



Synthesis

of the
4th World Water Forum

4TH WORLD WATER FORUM SYNTHESIS

Synthesis of the 4th World Water Forum
Mexico City, 2006
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Note to the reader

In their role as co-organizers of the 4th World Water Forum, the Secretariat of the 4th World Water Forum and the World Water Council have co-produced this Synthesis of the 4th World Water Forum, in order to provide Forum participants and the international water community with the main messages, lessons learnt, and key recommendations presented in all the events that comprised the Forum.

As such, the content contained herein does not necessarily reflect the official position of the National Water Commission of Mexico, the World Water Council, the thematic beacons, regional committees or session conveners. Moreover, the views expressed in this document represent an effort from the organizers to synthesize the main themes, issues, key messages and recommendations addressed during the Forum.



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Introduction

In one of his most famous short stories, Jorge Luis Borges narrates the existence of a special point in the universe, named an *aleph*, through which it is possible to see the whole universe and time. The 4th World Water Forum created, to some extent, one of these points. It was an *aleph* through which we were able to observe, for a short period of time and in a limited space, the broad human universe related to water. Of course, the synthesis we offer in these pages is only a "glimpse at the *water aleph*".

To produce this synthesis, the Secretariat of the 4th World Water Forum and the World Water Council worked in close collaboration. The pillars of the synthesis are the session reports received, both from the session conveners and an internal team of rapporteurs, on the 206 topic-sessions and the local actions presented within these sessions; the thematic documents prepared by the Beacons as a basis for discussion on each theme or perspective at the Forum; the regional reports that addressed the specificities of each region of the globe; the thousands of comments and recommendations received from participants and processed through the mechanism named *Voices of the Forum*; the reports of specific groups; all the speeches and declarations, documents and reports published, side-events and even some voices that came from outside of the official Forum.

The production process involved joint teams from the Forum Secretariat and the World Water Council on each chapter. Their analysis distinguished first the lessons learnt, the key messages and the recommendations for action related to each chapter, and resulted in a list of the main ideas that had been developed during the Forum. A consultative team, consisting of some of the Beacons and other representatives from the global water community was then asked to comment on these first findings, thus allowing the writers to finally produce the chapters representing the nature of the debates at the Forum.



Nevertheless, even with this great effort, we recognize that aiming to synthesize the outcomes of the 4th World Water Forum is undoubtedly presumptuous. With more than 200 topic-sessions and a comparable number of parallel or side-events, the quality and intensity of the debates cannot be summarized easily. The spirit of this document is therefore slightly different: it aims to facilitate follow-up on the various issues debated in Mexico by reminding us of some of the main issues raised in the sessions, the numerous initiatives announced and discussed and the new partnerships initiated. Following-up is indeed pivotal to the Forum and to all similar events, which do not achieve their main role if they do not ultimately serve to trigger new action.

Action, especially at the local level, was a key ingredient of the 4th World Water Forum. We sincerely believe that imposing the presentation and discussion of local actions in all sessions was a good choice. The same choice was therefore made for this report by illustrating the outcomes with a few of the 1600 local actions submitted to the Forum Secretariat during the preparatory process of the Forum. The actions selected here are not necessarily the best or the most successful ones; they are here to remind us that theoretical debates, often the main purpose of international events need to be substantiated in order to remain relevant.

Local actions are also here to remind us that the main objective of the 4th World Water Forum was to identify ways to

possibly scale them up or replicate them in different contexts. This obviously could not be finished in one week! There is a lot to do to if we wish to pursue this important objective. Therefore this document is not only a tentative synthesis, it is also a plea for the pursuing of the effort in order to improve the situation of water in our world.

This synthesis has one other purpose we would like to emphasize: to share and to produce water-related knowledge. One of the main outputs of the focus on local action was the kind of knowledge that is the most difficult to transfer: implicit knowledge. Readers are invited to consult the Forum databases, mainly the session reports and local actions, available through the 4th World Water Forum website, and to initiate a networking communication with the session conveners and speakers, so as to continue the worldwide knowledge sharing initiated during the Forum.

This document is organized around the general framework of the Forum i.e. around its framework themes and crosscutting perspectives. It also includes specific sections on issues or events that have brought something new to this Forum. Such was the case for the issue of the Right to Water, which for the first time was debated in a rather consensual spirit, and the involvement of Local Authorities and Parliamentarians in a structured debate where their specific points of view could be discussed and brought to the attention of the entire water community.

Water for Growth and Development

Main Issues and Recent Tendencies

There is a general consensus that water development is a basis of social and economic growth and development. In choosing to address Water for Growth and Development as one of the framework themes of the 4th World Water Forum, one of the main objectives was to find a way to attract human, technological and financial resources into the water sector, to catalyze growth in the nations of the world. Focusing on economic growth as a priority could be seen as a provocative stance when we speak about development or poverty reduction in the context of the Millennium Development Goals, but it is surely a good way to attract the attention of the financing community, including Ministers of Finance, to increase all kinds of financial resources to the water sector.

During this first day of debates at the Forum, the articulation between growth, development, poverty reduction and environmental protection was strongly discussed. How can water resources be managed and developed to promote growth and alleviate poverty in a responsible manner? How can this be done in such a way that environmental resources are not destroyed, and all citizens can reap the benefits?

There was in particular a great deal of discussion on infrastructure, be it for reaching a minimum platform of water security or to further strengthen growth. Indigenous and local communities' approaches towards water, as well as environmental protection actors, contrasted with the views of infrastructures promoters. The role of women in water resources management and development was highlighted and a formal recognition for gender roles was urged.





Facts and Figures on Water for Growth and Development

- "As a sort of water paradox, many of the world's poorest countries, the ones that are in acute need of better water services and that face greater challenges from climate variability than the rich countries, have very little water infrastructure and management expertise. Thus, the challenges they face are far greater than the challenges that were overcome by today's developed countries".
 – Katherine Sierra, Vice President for Infrastructure, The World Bank
- Water variability can have a strong impact on GDP. In Ethiopia, economy-wide models that incorporate hydrological variability show that projections of average annual GDP growth rates drop by as much as 38% as a consequence of this variability. And even a single drought event within a 12-year period will diminish growth rates across this whole period by 10%. (Water for Growth and Development thematic document);
- All over the world there are 49,000 large dams, among which two thirds are in developing countries but most of them are in China (more than 20,000);
- Hydropower produces 19% of the world's electrical energy, but Africa fulfills only 3.8% of its hydropower potential, Asia 11.6%, Europe 27% and North-America 43%;
- A 2002 UNICEF study of rural households in 23 Sub-Saharan countries found that a quarter of women spent 30 minutes to an hour each day, collecting and carrying water, and 19% spent an hour or more. In Mile Gully, Jamaica, women spend on average between two to five hours daily carrying water. Additionally, time is spent going to the river to wash and on average washing takes place three times weekly.

Main Messages, Lessons Learned and Key Recommendations

Investing in Water and Poverty Reduction

During the sessions, the link between poverty reduction and water services was pointed out, and the following notions were highlighted. Investing in water management can contribute to poverty reduction and all of the MDGs in different ways, not just those that refer explicitly to water and sanitation (session FT1.04 *"Linking Poverty Reduction and Water Management – Reaching the MDGs Through Investing in Water"*). Investing in water (and sanitation) is an economically sound decision, whether it be in large-scale infrastructure or small local developments. Investments can generate rapid returns that make them competitive with investments in other sectors and are beneficial in wider development terms, tackling

fundamental causes of poverty. The potential of encouraging local entrepreneurs in particular needs to be explored.

Emancipating women from time-consuming water-related tasks can contribute significantly to income generation, poverty reduction and the social development of many countries. In general, projects that are gender equitable are also more economically efficient and effective.

Concerning urban sanitation, treating urban pollution saves lives and the environment, delivers economic growth, creates jobs and reduces health risks and water supply costs. It benefits health, economy and ecosystems (session FT1.02 *"Wastewater Treatment to Fight Poverty"*). The health consequences that affect the elderly and children, the increased expenditure on medical care, and the greater time and energy spent by women who care for them, all serve as economic incentives to treat urban pollution and empower women.

Wastewater Treatment to Fight Poverty in Fez, Morocco

The city of Fez (1.2 million inhabitants) classified as universal heritage by UNESCO has become the Moroccan economic development pole. The population has multiplied ten-fold in a century and all organic pollution is evacuated to the Sebou River. Since 1996, several actions have been undertaken, such as the adoption of a wastewater master plan. The basin agency of the river Sebou has been created to operate IWRM in the watershed with all water stakeholders and notably promote and support wastewater treatment and cost recovery through a polluter-pays mechanism. The building of a first treatment plant will start at the end of 2006 (total cost: US\$70 million) and will reduce effluent discharge by 85%, thus bringing a vast improvement in sanitary conditions, a rational water resources management and social and economic development. Total estimated gain: US\$20 million/year.

Presented in session FT1.02 "Wastewater Management to Fight Poverty"

The majority of the population whose lives would be affected by the realization of the MDGs lives in dispersed rural areas and consequently, meeting the development goals means focusing water investments on rural areas and small farmers, and raising yields in rain-fed areas, (session FT1.25 *"Ensuring Dams are a Platform for Growth and Sustainable Development"*).

Water Security, a Prerequisite to Growth and Development

The thematic document addressed water security as a development need. The Forum confirmed that point of view and that water security implies the ability to provide basic water services and to protect populations against water related disasters and the effects of climate variability. This security must not prejudice the sustainable conservation of freshwater and terrestrial ecosystems.

A minimum level of water security is a prerequisite for growth and development, especially in the countries of the

South, where the hydro-climatic conditions are often strongly variable. For many developing countries, especially in tropical areas, protection against floods is pivotal to their continued development. Regular droughts can also significantly affect the development potential of a country. Due to a lack of resilience systems, much of the supply of freshwater in the developing world and economic sectors relying on water supply are very sensitive to the impacts of climate variability (session FT1.22 *"The Dynamics of Water and Growth: Issues and Political Reflections"*).

For developing countries, reaching water security should be the first priority. Developing countries must be able to separate growth from hydroclimatic conditions, to develop resilience systems in water that improve the reliability and quality of water supplies, reduce the vulnerability of economies and people to climate shocks and mitigate the impact of climate variability and seasonality (session FT1.05 *"Achieving Water Security: Innovative Solutions for System Resilience"*).





Mauritania: Food Security and Natural Resources Management

Baidiam Commune (district) is located in southern Mauritania, in the region of Guidimakha, a Sahelian area. It is the region with the greatest population density but at the same time there is a very high migration rate. As a consequence, the Guidimakha region is progressively deprived of its workforce. Desertification and erosion are currently significant and increasing in intensity. Despite the increase in rainfall over the past 10 years, temporary water surfaces have been reduced almost by 80%, as for eroded land, it has increased by 46%. This is due to natural factors (drought, erosion) and human intervention factors (cultivable ground overexploitation, overgrazing, etc).

