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TRENDS AND PERSPECTIVES IN CAPACITY BUILDING

A Presentation¹ by

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Abstract

Education, training and awareness are key elements in forging a strategy to prepare society for the challenges of the twenty-first century. Following the outcomes of the 2nd World Water Forum (March 2000) and further consultations with interested stakeholders, significant progress has been made in mobilizing decision makers and stakeholders around the Water-Education-Training (W-E-T) theme and capacity building in the water sector. However, much remains to be done. It is anticipated that the UN Decade of Education for Sustainable Development (2004-2013) will give impetus to pursue the W-E-T goals actively.

This presentation reviews the genesis, concept and practice of capacity building, summarizes the lessons learned over the past fifteen years of efforts, and provides an overview of ongoing actions, perspectives and recommendations for the future.

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TRENDS AND PERSPECTIVES IN CAPACITY BUILDING

Executive Summary

Notwithstanding many past achievements in reforming water policies and implementing projects, water resources remain over-exploited and polluted. Over 1 billion people still lack access to a safe and adequate water supply, and close to 3 billion people have no access to sanitation facilities. A range of factors needs to be considered in addressing this situation, but the main challenge is to strengthen the human and institutional capacity necessary to managing water resources and service delivery in a sustainable way.

Over the last decade, capacity building issues have been addressed through numerous international fora, spawning many programmes with capacity building, education and training components. The most current of these programmes are reviewed in this paper.

Many providers of water education and training resources operate internationally and at national and local level. Although the programmes sampled in this paper are quite impressive and often innovative, their output in terms of number of students remains far from meeting the needs in most countries.

The Plan of Action on Water Sector Capacity Building is of particular relevance to the implementation of the upcoming 3rd World Water Forum recommendations for action. The Plan of Action was launched under the impetus of the 2nd World Water Forum. Its cornerstones are:

- (1) The establishment of a five-pronged approach to meet the needs for water-related education and training in (a) primary and secondary education (the formative years), (b) vocational training, (c) university education, (d) continuous learning, and (e) research capacity strengthening, and
- (2) Support by clusters of water professionals as instruments for innovation and action in various fields, each cluster being responsible for a set of specific activities with the aim was to bring about change and to mainstream capacity building work in their areas of concentration.

Financing Water Education and Training

An estimated \$70 billion is invested in water in developing countries each year. Little is spent on water education and training, even in cases where projects funded by external sources have earmarked funds for training. Capacity building rarely figures as a dominant theme in water sector strategies from international and national organizations. It is therefore advisable that investment decision-makers be sensitized to capacity building issues. The main mechanisms for financing education (government financing, sponsored financing, and international donor assistance) could be more evenly exploited, resulting in more training opportunities.

Lessons Learned and Recommendations

The main lessons learned from the implementation of capacity building programmes can be summed-up into the following three principles: local ownership, partnerships, and demand responsiveness. Other major factors impacting on capacity building include: employment issues

(salaries, professional incentives and career paths), assessments of capacity building needs (at the national, regional or municipal level) and the use of appropriate and diversified learning tools (information and communications technology, distance learning, twinning of institutes, exchange of teachers and students, linkages with professional associations, community-based learning and national, regional and global networking).

Perspectives

Although there is a consensus that capacity building, training and education are prerequisites to achieve a sustainable water sector, actual commitments of staff and financial resources are well below needs.

For the formative years, the perspectives appear reasonably good. It is expected that UNESCO will provide a strong impetus in the context of the UN Decade of Education for Sustainable Development. The perspectives of breakthroughs in vocational training appear somewhat remote, but bright spots are likely to appear in the water utilities sector (urban and rural). For university education, the perspectives are encouraging but there are significant gaps concerning economic, financial and social issues, and other water disciplines needed to produce the leading water professionals of the future. In spite of a few good examples of continuous learning programmes, the perspectives for achieving broadbased continuous learning within a reasonable time are not encouraging, although one should expect good results in the more technical or cutting-edge areas of water management. For research capacity strengthening, prospects appear relatively good in developed and emerging countries, less so for the poorer ones. As in the case of graduate and post graduate education there are gaps concerning economic, financial and social issues.

Recommendations

The following are suggested for inclusion among the 3rd World Water Forum's recommendations for immediate action:

1. It is recommended that UNESCO convene a meeting of interested parties to build consensus on an appropriate process and renewed financial commitment for greater action for capacity building.
 2. Investment decision-makers need to be familiarized with capacity building issues, in order to ensure that substantial resources are included in loans and grants and used appropriately.
 3. Assessments of capacity building needs and requirements should be undertaken at the national, regional or municipal level.
 4. It is recommended to create working groups of promoters for each of the five prongs of human capacity building. Each working group would promote innovations on substantive matters and make the case for increased financial resources. The W-E-T Support Group could be considered for coordinating the five groups as part of the next phase of the W-E-T plan of action.
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TRENDS AND PERSPECTIVES IN CAPACITY BUILDING

Introduction

Water is both a necessary resource for human development and an environmental resource essential to the health and functioning of the world's ecosystems. Agenda 21 codified that sustainable water resources management is management that meets current needs without compromising the ability of future generations to meet their own needs – both for water supplies and for a healthy aquatic environment.

Notwithstanding many past achievements in developing water supply and waste management services for domestic use, offices, industries, agriculture and the environment, the sobering reality remains that demographic pressures and rising incomes have led to over-exploitation of surface and ground water resources and unprecedented levels of water pollution. The most dramatic impact is felt by over 1 billion people in urban and rural areas who still lack access to a safe and adequate water supply and the close to 3 billion people without access to sanitation facilities. The ethical dimension of this unacceptable situation was underlined by the World Summit on Sustainable Development (WSSD) and implied in the Millennium Development Goals.

A range of factors needs to be considered in addressing this serious situation including public awareness, technology, finance, policy reform, institutional adjustments, education, training, the commitment of politicians and the involvement of the private sector and civil society.

But the main challenge is to strengthen the human and institutional capacity necessary to managing water resources and service delivery in a sustainable way.

The Concept and Practice of Capacity Building

The Concept

Capacity building may be defined as *“the sum of efforts to enhance and utilize the skills and capabilities of people and institutions at local, national, regional and global levels, aimed at sustaining development”*.

The concept of capacity building was articulated during the first global UNDP Symposium “A Strategy for Water Sector Capacity Building,” held in Delft, The Netherlands in 1991. The Symposium concluded that capacity building consists of the following three elements:

- creation of an enabling environment with appropriate policy and legal frameworks
- institutional development, including community participation

- human resources development and strengthening managerial systems

Taken together, these elements reflect a holistic, rather than a narrow-focused, approach towards water resources management. For example, an institution cannot function without well-trained staff. Well-trained staff cannot function in an out-dated institution, and neither institution nor staff can achieve their full potential in the absence of an enabling policy and legal environment and adequate financial resources. Participatory approaches, information exchange, awareness raising, information and communication technology and networking have become noteworthy modalities supportive of the capacity building process. An important crosscutting issue is the promotion of a gender perspective as one of the core capacities to be developed.

The concept of capacity building was further strengthened by various discussions in international fora, such as the International Conference on Water and the Environment, Dublin, January 1992, and the United Nations Conference on Environment and Development, Rio de Janeiro, June 1992, which agreed upon the so-called Dublin/Rio principles.

The Dublin Principles

1. Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels.
3. Women play a central part in the provision, management and safeguarding of water.
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

The Dublin and Rio conferences recognized that water resources are limited as compared to the growing demands, and that, in a business-as-usual scenario, water shortages are to be expected in most regions. To address these shortages, management of the demand for water - rather than the supply of water - was adopted as one of the most important guiding principles. It was agreed that water resources need to be managed in an integrated manner, i.e. through the recognition of the impact of political, social and economic factors and the competition for water between sectors, between upstream and downstream users, and between land, water and eco-systems. The demands of different societal groups would need to be taken into serious consideration including, for example, differences between social strata of the population and between women and men. The Dublin and Rio Conferences recommended that water should be managed as an economic good (though also respecting its social value) and at the lowest appropriate administrative level. The importance of well functioning institutions and a well-educated and trained human resource at all levels was strongly emphasized. Henceforth, multi-disciplinary and multi-sectoral approaches were to become the "order of the day" for Integrated Water Resources Management.

The principles and approaches evoked in Dublin and Rio were reinforced during subsequent international water conferences such as the Habitat II International Conference on Managing Water Resources for Large Cities and Towns (1996), the 2nd World Water Forum (2000), the International Conference on Freshwater in Bonn (2001) and the World Summit on Sustainable Development (WSSD, 2002). It is very fitting that the lead-theme of the 3rd World Water Forum is “from crisis to action.”

Ministerial Declaration on Water Security in the 21st Century

In addition to the above Dublin principles, it is worth recalling the following statement pertinent to capacity building from the Ministerial Declaration on Water Security in the 21st Century, issued during the 2nd World Water Forum and Ministerial Conference, The Hague, 17-22 March 2000:

“We will work together with other stakeholders to develop a stronger water culture through greater awareness. We will identify best practices based on enhanced research and knowledge generation capacities, knowledge dissemination through education and other channels and knowledge sharing between individuals, institutions and society at all appropriate levels. This will include coordination at regional and other levels, as appropriate, to promote arrangements for coping with water-related disasters and for sharing experience in water sector reform. It will also include international cooperation in technology transfers to, and capacity building in, developing countries.”

Strengthening the local “capacity builders” is at the core of capacity building. It will enhance, over time, the local capacity to acquire new knowledge and skills without significant external support. In recent years, experience with the concept and field application of Integrated Water Resources Management (IWRM) and capacity building has increased in various parts of the world, but it is often available only in a scattered way in different countries and organizations, and between different sectors and disciplines. Networks between professionals and institutions should help to pool recent experience, enhance communication and transfer knowledge. Both South-South and North-South exchange of information is relevant. Networks will, at the same time, help to better link “problem providers” and “solution providers.”

