fax 33 1 47247788  
tlx 612611 f
- Ir H.H.G. Savenije**  
IHE  
P.O. Box 3015  
2601 DA Delft  
The Netherlands  
tel 31 15 786117  
fax 31 15 122921  
tlx 38099 ihe nl
- F.E. Schulze**  
IIMI  
P.O. Box 2075  
Colombo  
Sri Lanka  
tel 94 1 565601-012  
fax 94 1 562919
- S. Scott**  
FAO  
Via delle Terme di Caracala  
00100 Rome  
Italy  
tel 39 6 57973959  
fax 39 6 57973152/57974408
- W.A. Segeren**  
Director  
IHE  
P.O.Box 3015  
2601 DA Delft  
The Netherlands  
tel 31 15 783401  
fax 31 15 122921  
tlx 38099 ihe nl
- M. Sekwale**  
Director of Water Affairs  
Dept. of Water Affairs  
Private bag 0029  
Gaborone, Botswana  
tel 267 351601  
fax 267 374372  
tlx 2257 water bd
- S. Sugandi**  
Head of Section Sanitation  
Provincial Public Works Service  
for Human Settlements  
West Java Province  
Jl. Taman Sari no. 51  
Bandung - Indonesia  
tel 62 22 81866
- M. Sukanda**  
Head West Java Provincial Public  
Works Service for Human Settlements  
West Java Province  
Jl. Lengkong 10  
Bandung, Indonesia  
tel 62 22 75421  
fax 62 22 57146

- M. Tafesse** tel 251 1 181132  
Chief Engineer tlx 21134 awapro  
Water Resources Dev. Authority  
P.O. Box 5673  
Addis Ababa  
Ethiopia
- P.K. Thomas** tel 63 2 632-6850  
Manager fax 63 2 817-0004  
Asian Development Bank tlx 63587 adb pn  
P.O. Box 789  
Manila  
Philippines
- D.B. Warner** tel 41 22 791-3546  
WHO fax 41 22 791-0746  
Water Supply and Sanitation Unit  
Div. for Environmental Health  
1211 Geneva 27  
Switzerland
- M. Wickremage**  
Additional General Manager  
National Water Supply and Drainage Board  
Colombo  
Sri Lanka
- B. Wickramanayake** tel 66 2 516-0110  
Lecturer fax 66 2 516-2126  
Asian Inst. of Technology tlx 84276 ait th  
P.O. Box 2754  
Bangkok 10501  
Thailand
- G.J. Young** tel 41 22 730-8275  
Coordinator ICWE Dublin fax 41 22 734-2326  
WMO  
Hydrology and Water Resources Dept.  
41, Avenue Giuseppe Motta  
CH-1211 Geneva 2  
Switzerland
- R. Zhu** tel 86 1 367931-2378  
Project Officer tlx 22466 mwrep cn  
Dept. of Planning  
Ministry of Water Resources  
P.O. Box 2905  
Beijing, China 100761



## Acronym List

ACC/IGWR	The UN Administrative committee on coordination Inter-Secretariat Group for Water Resources management
ADB	Asian Development Bank
ARIS	Annual Review of Implementation and Supervision
CB	Capacity Building
DGIP	Division for Global and Interregional Programmes
DGIS	Directorate General for International Cooperation, The Netherlands
ESA	External Support Agency
ESCAP	Economic and Social Commission in Asia and the Pacific
FAO	Food and Agriculture Organization
HRD	Human Resources Development
IAP-WASAD	International Action Programme on Water and Sustainable Agricultural Development
ICID	International Commission for Irrigation and Drainage
ICWE	International Conference for Water and the Environment
ID	Institutional Development
IDWSSD	International Drinking Water Supply and Sanitation Decade
IHE	International Institute for Hydraulic and Environmental Engineering
ILO	International Labor Organization
IRC	International Resources Center, The Netherlands
IRR	Irrigation
ISGWR	Intersecretariat Group for Water Resources
ITN	International Training Network for Water and Waste Management
MdP	Mar del Plata
MPAP	Mar del Plata action Plan
NGO	Non-Governmental Organization
OD	Organizational Development
OED	Operation and Evaluation Department
PROWESS	Promotion of the Role of Women in Water and Environmental Sanita- tion Services
UFW	Unaccounted For Water
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UN/DTCD	United Nations Department of Technical Cooperation for Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WASH	Water and Sanitation for Health
WB	World Bank
WHO	World Health Organization
WMO	World Meteorological Organization
WSS	Water Supply and Sanitation
WSTC	Water Supply Training Center





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