In eroded zones, many families either no longer have arable land or enough production in order to ensure their food self-sufficiency. There is a competition for access to the land, which results in deforestation and a number of conflicts in the area. It also causes a decrease in the living conditions of the population with a fall in agricultural income. Therefore, it pushes the farmers towards the only areas where water resources still remain, the last natural reserves of the area. Surface water management is a priority in Guidimakha for conserving the crop production potential.

Baidiam Commune, with 8,500 habitants, is responsible for its own local development. With the support of GRDR and local consulting engineers, local authorities and the population have been working out a surface water harvesting program which should, in the long term, guarantee food safety and sustainable natural resources management to the Commune. This plan was initiated with large community participation, and the innovative idea was to focus on traditional land repartition and to propose their own land management to avoid land conflicts after building dams. The project goal was to make rain crop and flood plain cultivation safe and to provide access to the land for the population, who previously had no land to cultivate.

In 2003, the local authorities financed the first studies and initiated a program in order to ask for grants, defining with community participation, the Territorial Development Units which are the watersheds where work was to begin.

In 2004, a land diagnosis was initiated on each place to be developed and local rules were established for land management after the construction.

In 2005, three water-spreading dams were built by village people (to reduce erosion and to recover the arable lands).

For 2006, two further water-spreading dams, three filtration dams, and the protection of a *Zyzyphus* (tree) perimeter are planned.

The entire program was carried out by the consultation committee of the Commune. The local authorities were trained in the supervision and execution of work (they encountered difficulties with the building delays, land conflicts and financial management). After the first year, the dams retained a lot of water and a process of consultation was set up in the commune with agreements for the distribution of land.

Water for Economic Development

Beyond the water security prerequisite, investing in water can strengthen growth and economic development in providing clean renewable electricity, transportation facilities, or business opportunities, in agriculture for example.

Session FT1.28 *"Water and Energy"*, highlighted that the hydroelectric potential of many developing countries is far from being attained, especially in Africa. In the context of increasing prices of fossil fuels, a regular and reliable source of energy is essential to attract investments and ensure growth. Hence, there is great potential in investing in hydroelectricity, which is in addition clean and renewable. "Electricity from hydropower was the key factor in transforming Norway from one of the

poorest countries in Europe a century ago to the industrialized and wealthy nation of today" explained Anita Utseth, Deputy Minister, Petroleum and Energy of Norway. However, more than that, water and energy are inextricably linked. Energy is needed for water services, and water is needed for virtually all kinds of energy production. The strong relationship between water and energy has to be acknowledged.

Transport infrastructures are pivotal for trade and economic development. Session FT1.06 *"Water and Transport"*, revealed the high expectation for the use of the energy-efficient and environmental friendly Inland Water Transport (IWT).

In transboundary basins, cooperation between riparian states around water can strengthen regional economic integration and provide good opportunities for growth.

Regional Economic Integration Through Improved Mekong Navigation

The most striking weakness of navigation on the Lower Mekong Basin is the lack of a regional legal framework that defines common standards, procedures, and rules for navigation. The Mekong River Commission (MRC) Navigation Programme (NAP) Component 2 on Legal Framework for Cross-border Navigation will establish an appropriate legal framework ensuring effective freedom of regional and cross-border navigation on the Mekong and ensure its implementation and sustainability.

MRC NAP will install navigation aids to mark navigation channels, formulate common navigation rules and regulations, prepare strategies to both prevent and combat pollution, and support contingency planning.

The program applies a holistic and integrated approach to navigation development. Environmental, social, economic, and technical aspects are well balanced to accommodate the strong call for development while ensuring that development is sustainable.

From Local Action LA1722, by the Mekong River Commission

Respect for the Spiritual and Cultural Values of Water

Water, an economic, social and environmental good, also has a sacred dimension for most of the people around the world. That dimension was recalled on many occasions during the 4th World Water Forum. As session FT1.15 *"Is Water Alive? Indigenous Understandings of Water"*, pointed out, the sacred understanding of water of the indigenous peoples contrasts with "Western" water experts' views on water as a purely material substance. These contrasting understandings of water are one of the roots of many conflicts over water rights, water use, and water management.

Respecting the spiritual and cultural knowledge of indigenous peoples, including their understanding of local waters and watersheds and treating these local understandings as being just as valid as outsiders' paradigms about water

management, is crucial for building multicultural water resources management. The two sets of paradigms need not be in conflict; with mutual respect, each can benefit from the other, creating win-win situations. Indigenous communities actively manage their water through spiritual practices (ceremonies and rituals), as well as the more familiar physical practices (i.e., diverting water for irrigation). What outsiders may see as under-utilized water resources are already being managed and "used" through spiritual practices. The deep respect manifested through indigenous spiritual actions is needed for the sustainable management of water bodies.

Be it for poverty alleviation, for reaching water security, or to ensure growth and development, the major role of water to build sustainable societies and to face global challenges has to be recognized at the highest political level. Governments have to make water a top-priority in the development agenda.



A Need for New Infrastructures

There is a strong relationship between investments in water infrastructure and human, economic and social development. Developing countries without appropriate infrastructure have a limited ability to provide water services and to protect against the risk of water-related disasters. However, there is no single path to water security. Each country must evaluate the possible effects of infrastructure construction before selecting the appropriate level of investment, so as to protect the environment, taking into account local knowledge and in particular indigenous positions.

The debate between large-scale and small-scale infrastructure is still conflictual, but in fact both are needed

Larger irrigation projects are usually more economically viable than smaller ones but there is a strong need to consider the local situation: can Africa afford to move away from small-scale farming? (session FT4.24 *“Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities”*). Moreover, history has proven that the returns are often not realized as assumed in the original economic analysis. Investing in large projects composed of small-scale schemes is often more cost-effective.

In session FT1.25 *“Ensuring dams are a platform for growth and sustainable development”*, the opinion of the

majority of the participants was that, while a large effort should be made in terms of addressing the needs of the rural poor through strong support to small-scale decentralized solutions, large-scale approaches involving dams and reservoirs are also required because they provide services for poverty alleviation and constitute an option where and when there is a need to manage or protect against significant quantities of water. There was a general agreement that a comprehensive assessment of the needs and of the full range of options, including demand management and improved performance of existing facilities, is required to select the best response.

Nevertheless, the need for a greater attention on environmental conservation was expressed by organizations such as the International River Network, who disagreed that large-scale approaches involving dams and reservoirs could provide significant benefits for poverty alleviation and that they constituted a realistic option in both arid regions and those where there was a need to manage significant quantities of water.

Despite the contrasting positions presented, in general at the Forum, it would appear to have been agreed that the debate over dams should move beyond large versus small-scale infrastructure to consider all options available. Nations should consider both large and small-scale options to meet their needs at the lowest possible social and environmental costs (session FT4.24 *“Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities”*).





Mekong Habitat Classification Project: Identifying No-Go Areas for Dams

The Mekong River flows for some 4,500 kilometers through China, Myanmar, Laos, Thailand, Cambodia and Vietnam before discharging into the South China Sea. Its catchment area - home to more than 60 million people - encompasses an extraordinarily diverse range of biological, cultural, and geographical features. Rapid development is now coming to the region, and this offers a unique opportunity for it to become a model for sustainable development by improving living standards without destroying the environment. An integral part of this development is the growing demand for electricity; for example, at present, only 15% of Cambodians have access to electricity. Hydropower dams are regarded by many as the "knight in shining armor" to fill the gap.

WWF's Living Mekong Programme has identified large-scale infrastructure (and notably hydropower dams) as the single biggest threat to the aquatic biodiversity of the Mekong basin. In WWF's view, the best way to proceed is to move away from a project-by-project approach towards involvement with key partners (governments and basin-scale development organizations like the MRC and ADB) in an integrated approach to dam planning on the scale of an entire large watershed and/or region (consistent with the principles of Integrated River Basin Management).

The first step in the process is to develop a picture of the suitability of locations for dam projects. In order to achieve this, the project will develop an aquatic habitat classification map that can be used as a basis for identifying no-go areas for hydropower development based on a range of criteria. As well as acting as a useful planning tool for a range of stakeholders, the habitat classification map will feed into the longer term and more ambitious project entitled The Scenarios for Hydropower Development in the Mekong.

From Local Action LA0378 by World Wildlife Fund

Implementing infrastructure projects at the lowest environmental and social cost

Substantial new investments in water control infrastructure are needed, including major water control structures to increase storage capacity and regulate water flows, but these need to be part of a package of structural and non-structural measures that includes social, environmental and health safeguards.

Doing infrastructures right supposes learning from past experiences. For instance, it is well known that in many cases the environmental and social impacts have been underestimated. Many large dams were originally built for a single-purpose. Existing infrastructures can be re-optimized, at low cost, to integrate the ecosystem as a water user (session FT1.08 "The

Global Potential for Major Infrastructure Re-optimization to Restore Downstream Ecosystems and Human Livelihoods"). Small adjustments to the system can result in major beneficial changes. New infrastructure development should integrate multiple uses, including ecosystems, and should be evaluated at the river-basin scale (session FT1.34 "Water Infrastructures for Sustainable and Equitable Development"). In developing countries, projects should include social, cultural and environmental safeguards, or at least, ponder the least environmentally costly alternative, protect endangered species, ecological stream flow and plan adaptive measures for ecosystems that could be taken later, such as restoration. Shift of values toward environmental protection comes with development.



Yellow River Integrated Water and Sediment Regulation

The Xiaolangdi Reservoir is the last storage facility on the Yellow River main stem. Its purposes include flood control, alleviating sediment deposition, water supply, irrigation and hydropower generation. The joint operation of the Xiaolangdi Reservoir together with the Sanmenxia Reservoir right above Xiaolangdi, and the Guanxian and Lulun reservoirs on the major tributaries, is essential for flood control in the Yellow River from Xiaolangdi to the Bohai Sea. The joint re-optimization of these four reservoirs' operation could significantly improve downstream ecological functions and human livelihoods. The Yellow River Conservancy Commission conducted four experiments from 2002 through 2005, creating artificial flow through joint reservoir operation to most efficiently flush reservoir and downstream river bed sediment to the Bohai Sea. These four reoperation experiments succeeded in restoring a continuous –but modest and non-variable–flow to the Bohai Sea. Now the challenge is to make those operational features permanent.