The Practice

The above meetings and resolutions spawned many programmes with capacity building, education and training components. Two examples are highlighted below: the UNDP Capacity Building Programme for Sustainable Water Sector Development, and the Plan of Action on Water Sector Capacity Building.

The UNDP Capacity Building Programme for Sustainable Water Sector Development

This programme played a pioneering role in field-testing capacity building approaches, and exemplifies the “practice of capacity building”. It emerged from the first UNDP/IHE Symposium on Water Sector Capacity Building (1991). It was supported by global programme funding from UNDP and the Netherlands, and supplemented by local funding in several countries from UNDP, the World Bank, Denmark, Canada, UK and USAID.

The Programme supported water sector assessments and sector reform activities in Bolivia, Peru, Mexico, Ghana, Mali, Niger, Nigeria, China (Guizhou Province), and economic/legal reform activities in Swaziland and Vietnam.

The Programme's results include comprehensive water sector assessment reports and long-term strategies prepared by teams of national specialists, adoption of recommendations such as a river basin approach in Peru, participatory preparation of regulations at the provincial level in Vietnam, a national water policy in Ghana, adoption of legal and economic reform measures in Swaziland. Significantly, the Programme enhanced the processes of inter-sectoral and inter-disciplinary consultations among stakeholders, sector reform and human and institutional capacity development. It triggered or influenced investments by the World Bank (Mexico, Peru), technical assistance from UNDP (Mali), and bilateral technical assistance (Ghana).

These results were reviewed during the Second UNDP Symposium on Water Sector Capacity Building (1996), which singled out human resources development as one of the most difficult and complex areas deserving long-term national and international action. It recommended, inter alia, the creation of an international network for water sector capacity building focusing on human resources development. Subsequently, UNDP and the Netherlands launched a new programme entitled the International Network for Capacity Building on Integrated Water Resources Management (Cap-Net), which became operational in 2002.

Plan of Action on Water Sector Capacity Building

Another key example relates to the collaboration among capacity building programmes of various agencies. Under the impetus of the 2nd World Water Forum, UNESCO, UNDP, the World Bank Institute, UNU/INWEH and IHE-Delft initiated a plan of action on water sector capacity building focusing on education and training (now called Water Education and Training, W-E-T). The cornerstones of the plan of action of action were:

- The publication of a joint strategy paper entitled "Towards a Strategy on Human Capacity Building for Integrated Water Resources Management and Service Delivery". The strategy calls for a five-pronged approach to meet the needs for water-related education and training in (a) primary and secondary education (the formative years), (b) vocational training, (c) university education, (d) continuous learning and (e) research capacity strengthening (see Annex 1 for details of the five-pronged approach); and
- The organization of the International Symposium on Human Capacity Building in the Water Sector through Innovation and Collaboration (Delft, 2001), which solidified the commitment of a cross-section of water professionals, and led to the creation of clusters of water professionals as instruments for innovation and action in various fields including development of education and training materials, assessment of demand for education, training in leadership, governance and management of urban water supply, information and communication technologies and networking.

A key feature of the programme of action has been the sustained activity of the "W-E-T Support Group", composed of representatives of UNESCO, UNDP, the World Bank

Institute, UNU/INWEH and the UNESCO-IHE Institute for Water Education. The W-E-T Support Group coordinates and monitors the progress of the plan of action and also serves as an informal platform to exchange ideas on capacity building. It operates in a very cost-effective way through monthly conference calls and occasional face-to-face meetings, seizing the opportunity of international conferences.

The next phase of the plan of action will be prepared in the light of the outcome and recommendations of the 3rd World Water Forum.

Clusters

In order to follow up on the above Symposium's recommendations, the participants formed eight clusters designed to bring about rapid action without bureaucratic constraints. Each cluster was responsible for a set of specific activities to be carried out over a period of one year to eighteen months. A major aim of the clusters was to bring about change and to mainstream capacity building work in their areas of concentration.

Clusters

1. Exchange and Development of Educational and Training Materials
2. Community-based Learning
3. Demand Assessment and Articulation Systems
4. Urban Water Management
5. Governance
6. Information and Communications Technology
7. Networking as a Tool for W-E-T Delivery
8. Water and Nature

Over the past year the following four clusters have been active and have produced tangible outputs: Exchange and Development of Educational and Training Materials (supported by Cap-Net), Information and Communication Technologies (absorbed by the PoWER project of the UNESCO-IHE Institute for Water Education), Networking as a Tool for W-E-T Delivery (sponsored by UNESCO-IHP) and Demand Assessment and Articulation Systems (sponsored by the UNESCO-IHE Institute for Water Education). Among the remaining four clusters two are about to start a combined activity (Governance and Urban Water Management) and two have not yet been active (Community-based Learning and Water and Nature).

The results of the four active clusters can be summarised as follows.

Cluster on Exchange and Development of Educational and Training Materials:

This cluster, with support from Cap-Net, produced the following three concrete outputs:

1. A Cap-Net website providing information on how to access capacity building materials and links to those materials, with a possibility to directly download materials from Cap-Net;
2. A framework for the assessment, selection, storage and retrieval of the materials has been designed which considers technical limitations, structure, design, assessment criteria, quality, educational levels, language, areas and topics; and

3. An ongoing activity for the collection of capacity building materials for IWRM professionals and other specified target groups.

Cluster on Networking as a Tool for W-E-T Delivery:

Under the auspices of the UNESCO/ International Hydrological Programme, this cluster produced a path-breaking report discussing the basic concepts of networking. It stipulated that networks need to have declared objectives related to the target group of actors and build upon the intensity level of the interaction among actors. The following typology was proposed: low-intensity networks (forum/marketplace, platform, alliance) and high-intensity networks (cluster, partnership/consortium). Other aspects of networking discussed in the report included multi-modality (top-down, bottom-up or a combination of both), the structure (horizontal or vertical), the code of conduct, expectations, mutual trust, selection and type of actors (inclusive or exclusive), management and the role of a facilitator (for low-intensity networks) or coordinator (for high-intensity networks), effectiveness and efficiency and six performance indicators. The report analyzed eight examples of networks in Europe, Central Asia, Africa, and Southern Africa (see Annex 2), and produced a very useful glossary of terms.

Cluster on Information and Communication Technologies (ICT):

This cluster was absorbed early on by the Partnership for Water Education and Research-PoWER, sponsored by the UNESCO-IHE Institute for Water Education. PoWER is in the process of creating the ICT infrastructure and applying appropriate tools for the effective operation of its global network and for its collaborative working and learning activities at the global and regional level. The following Communities of Practice will be facilitated by UNESCO-IHE and its collaborating regional partners, the Global Alumni Network, and two regional knowledge Networks: WaterNet and the Nile River Basin Network.

Cluster on Demand Assessment and Articulation Systems:

Lastly, fieldwork of the cluster on Demand Assessment and Articulation Systems is in progress, under the auspices of the UNESCO-IHE Institute for Water Education, particularly in East Asia through IHE's network of alumni.

A preliminary analysis shows that the progress achieved in the four productive clusters was due primarily to clear objectives and time-tables, tangible outputs, an active coordinator, institutional and financial support. In general, it can be stated that the progress achieved was significant and pushed the frontiers of knowledge and know-how on capacity building through education, exchange of information and networking.

The concept and practice of the clusters will be reviewed by the W-E-T Support Group as part of their preparation of the next phase of the plan of action.

Other programmes

There are many providers of water education and training resources, which operate internationally and at national and local level. Annex 3 provides examples of some of these programmes, including those of the cosponsoring agencies of W-E-T, namely, UNESCO (International Hydrological Programme), UNDP (Cap-Net), the World Bank Institute, the United Nations University (UNU/INWEH) and the UNESCO-IHE Institute for Water Education.

The programmes fall under one or more categories of the five-pronged approach. One may also distinguish three broad types: (a) networks, which foster communication, collaboration, exchange and dissemination of information and ideas, experiences, know-how and materials; (b) educators, whose main business is to provide education or training activities (courses, seminars, workshops, distance learning); and (c) knowledge providers, which generate or compile knowledge products (printed materials, audio-visual, electronic). Research programmes are included in this category. There is considerable overlap between the target groups and the dominant themes related to each example.

The examples listed in Annex 3 are mostly networks providing knowledge and learning services, or programmes of agencies or institutes with strong networking activities. Many good programmes have been left out, in particular programmes by many universities around the world, as the information would be very time consuming to assemble.

A challenge is to identify the relevance and usability of these resources for specific requirements. Although the programmes sampled are quite impressive and often innovative, it should be noted that their output in terms of number of students educated or trained is far from meeting the needs in most countries.

Financing Water Education and Training²

An estimated \$70 billion is invested in water in developing countries each year. About 90 percent of this investment comes from domestic sources. The World Bank accounts for about half of the remaining 10 percent, contributing about \$3 billion a year, the rest being shared among the other external resources agencies.

The global amounts spent on water education and training are not readily available, but there seems to be a consensus among sector experts that very little is actually spent, even in cases where projects funded by external sources have earmarked funds for training. These funds often remain substantially undisbursed when the projects end. Yet, funding capacity building, and in particular education and training, is "a poor cousin" of the more spectacular water infrastructure investments. Capacity building rarely figures as a dominant theme in water sector strategies from international and national organizations, although lip service is usually paid to the topic. It is therefore advisable that investment decision-makers be sensitized to capacity building issues as a prerequisite for sustainable development of the water sector. The target group would be officials in finance ministries, water-related ministries, education ministries, bilateral and multilateral agencies, development banks, NGOs and water and waste management companies.

² The ideas presented in the "financing W-E-T" section have been mostly derived from UNEVOC International Project on Technical and Vocational Education, UNESCO-UNEVOC Berlin, 1996. Document No. ED/IUG/006 - With contributions from P. Bolina and D. Atchoarena. Although the UNEVOC document focuses in vocational training in general, its main premises and conclusions are very relevant to water sector education, and are broadly applicable beyond vocational training.

Questions about who should meet the costs of education are raised almost each time financing is discussed. Some of the better-known mechanisms for financing education, including water education, fall in the following three types:

1. Government Financing:

To be successful, government financing should concentrate on choosing appropriate objectives, improving market orientation and matching policies in accordance with needs, using resources efficiently and diversifying sources of finance. Public supported training systems should be able to receive funding from local taxes, user fees and collaborative arrangements. When public financing is the sole source of support, institutions may face fluctuations in budget allocations. This can cause shortage of resources, which may lead to low quality programmes with limited returns on investment.

2. Sponsored Financing:

Governments faced with a shortage of resources would like individuals, enterprises and non-governmental organizations (NGOs) to share the financial responsibility for water education.

Many schemes exist, each with its advantages and disadvantages, its relevance to each of the five "prongs", and policy implications. The most often used schemes include:

- *Training fees* (more commonly, employers or trainees bear part of the costs and government finances the remaining);
- *Fellowship, grants and loans;*
- *Sale of training services* (Training Institutes generate income from the sale of services to public and private enterprises or through individual tuition services);
- *Co-financing agreements* (for instance between enterprises, communities and vocational schools);
- *Apprenticeships* (generally there is a formal contract between an employer and a trainee under which the trainee agrees to work for the employer in return for practical experience which makes him/her a skilled worker);
- *Paid educational leave* (employers continue to pay wages to employees while they receive part time or full time vocational education);
- *Non-governmental and voluntary organizations:* In the developing countries the involvement of NGOs in vocational training is gradually assuming greater importance. Sometimes NGOs are charitable institutions with their own infrastructure and they can be successful especially in conducting short-term training programmes in the rural or urban informal sectors.

3. International Donor assistance:

Donor assistance is still heavy on capital costs creating large training facilities, in spite of a relatively recent move away from conventional delivery systems, such as projects and programmes, towards a sector-wide approach, or policy dialogue and partnership to ensure that aid is used in accordance with host government policy priorities. Programmes cannot operate successfully without adequate support of recurrent expenditure by the host country. Therefore the size of the project to be funded by the donor and its duration should be based on the capacity of the recurrent funding available. Otherwise a project started with good intentions may start malfunctioning. The most successful donor projects are those, which lay emphasis on strengthening the management and upgrading the quality of staff of training institutions.

Financing W-E-T: Key messages:

- Without adequate investment in water education, it is impossible to achieve a sustainable water sector.
- Efforts have to be made to better utilize available resources by removing existing inefficiencies, stricter accountability, improving organizational structures and proper application of new information technology.
- With diversification of financing mechanisms, larger resources are available for creating more training opportunities.
- Investment decision-makers should be sensitized to capacity building issues as a prerequisite for sustainable development of the water sector.
- There is no single or universal solution for financing water education and no one method that can serve all sections of the society. There are many different limitations in every system. Given the wide variety of funding arrangements around the world, there can be no single model that is right for everyone. But a variety of experiences exist which should be studied, then copied or adapted to different settings.

Lessons Learned

Over the past ten years the term “capacity building” has become widespread. Although the water sector can claim - with some justification - that it has played a leading role in both the definition of the concept and its application, nowadays capacity building is pursued in many social and economic sectors. As increasing experience is being gained in development cooperation programmes, more lessons are being learned and documented on capacity building.

For example, the recent International Symposium on Capacity Development and Aid Effectiveness (Manila, Philippines January 14-16, 2003), cosponsored by the Japanese International Development Agency (JICA), the United Nations Development Programme (UNDP), the World Bank Institute (WBI) and the Canadian International Development Agency (CIDA), concluded that:

- Capacity enhancement concepts and principles are increasingly converging – but translation of these new concepts into country-level capacity enhancement efforts remains a major challenge for donors and partner recipient countries;
- Lessons of successes and failures repeatedly point to key issues of incentives and enabling environment and the need for donors to focus on empowering long-term change processes based on existing local capacities;
- New capacity enhancement opportunities...require shifts of donor in-country practices away from disbursement pressures, from primary focus on short-term concrete results, and predominant use of foreign consultants; but also required are stronger country leadership skills and commitment to forge an effective multi-stakeholder national capacity enhancement process.

In this context UNDP has produced a summary (see Annex 4) distilling the lessons learned into ten “default settings” outlining the prerequisites for a successful capacity building process.

A good example of lessons learned in the water sector can be found in the strategy recently adopted by the International Network for Capacity Building in Integrated Water Resources Management (Cap-Net), which translated lessons learned into the following three principles (see details in Annex 5):

1. **Local ownership:** promoting the use of local institutions is critical for effective planning and delivery of capacity-development services.
2. **Partnerships:** assembling the local expertise and skills required to address capacity building in integrated water management and providing the vehicle for effective sharing of the best international and local knowledge.
3. **Demand responsiveness:** promoting and using demand-assessment tools and techniques and linkages between implementing agencies and capacity-building service providers are vital to make significant impacts.

Other factors impacting on capacity building

Employment issues: In parallel with education and training issues, it is essential to deal with employment issues. Both public and private sectors need to provide adequate salaries as well as clear career paths and professional and financial incentives. Water charges paid by the customers (either through direct payments or taxes) are the single most important and promising source of revenues to cover employment costs. In view of the political and social sensitivity of water charges in many countries, public awareness campaigns could be organized to explain the cost and cost recovery mechanisms of supplying and treating potable and irrigation water.

Assessments of capacity building needs: In order to trigger action in capacity building it is strongly recommended that assessments of capacity building needs and requirements with emphasis on human resources development (HRD) – education and training needs and

resources – be undertaken at the national, regional or municipal level, as appropriate. These assessments would produce an inventory of what exists, identify gaps and formulate the elements of a short-term action plan (3–5 years) with a long-term outlook (10–15 years). The duration of these assessments would be 3–6 months. National specialists from educational institutions and operational agencies, companies and other entities in the public and private sector would carry them out. Matching demand for HRD with supply is an essential feature of such exercise. Where applicable, developing country governments are encouraged to request that external support agencies fund HRD activities as part of their development co-operation programmes, from the assessment through the implementation stages.

Learning tools: Education and training programmes can be accelerated and improved through using many contemporary learning tools available in addition to learning in the classroom, for example, information and communications technology, distance learning, twinning of institutes, exchange of teachers and students, linkages with professional associations, community-based learning and national, regional and global networking. In addition, there are many excellent publications and manuals available that should be given broader exposure.

The effect of water supply, sanitation and capacity building on achieving the Millennium Development Goals can be considerable (see Annex 6). Put in another way, without adequate human and institutional capacity the achievement of the MDG will be compromised. Consequently, it is imperative that substantial resources be generated in the immediate future for a massive capacity building effort primarily directed towards education and training. The water professionals, technicians and investment decision-makers trained in the short and long term represent the cadre that will be well equipped to deal with key capacity building issues in water sector policy and legal reform, institutional change, community involvement and human resources development. They will be the driving force - together with their fellow human beings in the urban and rural communities - for achieving water-related Millennium Development Goals.

Perspectives

Although there is a consensus in principle among international and national organizations that capacity building, training and education are prerequisites to achieve a sustainable water sector, action on the ground in terms of commitments of staff and financial resources is well below needs. One cannot escape the conclusion that water education is a “soft sector”. What are, therefore, the perspectives in boosting-up W-E-T?

The five-pronged framework provides a convenient way to share ideas and questions. It is stressed that the opinions expressed below are intended to promote discussion rather than to represent absolute truths:

1. **Formative years** (encouragement of water literacy, gender roles and involvement with the environment in primary and secondary education). There is a present almost nothing focusing on W-E-T in the national primary and secondary education curriculum of most countries (including some of the most advanced countries in the world), as the challenge of providing basic skills (reading, writing and counting) is daunting enough. There are, however, good complementary programmes targeting the formative years, such as the Water and Education for Teachers programme and

numerous State level programmes in the USA, the Canadian Environmental Citizenship programme, school programmes organized by national water agencies, such as in France (river basin agencies) or South Africa (Umgeni), and by many NGOs. These programmes could be relatively easily adapted and replicated to other countries. It is expected that UNESCO will provide a strong impetus in the context of the UN Decade of Education for Sustainable Development. The perspectives concerning W-E-T for the formative years therefore appear reasonably good. A large and currently unmet challenge is to provide funding to small local initiatives aimed at the formative years.

2. **Vocational training** is highly relevant because technicians are charged with the operation, repair and maintenance of the equipment. In developing countries, the involvement of NGOs in vocational training is gradually assuming greater importance, in spite of their financial constraints. An aspect almost completely left out concerns training in social skills such as participatory development techniques, community organization, business planning, loan applications, and bookkeeping. There are however some examples of good social skills training among NGOs, for instance that of the International Network for Participatory Irrigation Management (INPIM). Apprenticeships are rarely carried out through a clear arrangement between an employer and a trainee, and the prospects for effective apprenticeships in developing countries are mixed. The perspectives of breakthroughs in vocational training appear somewhat remote, but bright spots are likely to appear in the water utilities sector (urban and rural).
3. **Undergraduate and postgraduate education:** There are many good ongoing programmes, but most focus on engineering and hydrology, and to some extent on environmental technologies. There are significant gaps concerning economic, financial and social issues, and other water disciplines needed to produce the leading water professionals of the future. Some of the important skills to be learned by water professionals are techniques for conflict prevention and resolution, and for interaction with the public as well as with the higher levels of national bureaucracies. Another problem is the lack of communication and of sharing of materials within and across universities, in spite of the efforts of programmes such as the Electronic Hallway in the USA (a programme to share training materials), the "GOUTTE of Water" programme (an umbrella organization of universities and other educational networks addressing education, training and research issues at undergraduate and postgraduate level), and UNESCO's catalytic role, for instance through the mechanism of the "UNESCO Chairs". The UNESCO-IHE Institute for Water Education and WaterNet have pioneered the introduction of water in curricula for both undergraduate and graduate education. The perspectives here are encouraging. The effectiveness of W-E-T in undergraduate and post graduate education is likely to rest on the overall effectiveness of the education sector, and on the success of the above water-focused programmes to promote their agendas.
4. **Continuous learning** (to ensure that the water professionals keep up-to-date with the latest developments impacting the water sector). This is quite a weak dimension, as capacity building and W-E-T are low priorities in water (and other) water agencies, usually due to staff and funding shortages. Examples of international programmes supporting continuous learning include the World Meteorological Organization Guidelines for the Education and Training of Personnel, and the UNESCO-IHE Institute of Water Education, which provides refresher courses through its network

covering over 12,000 alumni from more than 120 countries. In spite of these good examples, the perspectives for achieving broadbased continuous learning within a reasonable time are not encouraging, although one should expect good results in the more technical or cutting-edge areas of water management.