From Local Action LA1748, by the Yellow River Conservancy Commission



More important than the technical shift in infrastructure development is the institutional framework governing planning and decision-making

It was agreed and acknowledged in session FT1.25 *“Ensuring Dams are a Platform for Growth and Sustainable Development”* that policy and regulatory frameworks, including robust licensing systems, are fundamental elements of the institutional platform that needs to be in place to ensure sound planning and decision making. Their strengthening, together with the building of managerial capacities, were seen as important actions to ensure

that resources are mobilized and time allocated to appropriately address these emerging environmental and social issues, as well as to carry out meaningful informed participatory decision making processes. Indeed, public participation is essential to meet the real needs, and to produce pro-poor designs. In addition, as nations develop their water resources, they need to invest relatively more in the development of institutions to ensure operation and maintenance, than in infrastructure building. Investment in infrastructures alone will not boost growth and development, but must rather go hand-in-hand with the strengthening of institutions and empowerment of local actors.

Rural Hydroelectricity Project in Nepal

The Andhi Khola Rural Electrification Hydropower Project (AHREP) in Nepal is an outstanding example of a well planned and efficient use of water and energy in a rural area. The scheme delivers reliable water and electricity services to 100,000 local people, improving their quality of life and driving the local economy. The pioneering approach, innovation and application of technology all helped reduce the costs of rural electrification, making electricity affordable for the first time to 22,000 low income families. In addition, secure supplies of irrigation water have enabled the farmers in the region to become self sufficient in food products. About 4,000 people have directly benefited from irrigation. The community, through its local organization, AKWUA, manages the irrigation system and more than 20 User Organizations are involved in the management of local distribution of electricity. The scheme undoubtedly created a feeling of ownership and stewardship in the region; at the same time, it has built capacity within Nepal for similar development initiatives.

From Local Action LA0083, by the International Hydropower Association

Corruption is a barrier to reaching water security

Researchers and policy makers alike increasingly agree on the importance of corruption reduction and of promoting transparency and honesty to achieve sustainable development. Session FT1.07 *"How to Overcome Corruption in Water Resources and Service Management. Actions for Development"*, was devoted to the analysis of the issue, and stated that "Uncorrupt institutions for public governance and economic transaction seem to be an important, if not the most important, asset for countries and local governments to achieve sustainable development". The World Bank Research Institute also identifies

levels of corruption as one of the major obstacles for economic development.

Corruption stunts social and economic development and makes it more difficult to reach the MDGs. It is especially poor people who are hit the hardest by corrupt practices. It is important to recognize that working under transparency principles can not only increase business opportunities and profits but also improve the quality of the service or delivered product. In the supervision of corruption, citizens and civil society must have a prime role, through *ad hoc* institutions, denouncing inappropriate behavior and promoting transparency.

Initiatives

- African Ministerial Conference on Hydropower and Sustainable Development, March 2006;
- "The Global Initiative on the Re-optimization of Major Dams" proposed by the Natural Heritage Institute, will assess the feasibility of re-optimizing the major irrigation, power and flood management systems to enable these dams to be operated to restore substantial measures of the formerly productive flood plains, wetlands, deltas and estuaries in ways that do not significantly reduce the irrigation, power generation and flood control benefits;
- The Seine-Normandy Water Agency, offered to organize a permanent network on fighting poverty through wastewater management, to demonstrate the benefits of urban wastewater treatment solutions;
- The Inter-American Development Bank (IDB) is in the process of approving a donation fund for infrastructure projects in Latin America, and expects most of these to be water-related. A 1.5 million US dollar limit is planned for each infrastructure project.





Implementing Integrated Water Resources Management

Main Issues and Trends

A large number of sessions at the Forum dealt with sharing experience and finding ways to further the implementation of IWRM. Indeed the IWRM day was perhaps one of the busiest days of all; a situation that clearly suggests that the implementation of IWRM is very much an ongoing and key concern, that definitely draws the watchful attention and endeavor of the water community. Perhaps one first aspect to stress is that the discourse on IWRM during the Forum reflected a degree of optimism about its advantages as a water policy approach *vis-à-vis* traditional mono-sectoral approaches. However, its implementation trends, although showing some progress, also depict very uneven results. Evidence would seem to suggest that different local water polities confront important and differentiated implementation challenges, which have to be addressed if more steadfast and widespread progress is to be achieved.

Countries' Readiness to Meet Johannesburg Target on IWRM by 2005

Region	Countries Surveyed	Good Progress	Some Steps	Initial Stage
Africa	45	6	17	22
Asia and the Pacific	41	5	20	16
Latin America	22	3	14	5
Total	108	14	51	43

Source: 2nd World Water Development Report, 2006

It is also possible to maintain that the debate at the Forum showed that there is a good degree of consensus on IWRM policy principles and objectives. Still it was also acknowledged that it is important to emphasize that policy makers should not consider that there are universal blueprints for implementation, but only road maps leading to different places, as local polities strive to ground theory and expand their implementation frontiers accordingly. In this sense, it is not possible to attain and purport orthodox guidelines; instead some general and useful policy recommendations could be highlighted. These could be assembled, for practical purposes, in line with emphasizing IWRM goals to keep them strongly present in the minds of policy makers, building more robust socio-political governance capabilities, supporting deliberative institutional designs for IWRM and furthering

efforts towards the institutionalization of inter-agency cooperation.

Groundwater management was discussed throughout the Forum and its relevance highlighted in terms of its contribution to sustainable development. The general opinion derived from the discussions is that water polities need to recognize the critical functions that groundwater resources can play for economic and social development, sustainable livelihoods and risk management, so as to develop the necessary governance systems to conserve them and make sustainable use of them. IWRM advocates supported the idea that local water polities should recognize that groundwater is intrinsically linked to surface water, and so it is important to attempt to couple groundwater management with IWRM processes.

Facts and Figures on Groundwater

African Regional Report

- Total aquifers represent 810 billion m³/year, which is 15% of the renewable water resources. For arid areas and during droughts, groundwater is the main freshwater resource;
- For example, groundwater represents 80% of total water used in Botswana and 60% in Algeria;
- There is an important lack of data on 38 transboundary aquifers.

The Americas Regional Report

- Saline water intrusion reported in Central America and the Caribbean, caused by excessive abstractions;
- Of 67 transboundary aquifers listed, about one third are in arid and semi-arid zones, 20 of these are already intensively mined and 16 have higher rates of salinity (in areas of intensive agriculture or industry).

Middle East and North Africa Regional Report

- Fossil aquifers are an important but fragile resource (South of the Sahara and in the Arabian Peninsula), whose total reserves are estimated at 144 billion m³, with an annual recharge of 12 billion m³;
- Groundwater resources are in a critical condition because of abstraction exceeding natural recharge, producing a continuous decline of water tables and seawater intrusion.

Key Messages and Policy Recommendations

There is a good degree of consensus on IWRM's theoretical principles and policy objectives

In many sessions at the Forum, several conceptual commonalities and concurrences on theoretical IWRM principles and policy objectives were established among the leading IWRM exponents. At the Forum, IWRM was depicted as an incremental and adaptive policy approach that seeks the coordinated development and management of water, land and related resources. It also seeks to harness water resources to attune to national development goals and challenges, such as poverty alleviation, economic growth, social development and environmental sustainability (session FT2.27 *"The Role of Water and IWRM in the Achievement of the Millennium Development Goals"*). Optimum policy outcomes are sought by attempting to balance political, social, economic, environmental, and water resources management considerations throughout the water policy process and across policy sectors (session FT2.38 *"Ecosystem and Ecohydrology Approaches to Integrated Water Resources Management"*).

IWRM is also about seeking to construct medium and long term policy objectives through strategic planning and master plans, based on a demand driven approach (sessions FT2.07, FT2.19 and FT2.20 *"IWRM in National Plans"* mega-session). IWRM approaches uphold managing water resources

at a river basin level, considering also sub-basins, micro-basins and aquifers as interdependent water resources management and development units (session FT2.16 *"Water Governance and River Basin Organizations"*). Decentralization and multi-stakeholder participation are to be pursued, among other policy measures, through the institutionalization of deliberative and participatory institutions like river basin organizations, micro-basin committees and groundwater committees. Lastly, IWRM seeks to address transboundary issues through international cooperation and development assistance; and to integrate into its discourse the subsidiarity, precautionary and user and polluter pays principles as supporting policy principles (session F2.51 *"Institutional Development for IWRM"*).

Emphasizing the goals: IWRM is a vehicle for social equity and cohesion, democratization, national unity, peacekeeping and sustainable development

The IWRM discourse at the Forum deployed by most of its proponent organizations renewed an ambitious range of normative political and technical goals such as social equity, social cohesion, democratic practice, national unity, peace keeping and sustainable development. These goals are of great relevance for water policy making, development planning and international cooperation; and should be endorsed further by domestic and international institutions, especially considering the alarming trends in water stress scenarios and





the potential conflicts among riparian communities that may arise from this situation.

Socio-economic and political inequalities in societies usually result in asymmetries in decision making powers among stakeholders, which produces biases in water policy outputs and outcomes towards already powerful groups. Accordingly, IWRM plans should explicitly acknowledge the redistributive and egalitarian implications inherent in the allocation and use of water resources, so as to proceed to devise the institutions and means to pursue social equity through water resources management and development (session FT2.50 *"Local Governance for Multiple Water Uses: Experiences in Community Participation in Rural Areas of Central and South America"* and FT2.27 *"Resources Management in the Achievement of the Millennium Development Goals"*).

Furthermore, pervasive and persistent socio-economic and political inequalities can exclude disenfranchised and marginalized groups from sharing the benefits of using water for personal hygiene and health care, livelihood and economic development purposes; cancelling opportunities for the broader welfare of families and communities. This situation can lead to the production of fragmented and polarized societies. IWRM plans should acknowledge this socio-political risk and proceed to harness water resources and develop the necessary institutions so as to create cohesive societies, in which all stakeholders are involved in development efforts and where social relations between user groups are strengthened through a sense of solidarity and interdependence when confronting

water issues (session FT2.36 *"Participation of the Public and Solidarity in Basin Management"*).

Contemporary water politics reveal the existence of great societal and cultural diversity among user groups with very different understandings, interests, and perspectives about water issues; a situation that complicates the water policy process. Hence, IWRM plans should aim to acknowledge social disparities and political pluralism in order to proceed to establish the necessary water governance structures capable of dealing with decision making and conflict resolution in a democratic and egalitarian manner (session FT2.35 *"Implementing the 2002 Johannesburg Commitments – African Civil Society in IWRM"*). Because water resources are frequently transboundary resources, nation-states and sub-national governments frequently have to deal with transboundary issues that sometimes generate conflict between them. Finding ways to procure national unity and peace keeping by creating the means to engage in cooperative multi-level governance, inter-governmental and international cooperation is also central to IWRM approaches (session FT2.45 *"IWRM Issues in Federative Countries"* and FT2.05 *"Water Management in Transboundary Basins"*). Also putting sustainable development at the core of IWRM's objectives by coupling environmental protection, social and economic development considerations in water resources management urges, similarly, for the development of socio-political, financial and technological means to achieve this goal (session FT2.38 *"Ecosystem and Ecohydrology Approaches to Integrated Water Resources Management"*).

Ethiopia's Poverty Reduction

Ethiopia's poverty reduction strategy has designated water development as one of the major pre-requisites for success of all other development programs that can ensure food-self-sufficiency and livelihood security. In this regard, the country decided to embark on various water resources development interventions as the cornerstone to its Multi-sector Agriculture and Industrialization Program.

Simultaneously, in an effort to speed up the project implementation and empower communities, Ethiopia's new constitution significantly delegates authority to Regional Governments, which have their own president, parliaments and administration. Power is further delegated to *woreda* (districts) which prepare their development plans, with ample opportunity for conflicting programs. Tigre and Amhara are two of Ethiopia's regions where these conflicts are being addressed through a multi-stakeholder process.

For example, in the Tigre Region, water is increasingly scarce and upstream/downstream tensions have started to emerge. The Berki River catchment traverses two *woredas* of Kilite-Awalos and Atsi Wombeta. Kilite, which is upstream, has plans to increase from 10 to over 100 pump stations for increased food production. This situation has caused worries in the lower riparian community, whose existing irrigation schemes and planned developments to increase acreage cannot be sustained if the massive schemes upstream are implemented.

Several Federal and Regional Bureaus as well as international NGO's supporting agricultural development, environment conservation and social development have been caught up in the fray. The Amhara Region is challenged by water exhaustion and lack of conservation activities in the past, causing conflicts among various interest groups/stakeholders. Amhara is therefore adopting an approach to follow micro-catchments as basic units for development to be integrated. It has a plan to first test in a pilot-model micro-catchment for future scaling up to the regional level. The selected pilot project, the Mesena micro-catchment, is located in the Oromiya zone, Dawa-chefa Wereda.

From Local Action LA1762, by GWP Eastern Africa, Regional Water Bureaus, Ethiopia Country Water Partnership, Africa

There are no universal blueprints for IWRM, only road maps leading to different outcomes

It is important to stress that local water polities have faced and are facing some important challenges in actually achieving a successful and comprehensive implementation of IWRM. Assessments show that there is still a poor understanding of IWRM in too many countries. Evidence depicts heterogeneous results, as challenges imposed by contextual backgrounds (i.e. political-institutional, socio-economic, technological, cultural, and environmental situations) impose very different working conditions and exert strong path dependencies (session FT2.28 "*Lessons Learned on Facilitating IWRM Planning*" and FT2.51 "*Institutional Development for IWRM*"). In this sense, it seems important to consider that there are no universal blueprints or orthodox formulae for implementing IWRM. In reality, local water polities 'muddle through' in their endeavor to understand and apply IWRM principles; engage in supporting legal reform processes, institutional development and capacity-building processes. So frequently, the results are winding road maps that show different outcomes imbued with important trade-offs. For instance, in some cases there have been good achievements in terms of water resources

management objectives against some democratic and social development deficits. In other cases there have been great achievements in terms of multi-stakeholder participation but slow progress in terms of water efficiency and conservation.

In this sense, the implementation of IWRM calls for some 'dialectical thinking' aimed at the constant adaptation of theory in interaction with context. In order for IWRM to really be a source of policy innovation, political modernization, institutional development and positive socio-environmental change, instead of being excessively ambitious, policy makers should avoid 'wishful thinking' and proceed to design transition strategies and channel efforts to build enabling environments (GWP, 2006). The implementation of IWRM requires changes on many fronts, policy makers should be ready to act strategically and exercise pressure where it is needed, when it is needed. They should also be willing to confront trade-offs and exercise a strong and committed leadership (session FT2.28 "*Lessons Learned on Facilitating IWRM Planning*"). Faster and more positive progress may be achieved if policy makers secure commitment at the highest political level at the same time as ensuring broad-based support that reaches down to the grassroots. The idea of establishing an IWRM multi-stakeholder and multi-sectoral steering group is promising.

Regional Actions Towards Achieving the Water MDGs and IWRM Targets

Responding to the World Summit on Sustainable Development in Johannesburg in 2002 that called for the development of integrated water resources management and water efficiency plans in all countries by 2005, with support to developing countries; the United Nations Development Programme (UNDP) is conducting through its comprehensive program in water governance with the Arab Water Council and CEDARE, a review to constitute the mandatory first steps to further design, develop and implement such plans in North Africa.

Some countries have approved national water resources plans. Other countries have developed frameworks, which contain elements of policy, in the form of strategies or master plans. But most of these policies, plans or strategies are inadequate to satisfy all the requirements of IWRM plans. In general, North African countries are beginning to recognize the importance of an integrated approach to water management. Political will and commitment that are motivated with enough awareness and backed with sufficient capacity building are key elements that determine the capabilities of governments to formulate IWRM plans and to further implementation.

Countries are progressing in different phases and at varying speeds towards developing national strategic water plans. However, awareness of formulation, development, and implementation of IWRM plans as required by the WSSD target is lagging behind and in several cases totally lacking. After reviewing the status of documentation towards development of IWRM plans, a number of gaps have become obvious.

From Local Action LA0932, by Center for Environment and Development for the Arab Region and Europe, North AMCOW, Arab Water Council



Building a 'Cooperative Socio-political Governance' for IWRM is a shared responsibility between the State and Civil Society

Water governance refers to all the efforts undertaken by socio-political actors aimed at maintaining coordination, coherence, cohesion and collective action among them in their efforts to provide governability to any particular water polity and throughout the governing process. More recently, the water governance debate has impelled some new developments and transformations to the governing structures and processes in the water policy sector. This situation has been driven by a widespread recognition of the State's limitations in addressing complex and cross-cutting water policy problems. Accordingly, such problems may be better addressed by establishing new patterns of interaction between the State and society, moving to reconsider the need to shift from State-centric and hierarchical modes of water governance to more decentralized, society-centred, participatory, and co-operative modes. In this sense, water

governance is no longer to be considered the sole responsibility of the State, but a more generic socio-political activity and systemic capacity, taking place throughout various types of institutions (both formal and informal), hybrid authoritative structures, partnerships, collaborative regimes and policy networks. The development of these emerging modes of water governance has also impelled us to rethink the role of the State (i.e. with strengthened enabling, regulatory, facilitative and steering roles and capabilities) and civil society (i.e. with enhanced participatory, co-responsible, empowered roles and capabilities) in water policy making (session FT2.02 "Integrated Management and Governance: A Framework for Making Empowerment a Reality" and FT2.16 "Water Governance and River Basin Organizations").

The IWRM discourse is deeply influenced by the current developments in the water governance debate. At the Forum, most participants agreed that, in order for the implementation of IWRM to progress steadfastly, there is a need to develop new modes of water governance that can help to create a common vision, acknowledge the interdependency among water

users and riparian communities and build co-responsibility among stakeholders. Accordingly, the implementation of IWRM cannot be achieved by the State alone acting in a top-down fashion, but through the active participation of civil society, intergovernmental institutions, partnerships and capacity-building networks (session FT3.51 *“Empowerment and Democratization Multi-Stakeholder Panel”* and FT2.34 *“Bottom-up meets Top-Down: Learning Lessons from Latin America and Africa”*). Building new types of collaborative and partnership relationships between the State, civil society and

other non-State actors is perhaps one of the most important determining factors that influence the implementation of IWRM (session FT2.28). Governments need to encourage many and varied arrangements for socio-political interaction (i.e. self-regulation, co-regulation, cooperative regimes, etc.), taking care of building into them effectiveness criteria, making them accountable, representative, democratic and egalitarian. The need to address gender issues and proceed to create a gender sensitive IWRM is paramount in devising such governance arrangements.

Decentralized Water Resources Management

Water resources management has traditionally been approached in a centralized, hierarchical manner. Many constitutions, legal frameworks, policies and strategies still recognize IWRM in this way. However, with increasing water scarcity and competition among different water users, it has recently been suggested that IWRM needs to combine both a top-down with a bottom-up approach. This involves a combination of actions and responsibilities at the central level and others at the local level. Decentralization of some IWRM responsibilities to the local governments is therefore imperative. But in order for such decentralized management to be effective local communities need to be empowered and educated on IWRM.

The setting up of local committees helps in raising awareness in the local areas of the roles and responsibilities of different stakeholders in water resources management, thus developing ownership for IWRM. The committees were then made responsible for the compensation to the local population due to the installation of power lines linked to hydropower infrastructure. Since then, as the institutions have gradually become stronger, they have been involved in the preparation of local IWRM plans and the implementation of programs. With further strengthening and capacity building, their responsibilities will grow with the long-term goal of transitioning to relatively self-sufficient organizations.

From Local Action LA1569, by World Bank, The governments of Senegal, Mali, Mauritania and Guinea, OMVS

Deliberative Multi-stakeholder Institutions for IWRM are promising spaces for an empowered and democratic water politics

Multi-stakeholder deliberative institutions like river basin and sub-basin committees, participatory groundwater management institutions and water advisory boards are promising political spaces for an empowered and democratic water politics. This is because they intend to be arenas for an open and inclusive public deliberation, advice formulation and decision-making on water resources management and development issues that are of public interest and common concern for relevant stakeholders. Deliberative institutions matter because they have been seen to help gather information from different stakeholders on complex policy problems, therefore building a better understanding of local water situations. They are also aimed at giving voice, recognition and representation to stakeholders, thus contributing to achieving greater consensus

and legitimacy over policy decisions, facilitating the exercise of political authority and enforcement (sessions FT2.16 and FT2.34 *“Bottom-Up Meets Top-Down: Learning Lessons from Latin America and Africa”*).

Evidence shows that it is important for water governance systems to be clear on the role that deliberative institutions are to play for the polity, with a clear definition of roles and responsibilities (i.e. executive, regulatory, administrative or advisory, for example) and resources endowments (including political, financial, technical and technological capabilities). Deliberative institutions should have a budget commensurate with their role and responsibilities. Examples show that the right mix in the budgeting sources is also relevant; when budget allocation comes from all stakeholders, including central and local government, local organizations and other external agencies, all stakeholders have been seen to have strong incentives to participate and make the institution functional.