5. **Research capacity strengthening:** A sustained effort in this area is recommended to find new ways of addressing engineering, social, economic and environmental issues. As in the case of graduate and post graduate education there are gaps concerning economic, financial and social issues. Ongoing programmes include the European Thematic Network of Education and Training for Environment-Water (ETNET), focusing on the relation between research and technological development in the domain of environment-water, the Global Water Research Coalition (GWRC), a non-profit organization serving as a collaborative mechanism for water research, the International Water Management Institute (IWMI), a research institute with increasing emphasis on capacity building through research capacity strengthening, and the Water Research Network (WRN), which supports a database on research programmes. Prospects appear relatively good for developed and emerging countries, less so for the poorer ones.

Recommendations

The ministerial statements issued at the International Conference on Freshwater in Bonn (2001) and the World Summit on Sustainable Development (2002) highlighted the importance of capacity building, education, training and knowledge sharing. However, among the commitments made, few were directed to capacity building initiatives.

The 3rd World Water Forum offers a new opportunity to correct this imbalance by persuading countries and donors that robust investment in capacity building in the water sector will yield high returns in the short and long term. Indeed it will be the best guarantee for adopting and implementing contemporary policies and institutional reform, for involving all stakeholders in the public and private sector, and for managing sustainable human and capital investments.

The following are suggested for inclusion among the 3rd World Water Forum's recommendations for immediate action:

1. To ensure the sustainability of the capacity building process, a much larger financial investment must be made on a global scale. To this end, it is recommended that UNESCO convene a meeting of interested parties to build consensus on an appropriate process and renewed commitment for greater action for capacity building.
2. Investment decision-makers need to be familiarized with capacity building issues, in order to ensure that substantial resources are included in loans and grants and used appropriately, especially for education and training in water-related areas. The target group would be officials in finance ministries, water-related ministries, education ministries, bilateral and multilateral agencies, development banks, NGOs and water and waste management companies.

3. In order to trigger action in capacity building it is recommended that assessments of capacity building needs and requirements be undertaken at the national, regional or municipal level, as appropriate. These assessments would emphasize human resources development (education and training needs and resources) and would produce an inventory of what exists, identify gaps and formulate the elements of a short-term action plan (3–5 years) with a long-term outlook (10–15 years).
4. It is recommended to create working groups of promoters for each of the five prongs of human capacity building (primary and secondary education, technical/vocational training, graduate and postgraduate education, continuous learning and research capacity strengthening). Each working group would promote innovations on substantive matters (e.g. curricula, teaching resources, networking, information and communications technologies), and make the case for increased financial resources. These “prong promoters” would consist of a mix of institutional and other stakeholders and would need to be financially supported by a modest honorarium and funds to defray the cost of communications, meetings and the commissioning of synthesis papers. The W-E-T Support Group could be considered for coordinating the five groups as part of the next phase of the W-E-T plan of action linked to the UN Decade of Education for Sustainable Development (2004-2013). The UN Declaration is at Annex 7.

Annexes:

1. The Five-Pronged Approach to meet the needs for water-related education and training
2. Report on Networking
3. Examples of providers of water education and training resources
4. Capacity Development “Default Settings”
5. Principles for successful development of capacity in the water sector
6. Potential impact of water supply and sanitation on achieving the Millennium Development Goals (MDG)
7. Resolution on the “United Nations Decade of Education for Sustainable Development”

Annex 1

The Five-Pronged Approach to meet the needs for water-related education and training¹

1. **Formative years:** encouragement of water literacy, gender roles and involvement with the environment in primary and secondary education, which is critical if the next generation is to be prepared to face increasingly complex water and environmental problems. The approach would also stimulate interest among young men and women in a future career in water-related professions, whether in engineering, environmental sciences or water resources management. Water education during the formative years can also be seen as a wise pre-planned effort in the area of public awareness raising.
2. **Vocational training:** is highly relevant because technicians are charged with the operation, repair and maintenance of the equipment. Such training ranges from technicians who operate sophisticated water supply and sewerage treatment plants to community level water supply and irrigation pump mechanics and caretakers. Technicians must not only learn what is needed today but also how to meet the needs of tomorrow. Much can be learned from utilities which use clearly targeted on-the-job training programmes. Poverty and gender considerations may require on-site training, since many trainees, especially women, may not be able to leave their families for any length of time. Furthermore, rural communities and small towns in particular will need to mobilize their own resources if they want to attract and retain well-trained technicians for repair and maintenance. Vocational training programmes need to be complemented by special programmes for 'social technicians.' These are the people who specialize in 'software' such as participatory development techniques, community organization, business planning, loan applications, and bookkeeping.
3. **Undergraduate and postgraduate education** in engineering, hydrology, economics, environmental sciences, water resources management and other water disciplines will produce the leading water professionals of the future. In order to tackle complex water-related problems they need to have the ability to interact with each other on water quantity and quality issues, particular from the points of view of irrigation engineers, water and sanitation engineers, hydrologists, environmentalists, economists, lawyers and other specialists. Some of the important skills to be learned by water professionals are techniques for conflict prevention and resolution. Of special interest to this level of education are the many learning tools available nowadays such as information and communications technology, distance learning, twinning of institutes, exchange of teachers and students, linkages with professional associations, and national, regional and global networking. In order to attract more funding for the water sector, water professionals need to be trained in the mobilization of conventional and non-conventional sources of funding.
4. **Continuous learning** will ensure that the water professionals keep up-to-date with the latest developments impacting the water sector. This type of learning needs to be planned and funded by both the public and the private sector. Its cost could be factored in the price of water services.
5. **Research capacity strengthening:** a sustained effort in this area is recommended as an investment in researchers, whose task it is to challenge conventional approaches and to find new ways of addressing engineering, social, economic and environmental issues. The unity of research and education is essential. Knowledge should not be only the reflection of the state-of-the-art. It should also enable people who acquire the knowledge, to extend the frontier of our understanding. Thus the methodology of research should also be taught.

¹ Source: Towards a Strategy on Human Capacity Building for Integrated Water Resources Management and Services Delivery (W-E-T), 2001

Report on Networking

Executive Summary

This report on networking in the water sector discusses basic concepts of abstract networks as models of society. Networks must have declared objectives related to the target group of actors and build upon the intensity level of the interaction among actors.

The following typology of networks is proposed:

Low-intensity networks

- A. a FORUM (market-place, agora): a regularly organised meeting where information and ideas are exchanged and discussion can be freely engaged; nowadays this forum-type of interaction among actors is often complemented by a "virtual forum" through Internet.
- B. a PLATFORM: a group of actors that supports an existing programme/project or plan a new programme/project; such an interaction could be the outcome of a forum.
- C. an ALLIANCE: a more or less diffuse link between actors or between several networks, whatever their type, with common objectives.

High-intensity networks

- D. a CLUSTER: a group of actors or partnerships which shares common support structures and seeks to exploit complementary characteristics of the group or results of projects.
- E. a PARTNERSHIP or CONSORTIUM: a group of actors executing together a project of limited duration.

Networks can be multi-modal, operating at different levels of intensity. They can be established either top-down or bottom-up or as a combination of both approaches.

The structure of the network describes the actors, the objectives and the interactions amongst actors. It may be a horizontal network when most of the actors are of the same nature; or vertical networks when actors are of a quite different nature, e.g. universities and enterprises. Vertical networks are rare and have more difficulty surviving. Internal and external coalitions amongst actors define the integration of the actors in the network.

The culture of the network is essentially democratic and non-hierarchical, based on a code of conduct for interaction among the actors. Also important to consider is the strategy of the network, and an understanding of the expectations of the actors. One can only talk about a network if there is minimum stability of the network, and this depends on the mutual trust and confidence between the actors, next to more material prerequisites as adequate management and sustainable funding.

The selection and type of actors play an important role. Inclusive networks accept all actors fulfilling the description of the target group and subscribing to the code of conduct. Exclusive networks invite selected actors to join and the number of actors is deliberately

limited. The actors may be either individuals or representatives of a legal body (an institution). Excellent networks are those where actors have strong ties and few isolates exist.

A feasibility analysis based on available or expected internal and external resources must define the management model to be adopted when initiating/creating a network. A feedback mechanism between structure, culture and management is required. The role and competence of the facilitator (for low-intensity networks) or coordinator (for high-intensity networks) is crucial.

The quality of networks is described by the effectiveness and the efficiency. The former is related to the satisfaction of the actors and is best evaluated through a self-assessment procedure by the actors, regularly repeated. The latter should be made measurable as much as possible but it should be recognised that both resources and benefits of networks are often also 'intangible': e.g. the expertise of the actors, and the prestige of the network.

Based on a project-wise approach of the objectives, on the number of actors and on the number of countries involved, six performance indicators are proposed to measure the efficiency:

- the Density of the network
- the Actor-Project-Integration API index
- the Actor-International-Integration AII index
- the Actor-Country-Integration ACI index
- the Project-Duration-Index PDI
- the Actor-Project-Closeness APC index

Some of these indicators are applied to the examples of best practice. Many more applications are expected in order to test the consistency and general applicability of these indicators. Many more performance indicators could be introduced if data are available, e.g. about resources allocated to different projects and actors. Trend analysis allows for evaluation over time within a network or amongst networks.

The results of a survey on networks, conducted in 2002, based on a theoretical part A (the expectations of the people interested in networks), and an applied part B (for identified networks where also '*obstacles encountered*' were investigated) are summarised. The results of Part A generally confirm the concepts introduced above. Part B, in general, shows a realistic approach from both the co-ordinators and the other actors with respect to the limitations of the identified networks. However, in Part B the respondents fail to recognise the '*obstacles encountered*' because the quality aspects of the network are seldom evaluated more than satisfactory.

It is concluded that quality issues in terms of effectiveness and efficiency of networks are not well addressed.

GOUTTE of WATER, a project of the International Hydrological Programme (IHP) Phase VI (2002-2007) of UNESCO will act as a feedback mechanism for these issues.

The report concludes with:

- suggestions for best practice with the aim to help when creating or when

developing/operating a network and to avoid failures;

- a list of eight examples of best practice of networks in the water sector, covering as well university networks as university/administration//enterprise and water utilities networks.

Since networking is a daily, and thus important, activity of everyone, it is believed that the report will be of practical use: networks always raise new expectations, offer generally benefits, but can also lead to disappointments should they be ill-conceived and/or half-heartedly implemented and managed.

EXAMPLES OF PROVIDERS OF WATER EDUCATION AND TRAINING RESOURCES

The following examples of capacity building programmes fall under one or more categories of the five-pronged approach. Although the programmes sampled are quite impressive and often innovative, it should be noted that their output in terms of number of students educated and trained is far from meeting the needs in many countries.

There are many providers of water education and training resources, which operate internationally and at national and local level. The challenge is to identify the relevance and usability of these resources for specific requirements. The examples listed below are mostly networks providing knowledge and learning services, or programmes of agencies or institutes with strong networking activities. Many good programmes have been left out, in particular programmes by many universities around the world, as the information would be very time consuming to assemble. For ease of reference, they are listed in alphabetical order, rather than according to some more elaborate classification scheme which would entail significant overlaps:

- Cap-Net: International Network for Capacity Building on Integrated Water Resources Management
- Electronic Hallway
- EPA: Environment protection Agency (USA)
- ETNET 21: European Thematic Network
- External Support Agencies
- Global Water Research Coalition (GWRC)
- Global Water Information Network (GLOBWINET)
- GOUTTE of Water: Global Observatory of Units for Teaching and Training and Ethics of Water
- Instituto CINARA, Universidad del Valle, Cali, Columbia
- International Hydrological Programme (IHP)
- International Network for Participatory Irrigation Management (INPIM)
- International Network on Water, Environment and Health (INWEH)
- International Office for Water (OIEau)
- International Water Management Institute (IWMI)
- International Water and Sanitation Centre, the Netherlands (IRC)
- Research and Ethical Network Embracing Water (RENEW)
- Strengthening Capacity for Global Knowledge Sharing in International Waters
- TEMPUS: Water-Related Projects
- The Water Page
- Umgeni Water South Africa
- UNESCO-IHE Institute for Water Education
- UNESCO-IHE Partnership for Water Education & Research (PoWER)
- Universities Water Information Network (UWIN)
- University of Zimbabwe
- Water Academy / Académie de l'eau
- Water Education Foundation
- Water and Education for Teachers (WET)
- Water-Education-Training (W-E-T) Support Group
- Water Environment Federation
- Water and Media Network
- WaterNet
- Water Policy and Management Program (World Bank Institute)
- Water Research Network (WRN)
- Water Utility Partnership (WUP)
- WaterWeb Consortium - Information on Water and Environment
- World Meteorological Organization Educational Guide

Cap-Net:

International Network for Capacity Building on Integrated Water Resources Management

www.cap-net.org

The purpose of Cap-Net, which became operational in 2001, is to enhance human resources development for integrated water resources management (IWRM) through the strengthening of individual and, through them, institutional capacities in a number of countries and regions. Cap-Net's objectives will be achieved through networking, awareness creation, training and education, and development of relevant materials/tools. As an associated programme of the Global Water Partnership (GWP), Cap-Net will serve as a global network that operates as a support programme for regional and national networks of IWRM training and education institutions, which will deliver the actual capacity building.

To date, Cap-Net has helped to create or established active linkages with Argentina (Arg Cap-Net), the Arab Region (AwareNet), Latin America (LA-WET-Net), Malaysia (MyCapNet), the Nile region (NBCBN-Re and NileNet), Central America (REDICA), South Asia (SaciWATERS), West Africa (WA-Net) and Southern Africa (WaterNet).

UNDP and the Netherlands are the initial sponsors of Cap-Net. Other multilateral, bilateral, non-governmental and private sector organizations are expected to join this multi-country, multi-donor undertaking.

Electronic Hallway

<http://www.hallway.org/>

The Electronic Hallway offers teaching cases, exercises, role plays, teaching workshops and curriculum planning resources to faculty focusing on public administration and public policy, including water policy.

EPA: Environment Protection Agency (USA)

<http://www.epa.gov/water/education.html>

The EPA makes available to the public a large array of education resources targeting adults and children, and provides various materials for educators. Examples for adult education include the *Water Quality Standards Handbook*, various watershed training modules accessible through distance learning, and an inventory of about 180 watershed-related training courses.

ETNET 21: European Thematic Network

www.etnet.vub.ac.be/eAbout/

ETNET 21, the European Thematic Network of Education and Training for Environment-Water, focuses on the relation between research and technological development in the domain of environment-water as producers of knowledge and skills, and the learning processes, methods and tools to enhance the transfer of this new knowledge and skills into the higher education system, including continuing education, training and professional development systems. ETNET 21 identifies the research priorities and how to transfer the results to those who can apply them in order to meet the society's requirements and concerns. It builds upon existing networks, bridges the gap between researchers and educators, creates synergies between these two professional communities in the environment-water field and brings the many stakeholders together in this broad multidisciplinary field.

External Support Agencies (ESA)

Most external support agencies sponsor or carryout activities related to water education. A partial list includes the following:

- National, regional and local authorities and other entities responsible for education and training programmes and budgets
- UN System Agencies such as UNDP, GEF, UNESCO, FAO, WHO, WMO, UNDESA, UNEP, UNICEF
- Development banks such as the World Bank, AsDB, ADB, EBRD, IADB
- The European Commission
- Bilateral agencies (e.g. DGIS, DFID, CIDA, SIDA, GTZ)
- Non-governmental organizations (e.g. WaterAid, Programme Solidarité Eau, GREEN)
- Potential donors such as business and commercial banks and private foundations

Global Water Research Coalition (GWRC)

<http://www.globalwaterresearchcoalition.net/>

GWRC is a non-profit organization that serves as a collaborative mechanism for water research. The product the GWRC offers its members is water research information and knowledge. The GWRC will not compete with the member organizations. Each of the member organization will still focus on national and regional water research issues. The GWRC was officially formed in April 2002 with the signing of the partnership agreement at the International Water Association 3rd World Water Congress.

The long-term goal of the GWRC is to achieve a sustained multi-million dollar annual joint research effort that will address international issues related to drinking water, wastewater, water supply, and renewable water resources. Ultimately, implementation of research strategies will lead to improved efficiencies among member organisations. The first item of research cooperation have been selected as Endocrine Disrupting Compounds. Work was expected to include research projects about the occurrence and fate of EDC during wastewater treatment and sewage and soil are being developed, an expert workshop about analytical methods will be organised in late 2002, and a State of the Art report about the EDC issue.

Global Water Information Network (GLOBWINET)

www.globwinet.org

GLOBWINET is an Associated Programme of the Global Water Partnership (GWP), implemented by the German Agency for Technical Cooperation (GTZ) with German government funding. The website provides information on transboundary river basin organizations, national and international water law and legislation, national water administrations and country-level water resources information. GLOBWINET incorporates two regional networks: SAWINET, the Southern African Water Information Network; and GEWINET, the German Water Information Network. Participating organizations and professionals are being trained in seminars and workshops.

GOUTTE of Water:

Global Observatory of Units for Teaching and Training and Ethics of Water

www.unesco.org/water/ihp

GOUTTE of Water is conceived as a global water-oriented, umbrella organization of universities and other educational networks, active in teaching and training. GOUTTE of Water will also be engaged in the transfer of teaching experience. It is designed to:

- (1) Address education, training and research issues at undergraduate and postgraduate level;
- (2) To be a forum where collaborating entities and their programmes can be discussed, compared and concerted; and
- (3) To help shape a 'New Water Ethics' in academia and in future practice.

This global network would be based on cells combining partners from developing and developed universities. Cells are expected to be focused on common interest or interdisciplinary context and are formed to use one common language of communication while the global network might rely on several cells using different languages. At a later stage GOUTTE of Water could assume advisory functions in accreditation, degree comparison, programme reviews and quality assessment in partnership with governments, multilateral and bilateral organizations and other partners.

Instituto CINARA, Universidad del Valle, Cali, Columbia

www.cinara.org.co

The Instituto CINARA has adopted a holistic joint learning approach as the centerpiece of its capacity building strategy aimed at increasing the effectiveness of water sector interventions. It involves university staff as teachers and learners. CINARA has a multi-disciplinary team working both at the university and in the field, teaming up with sector institutions, local government and community-based organizations. CINARA's interventions center around three pillars for sustainability: the community, the environment, and science and technology. CINARA is an example of "resource centers" pioneered under the STREAM project with support from the IRC International Water and Sanitation Centre (the Netherlands) and other agencies.