It is also important to recognize that deliberative institutions are frequently captured by local political and social elites. Therefore, their institutional design should directly address pervasive socio-economic and political inequalities and should include explicit goals of social equity and democratization. Also it is important to acknowledge that the presence of deliberative institutions is not enough, it is necessary to think also 'outside the water box', and proceed to draw on other social development programs (i.e. poverty reduction strategies, land reform policies, right to information policies, participatory budgeting, etc.) to help address poverty alleviation and socio-economic inequalities among stakeholders (session FT2.02 "*Integrated Management and Governance: A Framework for Making Empowerment a Reality*").

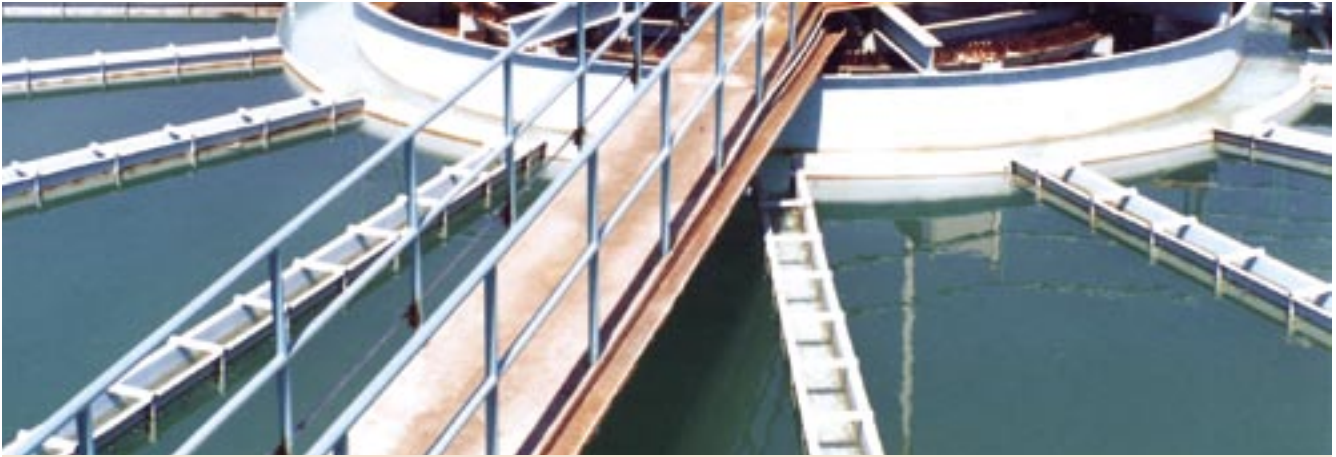
Deliberative institutions are also susceptible to policy stalemate and non-decisions, especially when the mix of stakeholders is very heterogeneous. Therefore, they should have in place robust consensus-building and conflict resolution mechanisms, accepted and endorsed by all relevant stakeholders (session FT2.03 "*Strengthening Institutions and Stakeholder Capacity for IWRM Implementation at the Local Level*"). Deliberative institutions should really aim at the inclusive and democratic political representation of all relevant stakeholders. This is frequently done through different types of election procedures such as consensus-based appointments and democratic voting. This is important because an accurate, inclusive and democratic political representation directly contributes in building political legitimacy for the institution and its policy decisions, thus facilitating enforcement.

Fully-fledge institutionalization of inter-agency cooperation is a way out from isolation to policy integration

Getting various agencies to work together is perhaps one of the most pervasive problems in the public sector; this is due to the development of the 'bureaucratic phenomenon' as a system for public administration. Government bureaucracies are frequently expert organizations with a clearly defined, specialized and fragmented division of labor, a predetermined budget allocation and fixed 'turfs' that are zealously guarded. Water ministries are typical examples of this. These types of organizations are most needed for governing, but have drawbacks, especially when confronted with complex, intractable and cross-cutting policy problems like the implementation of IWRM. The implementation of IWRM calls for mainstreaming water resources management and development considerations in other policy sectors and *vice versa*. This situation requires inter-agency cooperation aimed at integrating and harmonizing policy objectives and at increasing problem-definition and problem-solving capacities through synergies.

Inter-agency cooperation for IWRM requires the normalization of inter-agency cooperation functions through the establishment of an institution or body with the specific task of collaborating in the pursuit of IWRM goals and with the commensurate political, financial, human and technical resources for achieving its objectives. Because water is a cross-cutting policy issue it represents an excellent opportunity for establishing precisely an *ad hoc* institution or body for





The Mexican Committee for Sustainable Water Resources Management

Mexico is a mega-biodiverse country. Unfortunately, the development path followed in the last decades has had a strong impact on natural resources, damaging the ecology and also having important social and economic repercussions. The participation of all policy sectors and organized civil society is needed to address these grave challenges. This is why it is indispensable to take measures to foster multi-stakeholder participation and inter-agency cooperation for IWRM.

In this context, the National Water Commission decided to set up a formal institutional arrangement for inter-agency cooperation, the Mexican Committee for Sustainable Water Resources Management. This body is comprised of some 25 institutions and organizations, including ministries and other government institutions, academia, and civil society organizations. Its mandate is to mainstream water as a cross-cutting perspective across the public sector in Mexico. Its main objectives and workplan are the institutionalization of inter-agency cooperation, the creation of synergies among partners, and the pooling of political, financial, human and technical resources in the pursuit of a more a sustainable water resources management, and under the concept of river basin management.

The setting up of the committee required intense political work and networking, in order to build consensus on its functions, role, responsibility, capacity and endowments. Many difficulties arose, such as trying to bring all parties together, creating a shared vision and establishing day-to-day operating conditions.

The objectives, activities, means and ends of the committee are of national scope. This situation conveys the committee with a visible political profile and leverage that is gradually helping to further its institutionalization process and performance.

From Local Action LA1630, by the National Water Commission, Mexico

inter-agency cooperation as an initiative originating from the water policy sector. This opportunity should be seized by water policy makers. It is important to acknowledge that inter-agency cooperation for IWRM works through consensus-building, negotiation and compromise and so inter-agency cooperation officers should therefore be skilled politicians, leaving middle managers to sort out the day-to-day technical implementation.

Inter-agency cooperation for IWRM requires the strongest political support from the presidential or prime ministry's offices, as well as from other relevant ministries, like the treasuries, ministries of the environment, economic and social development. Evidence also shows that there needs to

be support from middle managers as well, because they are usually the ones involved in the day-to-day implementation. Another very important aspect to highlight is that IWRM strategies should have specific monitoring and evaluation mechanisms for measuring inter-agency cooperative performance. Lastly, local water polities should acknowledge that inter-agency cooperation requires a shift in the political culture and, at best, is an uneven and gradual process. Efforts for inter-agency cooperation have a greater chance of success if they are institutionalized in order not to depend on political cycles and contingent individual leadership (session FT2.53 "*Strengthening Crosscutting Schemes Toward the Integrated Management of Rivers and Coasts*").

Groundwater Resources Management should be coupled with IWRM processes. Local water polities should make efforts to gradually establish this relationship explicitly in IWRM plans and throughout the policy process

In many regions of the world, groundwater is a critical source of drinking water, a main source for water supply and sanitation for many urban settlements and industrial regions, a source for irrigation, and support of ecosystem functions. The viability of many urban and rural communities depends upon groundwater, especially in arid and semi-arid areas and in general during droughts. Over-abstraction and pollution of groundwater resources is rampant in many countries of the world. Technical and institutional difficulties related to the monitoring of groundwater resources and the enforcement of abstraction rights only complicate matters. Therefore, the general agreement derived from discussions at the Forum is that water polities need to recognize the critical functions that groundwater resources play for economic development, sustainable livelihoods, environmental protection and risk management, so as to develop the governance systems to conserve them and make sustainable use of them (session FT2.26 *"Groundwater for Life and Livelihoods: A Framework for Action"*).

Because groundwater resources are interdependent with what happens in terms of surface-water resources, forest and land-use management and, generally speaking, with human activities, advocates of IWRM consider groundwater resources management part of IWRM's policy reach. A number of factors (i.e. monitoring difficulties, enforcement challenges

and generally speaking the tragedy of the common types of problems, etc.) complicate the governance of groundwater resources. Accordingly, global monitoring efforts should attempt to develop a worldwide mapping of vulnerable areas and hot spots in order to help regions, countries and localities to assess situations and develop management strategies. Coordinated and concerted action of the international water community is needed to convince governments about the need to develop and maintain groundwater information systems. In the case of transboundary aquifers, riparian countries should establish mechanisms for joint monitoring and data sharing. Riparian countries should also seek to establish 'deliberative institutions' for joint decision-making and implementation (session FT2.33 *"Advancing Local Actions in Basins, Sub-Basins and Aquifers Through comprehensive IWRM Learning and Global Networks"*).

Water polities should also develop a comprehensive understanding of the impacts of groundwater rights, regulations and policy-making in order to improve management practices. The scientific community should continue efforts in developing recharge, pollution control, saline intrusion control and remediation techniques. Technological innovation should be oriented at cost effective solutions. The governance of groundwater resources requires the implementation of a number of governance instruments that frequently complement each other, such as legal frameworks, market instruments and voluntary and consensus-based agreements. The need to build robust cooperative socio-political governance for groundwater resources is also warranted, and should be part of domestic and international IWRM implementation efforts.



Water Supply and Sanitation for All

Main Issues and Recent Tendencies

In the 1990's, access to safe water experienced a substantial increase, nevertheless, nowadays, 1,100 million people still lack access to safe drinking water and 2,400 million people still lack basic sanitation.

The world population has multiplied by seven within the past two centuries, generating unprecedented human and industrial pressures on water resources and the environment. Under such conditions, the availability of clean freshwater and sanitation are among the most important issues facing humanity today - and will be increasingly critical for the future, as growing demand outstrips supplies and pollution continues to contaminate rivers, lakes and streams. In September 2000, world leaders pledged at the United Nations Millennium Summit to cut in half by 2015 the proportion of people unable to reach safe and clean drinking water, and at the 2002 World Summit on Sustainable Development in Johannesburg, a matching target was agreed to halve the proportion of people lacking adequate sanitation, also by 2015. In addition, sound water resources management and development are key to achieving all of the Millennium Development Goals.

To help the international community reach the MDGs, the UN Millennium Project was implemented, with ten Task Forces. One of them, dedicated to water and sanitation, produced a report "*Health, Dignity, and Development: What will it take?*", in which ten critical actions were identified for achieving Target 10 of MDG7 and fostering the sound management of water resources for all the goals.

Facts and Figures on Water Supply and Sanitation

Most of the population lacking access to secure water and basic sanitation are located in Asia (725 million and 1,920 million people respectively¹). Asia shows the highest number of people unserved by either water supply or sanitation; yet it is important to note that proportionally, this group is bigger in Africa because of the difference of population size between the two continents.