International Hydrological Programme (IHP)

www.unesco.org/water/ihp

The International Hydrological Programme (IHP), UNESCO's intergovernmental scientific co-operative programme in water resources, is a vehicle through which Member States can upgrade their knowledge of the water cycle and thereby increase their capacity to better manage and develop their water resources. It is the sole fresh-water oriented research programme of the UN System, and responds in an integrated way to the growing concerns over the resource water and the ever-increasing need for education, training, knowledge transfer and public awareness raising at all levels.

The educational component of the Programme, covering all educational levels, was designed for the requirements of developing countries, in particular. Preference was given to the training of hydrologists from countries without local training facilities and a network comprising all educational levels was developed. Hydrology was included in several areas of university education. Various disciplines were analyzed and a practical system of possible combinations was developed, together with model curricula and syllabi. Computer-Aided Learning technology in hydrology was also introduced. The thirty-two post-graduate courses organized under the auspices of IHP are continuing their activities.

The IHP does not only address hydrology in research and education, but rather the entire scientific profile of terrestrial freshwater resources assessment, monitoring and management. Knowledge, Information and Technology Transfer (theme 8 of Phase V of IHP) reflects the whole scope of education, including pre-school, primary, secondary and tertiary educational levels, lifelong continuing education and training, as well as informal and innovative ways. In addition, the public awareness-raising component is explicitly addressed. Within the broad set-up, the characteristics of IHP, as a scientific programme, will be reflected by emphasizing university – postgraduate degree – and continuing professional education. As far as public awareness is concerned, priority target groups are the youth and the present-day (political) decision-makers. In Phase VI (2002–2007), Theme 5, W-E-T plays a crucial role. Activities are grouped in the following four focal areas:

- Teaching techniques and material development
- Continuing education and training for selected target groups
- Crossing the digital divide
- Institutional development and networking for W-E-T

INPIM: International Network for Participatory Irrigation Management

www.inpim.org

The International Network on Participatory Irrigation Management is an international network established in 1995, dedicated to making irrigation systems sustainable by supporting institutional reforms that promote greater involvement and increased capacity of farmers, Water Users' Associations, and other private stakeholders. INPIM is a non-profit, non-governmental organization (NGO) based in Washington, DC, and works closely with the World Bank and other development organizations, both public and private, which are active in the irrigation sector. INPIM Membership is open to anyone who has a professional interest in irrigated agriculture.

The network's membership is composed of over 2,000 irrigation professionals, and growing: engineers, farmers, academics, consultants, etc. from over 40 countries. INPIM publishes a semi-annual newsletter in addition to its website. INPIM carries out International Seminars on Participatory Irrigation Management and training courses, in addition to the many events carried out by the national chapters.

International Network on Water, Environment and Health (INWEH)

www.inweh.unu.edu

INWEH was established in 1996 by the United Nations University (UNU) in order to address the growing crisis in water quality and availability in the developing world. It has collaborated closely with members of both the public and the private sectors to develop an effective water stewardship concept and process. The concept helps those involved in water issues to better understand the full scope of requirements for sustainability, and provides a process that can be applied to achieve the goal. A central feature of the process is a capacity building framework that is used as a matrix to identify gaps in existing capacities, grouped into four categories, or 'pillars' of sustainable water stewardship. This information can be organized into a coherent, accurately priced and integrated plan for developing sustainable systems and practices. This "Four-Pillar" framework can also be used to align the efforts of agencies at the municipal, state and federal levels to develop the synergies needed to achieve the shared goal of sustainability.

International Office for Water (OIEau)

<http://www.oieau.fr/>

The International Office For Water is a non-profit organization. Its objective is to gather public and private partners involved in water resources management and protection in France, Europe and in the world (bi- and multi-lateral cooperation organizations, ministries, water agencies, local communities, universities, engineering schools, research centers, land development companies, water suppliers and professionals, industrialists, professional associations, non governmental organizations) in order to set up a real partners' network. It now comprises about 150 member organizations.

International Water Management Institute (IWMI)

www.cgiar.org/iwmi

IWMI is primarily a research institute, but puts increasing emphasis on capacity building through research capacity strengthening. For example, research policy on gender outlines the issues and connections between poverty, gender and water and identifies opportunities for improved pro-poor, gender-inclusive management.

At global and national levels capacity utilization and development is being enhanced through IWMI's *Policy Interactive Dialogue Model* (PODIUM): PODIUM runs on a personal computer and policy makers and scientists can learn to use it in minutes to explore vital questions such as: "Can we feed ourselves in 2025?" and "Do we have enough water to irrigate the crops needed to ensure future national food supply and or food security?". PODIUM is a dialogue tool because it is

designed so that country policy makers can quickly prepare various water and food security scenarios, then use these outputs as the basis for discussion and planning. PODIUM is now being used by several developing countries to help clarify their options and shape their water and food security policies. The next stage in refining it as a tool for vision planning in developing countries is to work with individual countries to refine the data sets. For example, IWMI has started this process in collaboration with the International Commission on Irrigation and Drainage in India, Pakistan, Mexico and Egypt.

International Water and Sanitation Centre, the Netherlands (IRC)

www.irc.nl

IRC is an independent, non-profit organization supported by and linked with the Netherlands Government, the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), the World Bank and the Water Supply and Sanitation Collaborative Council. IRC facilitates the sharing, promotion and use of knowledge so that governments, professionals and organisations can better support poor men, women and children in developing countries to obtain water and sanitation services they will use and maintain.

IRC meets these challenges through focusing on two core areas of activity:

- To provide improved access to and promote the use of knowledge among sector institutions and other stakeholders.
- To build the capacity of resource centres for the WSS sector in developing countries, through a strategy to incrementally increase the number of resource centres.

Using its web site, documentation, publications, IRC advocates change and aims to improve the information and knowledge base of the sector.

Research and Ethical Network Embracing Water (RENEW)

www.unesco.org/ethics/en/connaissances/comest_info.htm

The Research and Ethical Network Embracing Water (RENEW) identifies and endorses examples of best ethical practice in all aspects of freshwater use. Organizations so recognized are invited to participate in the Network, where collaboration and cross-fertilization is fostered among members. RENEW is sponsored by the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST).

Research centres, education and training facilities, water suppliers and regulators, industrial and agricultural users, organizations concerned with information transfer and exchange, as well as with promoting the empowerment of all water stakeholders, will be among the disciplines and interests eligible for membership of RENEW. The network will include a number of regional centres selected on both geographical considerations and, on the strength of their ability to contribute most effectively to innovation and dissemination of best ethical practice. These centres will provide facilities to host visiting researchers, students and workshops on all aspects of the ethical use of freshwater. They will be selected by COMEST/UNESCO trustees.

A primary goal is to promote public awareness, education relating to water conservation and protection, and dissemination of knowledge and information about research findings and methodology to improve freshwater quality, as well as on best practices and technology. Special attention will be paid to the role of women as decision-makers and managers in acquiring and using water.

RENEW would work in tandem with a parallel UNESCO proposal: GOUTTE of Water. The ethical dimension of this partnership lies in the explicit commitment to provide moral leadership in

forming and educating professionals and scientists sensitized to the accepted principles of sustainability, environmental consciousness and equity.

The Australian National University (ANU) has established the first RENEW centre, representing the Southeast Asia-Pacific region. In August 2001 the Nordic-Baltic RENEW was created. Its regional centre is the University of Bergen in Norway.

Strengthening Capacity for Global Knowledge Sharing in International Waters

The purpose of this global project is to improve global management of transboundary water systems by increasing capacity to replicate best practices and lessons learned in each of the Global Environment Facility (GEF) supported international waters operational programmes. Phase I integrates three initiatives:

- The International Waters Distance Learning Project (IW:LEARN), which uses new communication technologies for an 'international waters knowledge community' so that people managing these ecosystems can better teach and learn from each other. www.iwlearn.org
- The TRAIN-SEA-COAST Project (TSC) will establish six new regional centres for course development guided by participatory needs and resources assessment. IW:LEARN will co-operate with TSC in targeting new areas for the development of TSC curricular materials and identify selected TSC courses/modules, which can be converted into distance learning formats. www.un.org/depts/los
- The biennial GEF International Waters meetings are arranged for a portfolio-wide strategic planning and exchange of project experience and lessons learned. (IW:LEARN)

TEMPUS: Water-Related Projects

ewa.wietsma@users.whh.wau.nl

TEMPUS is a joint European Programme in support of innovative inter-university co-operation and networking. Over the past ten years Tempus has supported a number of initiatives a sampling of which follows:

- Co-operation on methods of sustainable, environmentally sound river basin administration.
- Creation of an interdisciplinary partnership of 25 universities from 10 countries. Forum for an implementation of joint educational, training and mobility programme through student and staff movements between West and East, East and West, East and East and short intensive courses.
- Improvement of university education on environmental protection through updating curricula and teaching material in Central Europe.
- Restructure the curricula at 8 Polish universities including the creation of a 4-year PhD programme and a postgraduate course, both in the area of environmental protection and to develop a Geographical Information Systems Training Centre.
- Incorporation of environmental/ecological concepts in Civil and Agricultural Engineering courses at eight Hungarian universities and institutions of higher education; setting up new PhD programmes in environmental engineering and in IWRM, organizing international interdisciplinary PhD Workshops and hydrological field experiments.
- Introduction of new degree courses, at both Bachelor and Master levels, at two Polish partner universities and launching an interdisciplinary and inter-faculty study programme in environmental engineering and management.

The Water Page

<http://www.thewaterpage.com/>

The Water Page is an independent initiative dedicated to the promotion of sustainable water resources management and use. It has become one of the most consulted water policy information source. A particular emphasis is placed on the development, utilisation and protection of water in Africa and other developing regions. The Water Page includes a special section on water education.