In **Africa**, it is estimated that at least 297 million individuals lack access to safe water and 313 million people lack access to basic sanitation.

In the **Americas**, the overall average percentage of coverage for water supply and sanitation, which exceeds those for Africa and Asia, hides the challenge over ensuring supply to marginal populations. Indeed, more than 100 million urban dwellers still remain without those services and an estimated 120 million additional people require access to safe water supplies.

Only 49% of the rural population across **Latin America** and the **Caribbean** are connected to conventional sewage systems. To achieve Target 10 of MDG7, a further 83 million people in the **Arab Region** need to be supplied with safe water and an extra 96 million with sanitation services by 2015.

Even in **Europe**, an estimated 41 million people do not have access to safe drinking water and 85 million people lack access to basic sanitation².

Target 10 of MDG7 is to "Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation". To achieve this target, a yearly fund of 12 billion dollars (as opposed to 3.5 billion actually) is needed in the sector, according to the French Partnership on Water.

Despite progress made in solving the world water crisis and towards the MDGs, **sanitation** remains the biggest challenge, which needs greater attention by the international community.

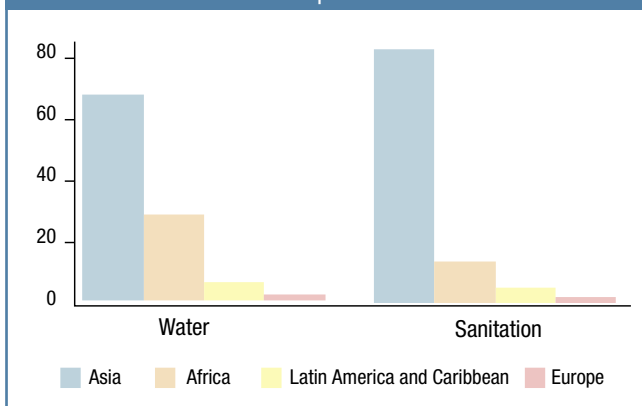
The gap in water use between rich and poor countries is stark: developed nations use an average of 400-500 liters a day per person for all purposes, whereas in developing countries the volume is just 20 liters. Globally, the withdrawal of water supplies is projected to increase by at least 50% by 2025³.

Many efforts were made and progress realized, mainly in terms of water supply (in urban areas, the water coverage is 94%, and 71% in rural areas). Providing water and sanitation services in urban areas will be a particular challenge, because the population in the cities will continue to grow, especially in developing countries. In rural areas, scattered populations make providing services very difficult and costly. There is still a tremendous challenge in rural areas as well, especially considering that few projects will be financially feasible.

The world is however not on track for achieving the sanitation goal in each of its three aspects: hygiene promotion, household sanitary arrangements, and sewage treatment⁴. The world's sanitation coverage is 86% in urban areas, but only 38% in rural settlements. In addition, half of the population in the developing world, particularly in Africa, lacks basic sanitation. On one hand, due to technological developments, human dispersion and high costs, the fulfillment of the MDG on sanitation still remains more difficult in rural areas.

Thus, the provision of safe water and sanitation remains an unsolved challenge. This situation results in the death of thousands of lives per day due to preventable water borne diseases and causes suffering to millions due to illness, prevents progress towards gender equity, and impedes economic development. Between 1,085,000 and 2,187,000 deaths due to diarrhoeal diseases can be attributed to the

Illustration 4.1 Location of Population Without Water Services



¹ First UN World Water Assessment Report. 2003

² Regional documents

³ *Health, Dignity, and Development: What will it take?* UN Millennium Project Task Force on Water and Sanitation, Final Report, 2005

⁴ *Compendium of Actions of the United Nations Secretary General's Advisory Board on Water and Sanitation*, 2006

'water, sanitation and hygiene' risk factor, 90% of them among children under five.

The current rate of progress is not sufficient and radical change is necessary. In order to stimulate the debate and orient the reflection aiming to triggering this change, the fulfillment of Target 10 of MDG7 was the main concern of theme 3 ("Water Supply and Sanitation for All") of the 4th World Water Forum. The "*Compendium of Actions*" of the UN Secretary General's Advisory Board on Water and Sanitation, published during the Forum, fits in this sense, and provides actions to improve the current situation. These actions reinforce the ten recommended in the Final Report of the UN Millennium Project. Moreover, in the *Compendium of Actions*, specific targets and indicators were identified, and stakeholder responsibilities clearly defined for each action.

Main Messages, Lessons Learnt, and Key Recommendations

Strengthening local authorities is needed for local water governance

Reaching Target 10 of the MDGs depends strongly on the governments' capacity to overcome their financial, institutional and governance challenges. Consequently, it is necessary that governments give greater priority to the water crisis in their agendas. Innovation, financial mechanisms, dissemination of information and awareness raising, capacity building and institutional responsibilities are also needed if this challenge is to be overcome (session FT1.04 "*Linking Poverty Reduction and Water Management - Reaching the MDGs through Investing in Water*").

Additionally, there is a need for commitment of national, state and local authorities to promote transparency and public control on water services management, and to formulate gender-sensitive strategies and policies that cut across water, social, health, and education Ministries.

To ensure good local water management, it is indispensable to:

- Implement a monitoring system, which is an instrument for planning, development and corrective action, and to promote the use of performance indicators and the benchmarking approach to evaluate services; and
- Provide technical assistance and capacity building to local authorities and communities regarding planning, water utilities management, low-cost appropriate and environment-friendly technologies, so they may increase their overall performance.

The improvement of local water governance should also be made through regulation, empowerment, decentralization, defining and securing water rights, and enhancing institutional capacities that bring decision-making within the reach of the poor.

Sanitation: A key issue for achieving MDGs and for human dignity

The world community will not sustainably or equitably reach Target 10 of MDG7 without paying reinforced attention to the global challenge of sanitation. For many countries there is little prospect of reaching the sanitation target without major changes in their approach and allocation of resources.

Rethinking sanitation in terms of understanding the motivations and constraints of households and the delivery and marketing of sanitation as consumer products and services that households must want and pay for, is an important paradigm shift for changing the way business has been done in sanitation.

In this context, governments and other stakeholders must move the sanitation crisis to the top of the agenda⁵.

⁵ *Health, Dignity, and Development: What will it take?* UN Millennium Project Task Force on Water and Sanitation, Final Report, 2005



Acting for sanitation is a big challenge in terms of improving health conditions of households and protection of natural resources as well as poverty reduction. To realize this challenge, more awareness and capacity are needed. While advocacy is key at the global level, regional and sub-regional organizations should undertake concerted campaigns to support the provision of financing, marketing, technology and organizational assistance and guidance.

Efforts to reach the sanitation target must focus on sustainable service delivery, rather than construction of facilities alone. In this sense, institutional, financial, and technological innovation must be promoted.

Eco-sanitation: An innovative approach to be supported

Water and waste management must be linked to wider processes of poverty reduction and sustainable development at the national and local levels. This is one of the main principles of the eco-sanitation approach.

Despite legal constraints and some cultural non-acceptance, new technologies of eco-sanitation have been successfully implemented by many organizations such as WASTE (The Netherlands), GTZ-ecosan (Germany), EcoSanRes (Sweden), Sarar Transformación (Mexico) and CREPA (Africa). Several sessions at the Forum on this topic showed that, for further development and large dissemination, it is necessary to provide technical assistance to local authorities and communities regarding low-cost, appropriate and environment-friendly technologies. Reducing pollution at the source and decentralized treatment should be privileged in all suitable

cases. These sessions also showed that the eco-sanitation approach provides sustainable solutions, with regard to user demand, and environmental and social contexts (rural, urban, poor and rich areas).

Additionally, a suitable combination of sound operation, maintenance and management is essential for the sustainable use of water supply and sanitation facilities, which would not work well otherwise and, consequently, would cause the waste of investments even if they are properly designed. This is why high attention must be paid to the operation and maintenance of water supply and sanitation facilities and involving the right stakeholders.

Women and children should be considered as key actors in capacity building programs

Community mobilization requires the development of specific communication (advocacy and awareness) programs to improve the public perception of the benefits of treating pollution, to focus on 'triggering' behavior change for collective action, and not simply for individuals. In this context, facilities or, better yet, services must respond to preferences, beliefs and practices; supporting a broad range of technological choices allows communities to install the water supply and sanitation infrastructure they want, and ensures the sustainability of operation and maintenance processes due to the total commitment of the communities.

Session FT3.12 *"Safe, Accessible, Private and Nearby: Making Services Work for Women - The Key to Meeting the MDG Water and Sanitation Target"*, pointed out that equitable

ACTS Ecosan Pilot Project in Bangalore, India

Before 2001 the majority of households in Rajendra Nagar Slum, did not have their own toilets and residents had access to only one functioning communal toilet. Open defecating was a common option. Sexual harassment had been an associated problem as women were forced to defecate in open field before dawn or after dusk. Soon a large housing complex came up in the open area used for defecation and women were put into a difficult situation for toilet use. In 2001, the local NGO ACTS established an eco-friendly public toilet center (source separation of urine, faeces and wash-water) and a co-composting site for faecal matter at ACTS Rayasandra Campus. Not just wanting to provide toilets, ACTS being an educational NGO, identified this as an ideal situation for experimenting with a scientifically based eco-toilet. Urine and faecal matter were separately collected in 120-litre plastic drums. Once a day the full drums were picked up and conveyed to the ACTS Rayasandra Campus where faecal matter was co-composted with waste paper from nearby IT companies and biodegradable waste in composting trenches, and urine was applied to a banana plantation after storage. Wash-water produced at the toilet center was drained to an infiltration bed in front of the toilet block. Water that did not trickle away was collected in a subsurface collection tank, which was emptied when full.

From Local Action LA1263, by ACTS, India

Closed Loop Sanitation in Syria: Pilot Implementation of a Constructed Wetland

The pilot plant serves the village of Haran Al-Awamiid, in the Governorate of Rif Damascus, Syria. The village is located 40 km. south east of Damascus. It has a semiarid climate, with 185 mm. rainfall per year, falling within a four month period. This place fulfilled all the criteria such as disposal channels, wastewater quantity and enough room for building and expanding the project. Before the installation of the constructed wetland, wastewater was collected by a network of gravity sewers and used untreated for irrigation. The concerns of local authorities about introducing a new technology represented an initial difficulty, as did protests from local farmers who believed they would be deprived of the untreated wastewater for irrigation. The treated water is collected in a tank and pumped to irrigate the agriculture near the plant. Thus the effluent from the wetlands is still used by the farmers. To avoid salinisation of the soil the use of mineral fertilizers is strictly controlled. The farmers were instructed to use fresh water and treated wastewater alternately for irrigation.

From Local Action LA0648 by Abir Mohamed, Damascus, Syria - Ministry of Housing and Utilities

access to water and sanitation is vital to women, as in most cultures they are primarily responsible for the provision, use and management of water and sanitation fixtures and spaces and health care in the household. Over the years, women have accumulated an impressive store of environmental wisdom, being the ones in charge of finding water, educating children in hygiene matters and understanding the impact of poor sanitation on health. However women's voices are often unheard, and they end up with no choice about the type and location of services they receive. Thus, fixtures, appliances, dedicated water use spaces and water delivery services are often unavailable or inappropriate to meet their needs. It is an impediment to girls' education, especially in schools where no provisions are made for them (session FT3.08 "*Scaling up Water, Sanitation and Hygiene Education for Schools*"). Having access to sanitation at school improves health and enables girls to attend school.

It is critically important to improve access to water and sanitation in schools, accompanied by hygiene education in school curricula. Cultural contexts must be considered, in particular for sanitation projects, since girls and boys must have separate and adequate facilities in schools, especially to enable adolescent girls to continue to attend school. Education programs can also be promoted by channeling efforts through women's organizations.

While it is necessary to encourage equal participation among men and women, targeting women for training and capacity building is therefore critical to the sustainability of water and sanitation initiatives, particularly in technical and managerial roles aimed at planning, designing and operating water delivery services.

Children have to be involved as **agents of change and not just beneficiaries**. Targeting children benefits schools, families

and communities and they can actively participate in social change movements. Water, Sanitation and Hygiene (WASH) clubs and education in schools should be supported since they have a multiplying effect on families and communities.

Research and development of suitable (new) technological alternatives

Over the last few years, many interdisciplinary research teams have developed a variety of innovative integrated water and wastewater management approaches, based on participatory processes, which have demonstrated considerable potential towards addressing local as well as global challenges in water resources and sanitation management. Moreover, these research activities have developed a large set of innovative environmental technologies in various fields of use. Their application in real case studies has demonstrated that, under suitable framework conditions, successful diffusion of knowledge and innovation could take place with significant improvements in current practices. It is crucial to promote a new generation of public private collaborative research on water technologies, based on the common view of their necessity for achieving future growth, competitiveness and sustainability. There is also a need to carefully assess and disseminate the wealth of knowledge generated by research projects through education, demonstration and links to innovation and knowledge management platforms.

In arid and semiarid countries, developing new water sources will be increasingly difficult and costly. During the Forum, desalination was presented as one realistic alternative. The International Desalination Association noted that there are 17,000 desalination facilities worldwide, with a capacity of 37.75 million cubic meters.



Civil society should play a key role in water governance and in achieving the MDGs, and their action must be supported

Good practices need to be scaled up and successful examples should be replicated. In this context, civil society (Non-Governmental Organizations [NGOs], Community Based Organizations [CBOs], etc.) has to be involved at all levels of decision making, from planning to implementation and evaluation (session FT3.10 *"Voicing People's Interests- Civil Society Innovating Change in Water and Sanitation Policy"*). NGOs and CBOs have many successful examples to share that will demonstrate the value of an organized and informed local civil society. The collaboration between NGOs, CBOs and government therefore has to be effective; both need to share common goals. On this subject, governments and civil society must focus their efforts on the implementation of technologies and services, which should be technically, socially, environmentally, and financially appropriate.



Progress towards the water and sanitation targets and improved water governance requires community mobilization and involvement in policy-making and advocacy as well as implementation where organized NGOs, CBOs and networks, can perform a great role. Their action has to be reinforced because a strong and continued Government-NGO-Community partnership is a way to attain continued success.

One of the most optimistic results demonstrated at the Forum is the worldwide successful experience and growing importance of the communities as providers of their own water services (for instance, the case of southwestern Bangladesh, presented in session FT3.09 *"Asian Civil Society Innovating Change"*). CBOs must be empowered and supported by appropriate financing resources (the case of Local Action LA0115, Winner of the Kyoto World Water Grand Prize).

Financing is one of the key issues for accomplishment of Target 10 of the MDGs

On the subject of achieving the MDG targets for water and sanitation, many sessions addressed the financial aspects, and launched a series of orientations for action mainly focused on increasing national and international financial support, with a particular emphasis on the sanitation sector. Nevertheless, the global economy has never dedicated more than 0.3% of world GDP to the whole sanitation sector. Innovation in the financing of the water sector is essential if the potential of water and sanitation in poverty reduction is to be realized. This includes both increased financial flows from the international community and, more importantly, actions to enhance levels of internal capital generation in

Total Sanitation: A Community Stake

The NGO Forum for Drinking Water Supply & Sanitation is the apex networking and service delivery agency of 665 NGOs & CBOs, and 640 private sector actors who implement water and sanitation programs to disadvantaged communities in collaboration with civil society. NGO Forum initiated the Total Sanitation Campaign to advance the 2015 sanitation target in Bangladesh. It is a locally implemented initiative that conducts community awareness building activities and provides appropriate low cost infrastructure support elements to meet the increased demand for sanitation facilities. By December 2005, they had covered 2,550 villages with 100% sanitation facilities and 56 unions. There is high coverage of hygiene practices in the covered communities and civil society and local government representatives monitor the progress.

The NGO Forum has built alliances with Government and conducted lobbying, which has resulted in political commitment towards Total Sanitation and the Government of Bangladesh now has a national sanitation strategy 2005 and is on the way to achieving the national goal "100% Sanitation for All" by 2010.

From Local Action LA0965, by NGO Forum for Drinking Water Supply & Sanitation, Bangladesh

developing countries, including the private sector and the communities.

The participation of the private sector was a controversial issue during the Forum, but the consensus was that the decision and manner of private participation depends only on the local actors. A pre-requisite for that is that they are well and timely informed, there is a sound legal basis for quality and quantity of services and communities are supported to get readable and fair contracts. Several public-private partnership models are available and could be used as an important financial source.

Focused investment is needed in the sector so that scaling up with quality can take place. The knowledge and experience exist and adjustments can be made along the way.

Sub-sovereign financing arrangements need to be implemented to ensure optimal allocation of funds to local actions with potential to be scaled up and replicated. This can facilitate the establishment of funding mechanisms for local governments and organizations to prepare credit projects, as well as the implementation of a stable and effective regulatory system, including the creation of local financiers to encourage investments by small local private sector enterprises.

At the same time, favorable macroeconomic and fiscal environments, institutional strengthening and legal reforms, ensuring stable regulations, are needed to improve the performance and affordability of the water utilities, local governments and institutions. Decentralization and empowerment of local initiatives are of special importance. The governments and utilities must also ensure that users who can pay do so in order to fund the maintenance and expansion of services, taking into account the needs of the poor households, which are to be met.

International support is critically needed

The water-related MDGs remain a major task that requires the development of international initiatives and solidarity actions. In this context, Official Development Assistance facilities and national programs specifically dedicated to financing water and sanitation infrastructures and services should be developed. This means that concerted efforts should be made by national governments, and supported as necessary by the UN and donors to monitor the delivery of services in the sector. The UN agencies and their Member

Rural Water Supply and Sanitation Initiative (RWSSI)

This is a major regional initiative on RWSS to meet the MDG targets. In response to the Africa Water Vision and the MDGs, the African Development Bank Group conceived the Rural Water Supply and Sanitation Initiative (RWSSI) in 2002 and officially launched it in July 2004 at the first AfDB Water Week, with a view to accelerating access to water supply and sanitation services in rural Africa where the majority of Africa's populations live under conditions of extreme poverty. The objective of the Initiative is to ensure that 80% of rural populations in Africa have access to water supply and sanitation by 2015. It is estimated that USD \$14.2 billion (or USD \$1.3 billion per annum) are required to achieve the rural water supply and sanitation MDGs in Africa.

RWSSI has already made significant achievements in terms of recognition, commitments received by both African and donor States, and programs launched and planned. The anticipated impact of RWSSI will include the following:

- Per capita water consumption figures will improve from less than 10 l/c/d to about 20 l/c/d;
- Distances to water points will be reduced to less than 0.5 km and water collection times to about 1/2 an hour;
- The number of people per water point will be reduced to between 250 and 300;
- The number of broken down water points will be reduced by half (from about 30% to 15%);
- Improve the health situation in rural areas of RMCs, reduce the incidence of water related diseases, and the associated mortality and morbidity;
- Build capacity of central and local government institutions as well as communities as a contribution to enhancing the decentralization process;
- Improve poor school attendance and high school drop out rates for girls; and
- Improve the quality of life by decreasing healthcare costs and increasing the availability of more disposable income as well as creating employment opportunities through water service providers.

From Local Action LA0655, by the African Development Bank (AfDB)

States must ensure the provision of a strong and effective support for the achievement of Target 10, and for water resources management and development.

The importance of donor support for local actions has been verified during the Forum. Some examples are the experiences of USAID in Indonesia and in Bangalore, India; SPFA Aquasistance in Armenia, WaterAid in several countries, or Syndicat d'Ile

de France in Laos. The total amount of Official Development Assistance (ODA) has risen from 2.6 to 3.4 billion dollars from 1990 to 2002. However, ODA for large water infrastructure halved from \$3 billion US dollars in 1991 to \$1.5 millions US dollars in 2002. ODA is awarded mainly to 20 countries, most of them in the Middle East⁶. ODA must be increased and distributed more equitably among developing countries.



Initiatives Announced at the Forum

To designate the year 2008 as "International Year of Sanitation"⁷

WSPortal – Health Through Water. As part of the partnership to health through water, WSPortal aims to contribute to improving and maintaining the safety of piped drinking water supplies through the effective implementation of WSPs. This is achieved through collecting and disseminating case studies, reference and tools, which provide practical guidance and evidence-based material of relevance that can be applied appropriately for a range of circumstances.

UNICEF/WSSCC "WASH Partnership": New bid to accelerate efforts in meeting Millenium Development Goals for water and sanitation by 2015.

Smart Sanitation Solutions, a publication of the Netherlands Water Partnership describing approved household and community based sanitation solutions. This publication is in the context of the commitment of the Netherlands government to provide at least 50 million people with access to water and sanitation services by 2015.

Interactive Global database on EcoSan by EcoSan Res and its partners. This program aims to monitor implemented EcoSan projects around the world, and to assess the contribution of the EcoSan approach to reaching the MDG Target on sanitation by 2015.

Reminder by French President Jacques Chirac in his declaration of the **commitment of the French government to double its public aid in order to reach 9 million of people in Africa by 2015.**

An **urgent appeal** launched by Nelly Olin, French Minister of Ecology and Sustainable Development, and others ministers for **improved water and sanitation facilities at schools, taking into account girl's needs**, and for increased integration of water sanitation and hygiene in school programs.