Umgeni Water South Africa

<http://www.umgeni.co.za/home.htm>

Umgeni Water is the largest water authority in the KwaZulu Natal Region of South Africa. Umgeni Water has an active External Education Services Unit, which has made available to the public a wide range of educational and training products for educating communities about water management.

UNESCO-IHE Institute for Water Education

<http://www.ihe.nl/>

The UNESCO-IHE Institute of Water Education, established in 2002, is the successor organization of The International Institute for Infrastructural, Hydraulic and Environmental Engineering (IHE). Within UNESCO's educational mandate, it aims to strengthen the global educational and knowledge base for integrated water resources management and contribute to meeting water-related capacity building needs of developing countries and countries in transition. Building on the experience and strength of IHE, the Institute will strengthen capacity building through education, training and research in the areas of water security, environmental integrity, urbanization, integration and information and communication. It has created a network covering over 12,000 alumni, who received their education and training at the IHE ranging from short courses to postgraduate education over the past 45 years. The network is used by many of the Institute's alumni from more than 120 countries who meet periodically with other members of the IHE community in international projects, regional refresher seminars, symposia and international fora and maintain contacts via the Internet. Based on the feedback obtained through these contacts, IHE is able to fine-tune its education, training and research programmes in order to ensure that they continue to meet changing demands.

UNESCO-IHE Partnership for Water Education & Research (PoWER)

www.ihe.nl/power

The Partnership for Water Education and Research (PoWER) will create a network of autonomous collaborating centres in all regions of the developing world, for the research into and the dissemination of all aspects of integrated and sustainable management of water and environmental resources and services. The Partnership will provide demand-responsive and duly accredited postgraduate education, research and capacity building services to individuals and organisations throughout the developing world. It will be characterised by a quality hallmark that ensures the integrity of its members and the quality of the services that they offer. The Partnership, with its members in the developing countries will be linked to a complementary network of supporting UN Agencies with relevant professional and education mandates, and with partners in industrialised countries). One of the major goals of the Partnership is to empower local and regional capacities in the developing world. The shaping of an appropriate technical information and communication infrastructure to reach that goal is part of the Partnership project. PoWER's education and training programme envisages short courses on water management for 300 individuals and a joint Masters programme (18 months) for 600 students.

PoWER will set-up the ICT infrastructure and implement appropriate tools for the effective operation of the global network and for its collaborative working and learning activities at the

global and regional level. In particular the following Communities of Practice will be facilitated: UNESCO-IHE and its collaborating regional partners, the Global Alumni Network, and two regional knowledge Networks: WaterNet and the Nile River Basin Network.

Universities Water Information Network (UWIN)

<http://www.uwin.siu.edu/>

The Universities Water Information Network disseminates information of interest to the water resources community and all concerned with water resources. UWIN is housed at the Headquarters of the Universities Council on Water Resources at Southern Illinois University in Carbondale, Illinois. UWIN is funded through a grant from the United States Geological Survey and is part of their outreach efforts to the water resources community.

University of Zimbabwe

<http://www.uz.ac.zw/>

Apart from a four-year honours degree programme, the Department of Civil Engineering runs a one and a half year MSc degree programme in Water Resources Engineering and Management (WREM). Starting in February 2002 the Department of Civil Engineering, in collaboration with IHE-Delft, The Netherlands, offers MSc in WREM for the fifth consecutive year. This post-graduate degree programme deals with water resources management in Southern Africa (it is part of the WaterNet Project), and addresses the challenges created by the increasing complexities and the recent and on-going reforms of the water sector in many Southern African countries.

Water Academy / Académie de l'eau

<http://www.oieau.fr/academie/>

The Water Academy was created in 1993 by the French Ministry of Environment and the French Water Agencies. It organizes prospective and multidisciplinary forums on water management.

It aims at:

- enhancing the value of the water considered as a heritage, by implementing exchange of information (technical, juridical, scientific, cultural) and thematic studies;
- helping decision making in the field of water, especially by organizing symposiums, by initiating and supervising studies, by giving recommendations... in order to contribute to a sustainable development;
- developing national and international relationships between all the actors dealing with water;
- improving consciousness-raising campaigns towards the public in the field of water.

The Academy operates with the support of the six French Water Agencies. It is homed by the Seine Normandy Water Agency.

Water Education Foundation

<http://www.water-ed.org/>

The mission of the Water Education Foundation, an impartial non-profit organization, is to create a better understanding of water issues and help resolve water resource problems through educational programmes. Wide range of education products, school programmes and special projects.

Water and Education for Teachers (WET)

www.montana.edu/wwwwet

Project WET is an example of water awareness raising and knowledge transfer at primary and secondary education level. Project WET is an international, interdisciplinary, water science and education program for formal and non-formal educators of kindergarten through grade twelve students. It is a source of information and materials, professional development training courses, networking assistance, and a valuable resource for organizations that have questions about water education and creating their own education initiatives. Since the inception of Project WET in 1984, the program has attracted global interest. The goal of the Project WET program is to facilitate and

promote the awareness, appreciation, knowledge, and stewardship of water resources through the development and dissemination of classroom ready teaching aides. The need for Project WET was identified by both educators and water managers. Educators need materials that are relevant, hands-on, and engaging for students. Water policy makers, managers, and scientists have a critical need for public understanding of and involvement in water issues.

Water-Education-Training (W-E-T) Support Group

The W-E-T Support Group is a small network including representatives of UNESCO, UNDP, WBI, UNU/INWEH and IHE-Delft, and independent experts. The group was established in the wake of the International Symposium on Human Capacity Building in the Water Sector through Innovation and Collaboration (Delft, The Netherlands, November 2001). The group acts on behalf of its sponsors to promote and help implement programs of action on water sector capacity building focusing on education and training. It's coordinator is Frank Hartvelt (FrankHartvelt@aol.com).

Water Environment Federation

<http://www.wef.org/>

WEF is a not-for-profit technical and educational organization founded in 1928. Its members are from varied disciplines and they collaborate with staff to realize the WEF vision of preservation and enhancement of the global water environment. The WEF network includes water quality professionals from 79 Member Associations in 32 countries. WEF provides a range of materials describing today's water quality issues. WEF also works to inform public officials and the media about water quality through educational tours, congressional testimony, newsletters, and formal comments on regulatory and legislative matters. WEF understands that professional and public education are key to preserving and enhancing the global water environment, and provides resources designed to help educators and students of all levels become more educated and involved in their water environment.

Water and Media Network

<http://www.worldbank.org/wbi/sdwatermedianetwork/index.html>

The Water Media Network is an initiative designed to help journalists examine the social, environmental, regulatory and financial issues relating to water, and experience the difference that water can make to the economy in your regions. The programme features workshops, field visits, distance learning courses and more.

WaterNet

<http://www.waternetonline.ihe.nl/>

The WaterNet project, which started in 1999, aims at establishing a regionally based network for education, training and research on integrated water resources management in Southern Africa. It facilitates professional course development and the establishment of a regional modular Master's Degree. It also promotes regional research activities and a professional association. To achieve these goals five funds are being created: a research fund, an exchange fund for lecturers, a fellowship fund for students, a staff development fund and a nodal strengthening fund for participating institutes. WaterNet will use the experience gained by the University of Zimbabwe with the modular MSc course in water resources engineering and management.

One of the main objectives of the post-graduate programme is to coin a common language of the central concepts in IWRM. This will allow present and future water managers to effectively communicate with experts from other disciplines, such as resource economists, environmentalists, lawyers, planners, community representatives, scientists, health professionals and engineers. WaterNet is supported by the Netherlands (DGIS), Sweden (SIDA) and other donors. WaterNet may have inspired similar initiatives in other regions such as Central Asia and Central Europe where similar networks are currently being considered.

Water Policy and Management Program

www.worldbank.org/wbi/sdwater/index.html

The World Bank Institute is the World Bank's knowledge and training arm, and as such, is actively engaged in water issues. The objectives of Water Policy & Management Program are to:

- Support national capacity building for sustainable water resources management, with a focus on formulating water resources management strategies and economic analysis
- Promote improved water services through informed policy dialogue on sector reform options and public-private partnerships
- Support sector reform implementation through learning partnerships with client country agencies, Bank operations, and civil society. Key topics include institutional options, tariff reform, economic and environmental regulation, and the design of public-private partnerships to improve services to the poor
- Build capacity through courses on water policy, policy learning events, networking and outreach activities, and learning and communication products

Since its inception in 1994, the program has reached over 12,000 decision-makers and stakeholders in 50 countries, leading to significant policy reforms. This demand-driven program is supported by the World Bank, donor governments, and client governments.

Recently, the World Bank established the Global Development Learning Alliance, which is committed to providing quality programming drawn from a variety of public and private sources, including the World Bank Institute. Learning programmes fall into three broad categories: Courses, Seminars, and Global Dialogues. Courses and Seminars combine two-way multimedia videoconferencing sessions complemented with print packages, CD-ROMs, interactive Web communications, or face-to-face tutorials. Some are fully Internet-based. Global Dialogues are stimulated through short videoconferences allow participants to work together to address pressing issues that call for a common international agenda or require a local policy response.

Water Research Network (WRN)

<http://water.nml.uib.no/>

The Water Research Network supports a database as a collaborative effort, run by University of Bergen, Norway and sponsored by the Norwegian Research Council and the Government of the Netherlands. The database has been operating since late October 2001.

The database will be useful for researchers and students from all kind of disciplines and from all over the world - dealing with the role of fresh water in history and development. It should help people in different countries, in different institutions and in different disciplines to come in contact with each other, and it should also - as the database develops - encourage cumulative research.

The database is to be a tool in the process of making a multi-volume book-series entitled "History of Water and Civilization", initiated by UNESCO. The work will be carried out by UNESCO in cooperation with the International Water History Association, and will take many years to finish. The database is thought to help the editors to identify potential contributors for the different topics of this multi-volume series. The support of the Government of the Netherlands is intended to make this possible.

The Water Research Network database will also be an important tool in the work of the Research and Ethical Network Embracing Water (RENEW), a worldwide research and education network connected to the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), UNESCO. The database should support the dissemination of research on water and ethics, and is therefore supported by the Scandinavian/Baltic node for research and education on water and ethics. The structure of the database is built around research projects and literature

connected to thematic keywords, countries of research, watersheds, researchers and institutions. You may add information to the database or make changes in your registration data at any time. The database is updated and the new information is available for all users as soon as changes are submitted.

Water Utility Partnership (WUP)

www.wupafrica.org

The Water Utility Partnership is a regional programme for Africa, which was created in 1996 in response to the need to improve the low level of efficiency of water utilities and to improve the quality of services an enabling environment for the implementation of water sector reforms, and the increase of private sector participation in the financing and management of water and wastewater. Workshops and seminars are at the heart of capacity building activities of the WUP. Noteworthy are seminars for journalists to inform civil society of contemporary water issues.

WaterWeb Consortium - Information on Water and Environment

<http://www.waterweb.org/>

The WaterWeb consortium promotes the sharing of information concerning water and the earth's environment. It seeks to create a global community, bringing together educational, governmental, nonprofit, & commercial entities interested in water research, conservation, and management. WaterWeb's goals are to advance water related issues, promote the use of quality information, and share information with water use stakeholders and decision makers.

World Meteorological Organization (WMO) Educational Guide

www.wmo.ch/web/etr/classif.html

The World Meteorological Organization (WMO) is currently producing a fourth edition of one of its major publications: Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology. This revision will appear in two separate volumes. The first volume on Meteorology is now available, and an editorial panel is actively working on the Hydrology volume. As an example of interagency co-operation UNESCO has nominated a representative to the editorial panel, and has made available the collective experience encapsulated in the UNESCO Studies and Reports in Hydrology and other publications on the education and training of hydrologists and hydrological technicians.

CAPACITY DEVELOPMENT “DEFAULT SETTINGS”

1. ***Think and act in terms of sustainable capacity outcomes!***
Capacity development is at the core of development. Any course of action needs to be probed against whether it serves this end.
2. ***Don't rush! Capacity Development is a long-term process.***
It is not amenable to deliver pressures, quick fixes and short-term results seeking. Engagement for capacity development needs to have a long term horizon and be reliable.
3. ***Scan locally and globally and re-invented locally!***
There are no blueprints. Capacity development means learning. Learning is a voluntary process that requires genuine commitment and interest. Knowledge cannot be transferred. It needs to be acquired.
4. ***Use existing capacities rather than creating new ones!***
This implies the use of national expertise as prime option, resuscitation and strengthening of national Institutions, and protecting social and cultural capital.
5. ***Integrate external inputs into national priorities, processes, and systems!***
External inputs need to correspond to real demand and need to be flexible to respond effectively to national needs and possibilities. Where such systems are not strong enough, they need to be reformed and strengthened, not bypassed
6. ***Establish positive incentives for capacity development!***
Distortions in public sector employment are major obstacles to CD. Ulterior motives and perverse incentives need to be aligned with the objective of capacity development.
7. ***Challenge mindsets and power differentials!***
Capacity development is no power neutral and challenging vested interest is difficult. Frank dialogue and moving from closed curtains to a collective culture of transparency is essential to promote a positive dynamic for overcoming them.
8. ***Stay engaged in difficult circumstance!***
The weaker the capacity, the greater the need. Weak capacities are not an argument for withdrawal or for driving external agendas. People should not be hostage to irresponsible governance
9. ***Stay accountable to ultimate beneficiaries!***
Even where national governments are not responding to the needs of their people, external partners need to be accountable to beneficiaries and contribute to a responsabilization of national authorities. Sensible approaches in concrete situations need to be openly discussed and negotiated with national stakeholders.
10. ***Respect the value system and foster self-esteem!***

PRINCIPLES FOR SUCCESSFUL DEVELOPMENT OF CAPACITY IN THE WATER SECTOR

Based on lessons from past experience, Cap-Net has identified three major principles underlying strategic approaches, which may make a significant improvement towards the successful development of capacity in the water sector.

1. Local ownership

Local ownership of the capacity building process must be anchored in the local capacity building institutions. Local institutions need to strengthen over time their responsiveness to local needs and demands, and address their own capacity constraints. Rooting capacity building in local institutions enables not only effective and targeted follow up, but equally importantly keeps the capacity building institutions in tune with their clients and further helps develop their skills and expertise as centres of excellence and as resource centres. Significantly, experience has shown that when new knowledge is not integrated into indigenous knowledge or production systems it fails to have the expected impact.

2. Partnerships

Effective capacity building will occur only when the capacity building institutions are sufficiently in touch with the implementing agencies with a view to understanding the real problems to be addressed and when they have the appropriate knowledge and skills to impart. A partnership approach is the most effective means of achieving this in the short term, thus forming a framework for effective collaboration in the future.

New technology is creating an exponential growth in tools for capacity building and ways to access knowledge. Information can now be obtained from a wide variety of sources and in a multiplicity of forms. Linkages between people and institutions across the world can now take place horizontally and directly without passing through formal channels. Networks are arising in increasing numbers as people themselves take hold of the opportunity presented to share ideas, information and knowledge.

Current management concepts for water resources promote the integrated approach. Bringing together multiple disciplines, drawing society into decision-making processes and addressing financial, social and equity issues not only crosses traditional technical boundaries but also demands new mixtures of skills. Partnerships amongst capacity building institutions are emerging as an effective strategy to share experience and skills and reach the critical mass of expertise required to address the demanding requirements of reform aimed at sustainable management of water resources.

3. Demand Responsiveness

To be effective capacity building service providers need to adopt a demand driven approach, identifying the immediate needs and demands of society and responding to them. In addition to the long-term requirements in terms of graduates and skilled personnel much greater attention has to be given to the immediate capacity needs of government and civil society to support policy, legal and institutional reforms. The world of learning has been changing very rapidly. A large part of our growth takes place after formal education has been completed, increasingly through continuous education and training activities.

Annex 6

POTENTIAL IMPACT OF WATER SUPPLY AND SANITATION ON ACHIEVING THE MILLENNIUM DEVELOPMENT GOALS (MDG)

A prerequisite to achieving the MDG will be the short and long-term education and training of water professionals, technicians and investors. They represent the cadre that will be well equipped to deal with key capacity building issues in the water sector such as policy and legal reform, institutional change, community involvement and human resources development, in the absence of which sustainable water sector development would be seriously impeded.

1. MDG: Reduce by half the proportion of people living on less than a dollar a day.

Impact of water: Livelihoods of the land poor can be significantly enhanced by irrigated agriculture and horticulture which often creates demands for labour in two or even three growing seasons a year. In addition, jobs can be created in the construction and maintenance of drinking water supply, irrigation, drainage and waste management.

2. MDG: Reduce by half the proportion of people who suffer from hunger.

Impact of water: Access by households to a sufficient quantity of water can significantly increase food production and incomes for the peri-urban and rural poor.

3. MDG: Reduce child mortality

Impact of sanitation and water: Hygiene education and hand washing reduce the mortality and morbidity of children. Irrigated agriculture and horticulture increase food availability.

4. MDG: Improve maternal health

Impact of sanitation and water: Hygiene education, access to a sufficient quantity of water for household use and garden irrigation improves the health of mothers and their families.

5. MDG: Achieve significant improvement in the lives of at least 100 million slum dwellers by 2020.

Impact of water: Access to a sufficient quantity of water for household use, urban agriculture and small-scale industry.

The Johannesburg Plan of Implementation issued at the World Summit on Sustainable Development (WSSD) includes the following targets and timetables related to water, sanitation and the management of the natural resource base:

- **Halve, by the year 2015, the proportion of people without access to safe drinking water (*reaffirmation of Millennium Development Goal*).**
- **Halve, by the year 2015, the proportion of people who do not have access to basic sanitation.**
- **Develop integrated water resources management and water efficiency plans by 2005.**

Resolution on the
"UNITED NATIONS DECADE OF EDUCATION FOR SUSTAINABLE
DEVELOPMENT"

**at the United Nations General Assembly (the Plenary Meeting),
adopted 20 December 2002.**

The General Assembly,

Recalling Chapter 36 of Agenda 21 on Education, Awareness and Training adopted at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 (the so called Earth Summit),

Appreciating the contribution made by the United Nations Commission on Sustainable Development to the issue of education for sustainable development since the Earth Summit,

Welcoming that the Plan of Implementation adopted at the World Summit on Sustainable Development held in Johannesburg this year confirmed the importance of education for sustainable development and recommended the United Nations General Assembly to consider adopting a decade of education for sustainable development, starting in 2005,

Emphasising that education is an indispensable element for achieving sustainable development,

1. Decides to declare the ten year period from year 2005 to be a Decade of Education for Sustainable Development;
2. Designates the United Nations Educational, Scientific and Cultural Organisation (UNESCO) as the lead agency for the promotion of the Decade of Education for Sustainable Development and request UNESCO to develop a draft international implementation scheme, clarifying its relationship with the existing educational processes including Education for All, in consultation with the UN and other relevant international organisations, governments, non-governmental organisations and other stake holders, with a view to providing guidance for governments to incorporate concrete measures to promote education for sustainable development in their respective national educational plan;
3. Invites governments to include necessary concrete measures to implement the Decade of Education for Sustainable Development starting from 2005 in their respective national educational plan by year 2005 in accordance with international implementation scheme to be prepared by UNESCO;
4. Decides to include in the provisional agenda of its fifty-eighth session the item entitled "a Decade of Education for Sustainable Development".