Proposal for the creation of **Task Force on Sanitation** for the World Water Forum (at the World Water Council).

⁶ Clermont F. *Official Development Assistance for Water*, World Water Council, 2006

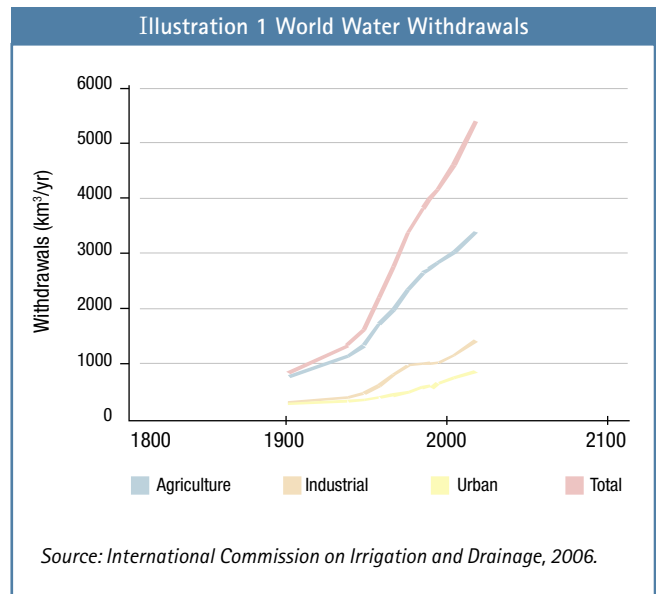
⁷ *Compendium of Actions* of the United Nations Secretary General's Advisory Board on Water and Sanitation, 2006



Water for Food and the Environment

Main Issues and Recent Tendencies

Demand on water for all uses is increasing, especially for agriculture production and environment requirements, and this trend is expected to continue in the foreseeable future, as shown in Illustration 1.



Simply offsetting the increased water demands for one sector with decreases in the other is not an option, as this will inevitably lead sooner or later to either increased food-insecurity or environment degradation. Water, agriculture and environment are thus intrinsically interrelated, and as sectors they share a common challenge and responsibility.

Facts and Figures on Water for Food and the Environment

The total global land precipitation is 110,000 km³/yr; 70,000 km³/yr are evapotranspired by vegetation, the so-called "green water", to sustain climates, ecosystems and biodiversity, and 40,000 km³/yr, the so-called "blue water", is renewable water. Of the renewable water, 30,000 km³/yr flows as uncontrolled streamflows and only 14,000 km³/yr constitutes what might be called water resources: a stable source of freshwater supply.

Of the total global land precipitation, an average of 40% is used by forests, 36% reaches the ocean, 15% is used by rangelands, 7% is utilized by rain-fed agriculture, 0.9% is used directly by crops in irrigated lands and another 0.9% infiltrates in aquifers and is stored in reservoirs to be withdrawn later on for irrigation, 0.1% is evaporated in reservoirs and lakes, and 0.1% is extracted from rivers, lakes and aquifers for urban uses. Green water is 62.9% and blue water 37.1% of the total global land precipitation.

Source: UNESCO, 2006



The challenge on water for food and the environment is clearly framed: finding the necessary water and land to grow food for a growing population, creating jobs and ensuring the preservation of ecosystems while cities are expanding, diets are becoming more water intensive and energy is becoming more expensive. There is a need to better clarify the role of water in food and livelihood security in light of environmental degradation and persistent poverty so as to better understand where to invest in order to address both human and environmental needs.

This Forum was characterized by a constructive debate on the possibilities and impossibilities of optimizing the productivity of water, land and ecosystems in the context of production and security of food and improvement of livelihoods.

Financing Water for Agriculture

It is estimated that the annual cost of managing water resources to meet the MDG hunger goals is around US\$40-50 billion over the next ten years, rising to US\$65-70 billion thereafter. The investment for building major infrastructure will fall to governments and much of the operating and upgrading costs will be financed by private farmers, and by international financing institutions, commercial banks and capital markets that will condition their lending on supportive policies, reformed institutions, sound projects, and creditworthy borrowers.

Source: van Hofwegen, 2006

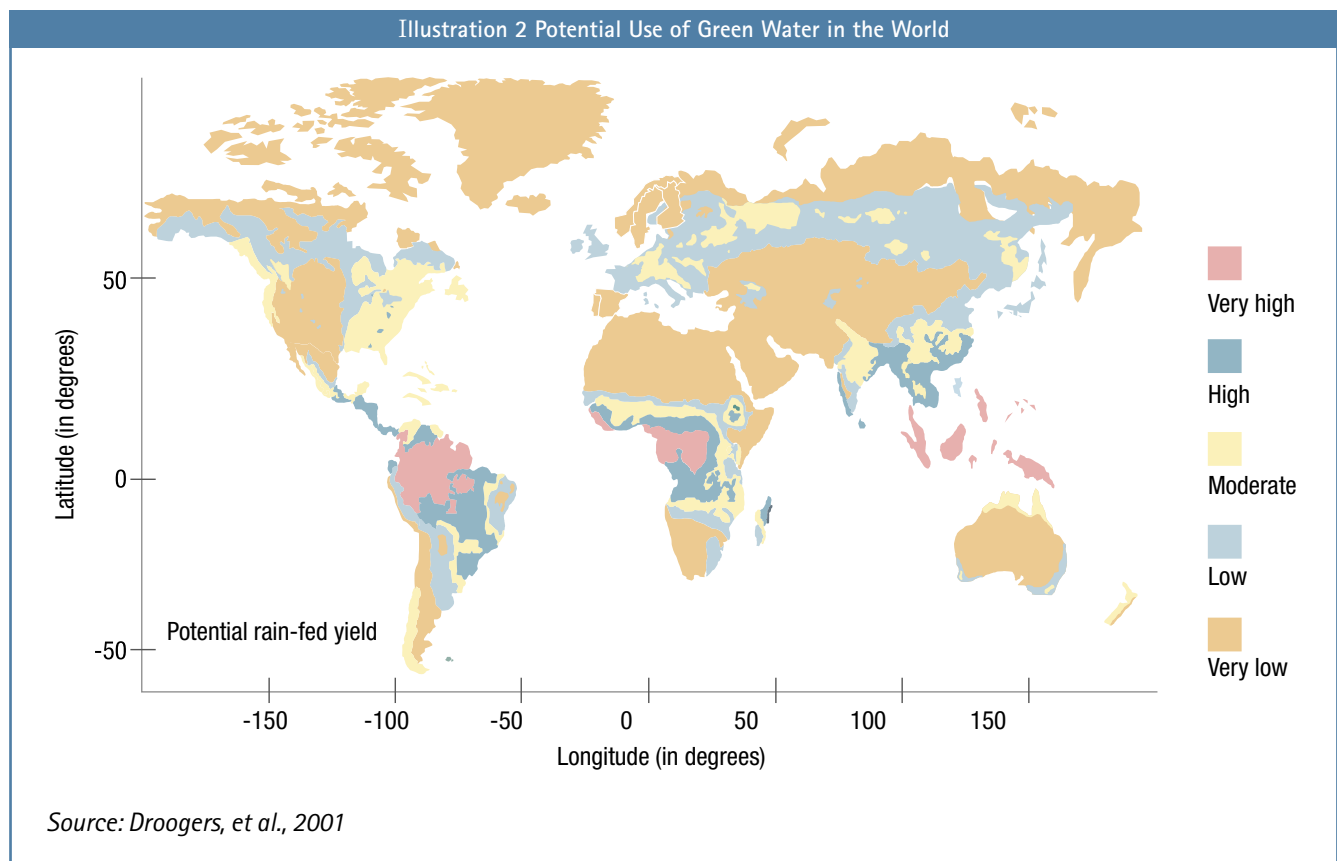
Main Messages, Lessons Learnt, and Key Recommendations

To primarily improve rural livelihoods, the productivity of rain-fed agriculture and supplemental irrigation should be enhanced

Access to water for food production is a proven ingredient to fight poverty. Of the world's poorest, 800 million live on tiny farms and subsist on rain-fed crops. Therefore, a tremendous potential for poverty reduction lies in upgrading rain-fed agriculture, and especially in improving water productivity in the semi-arid and arid tropics through

supplemental irrigation practices such as rainwater harvesting, since almost one third of the lands on earth are arid and semi arid areas.

Session FT4.41 "Green and Blue Water Resources for Improved Livelihoods – Utilizing the Rains for Intended Gains", pointed out that blue water is already overcommitted, due to the driving forces of demographic and socio-economic activities and the MDGs, and because of that it is necessary to make a better use of rain before it turns into green water. This action is effective in the semi-arid tropics, mainly the savannah zone, where there is great rainfall variability, a short growing season, dry spells, inter-annual droughts, and a thirsty atmosphere, as depicted in Illustration 2.



Upgrading rain-fed agriculture and improving supplemental irrigation are essentially local in nature, as highlighted in session FT4.37 "Assessing Livelihoods and Environmental Trade-Offs and Synergies for Water Management in Agriculture". Their further development requires an integration of the management of land and water resources together with ecosystems. With joint efforts of river basin institutions and community-based organizations, such locally adapted water management strategies can, besides supporting local food security and

poverty alleviation, also target environmental protection and sustenance. Conditions for widespread implementation need to be researched, analyzing possible social and cultural restrictions and the potential consequences for downstream blue water. Recommendations need to be developed for local authorities and governments to translate approaches into policy and governance structures, develop pilot and dissemination programs, allocate budgets, and develop and strengthen associated extension activities.

Sustainable Livelihoods and Green-Blue Water Management Through Conservation Agriculture in East Africa

Dry spells seriously affect rain-fed crop yields and have an impact on farmers risk perceptions. Statistically two dry spells occur per rainy season, causing serious yield loss. At the same time just under 10% of the rainfall is used productively, *i.e.*, large volume of water is unavailable to the farmer because it converts into runoff. Storage systems for supplemental irrigation were tested to bridge dry spells and upgrade the system. Normally ditch systems in semi-arid Africa are not used for gravity-fed irrigation of smallholder crops. Here, this was tested by locating small micro-dams in upstream locations where large productivity gains have been shown possible: crop yield increases in the order of 80% for maize, sorghum, upland rice and barley, around 100% for wheat, and more than 120% for sunflower.

From Local Action LA1746, by the Stockholm Environment Institute

As far as possible new and existing agriculture developments should be designed to coexist with ecosystems

A continued and increased commitment to investments and developments in agricultural and environmental water management is fundamental. This presents a straightforward commitment to a future in which agriculture and the environment coexist and complement each other in both their productive services and sustainable water use. The proposal is to combine an ecological approach to agriculture and a measurable approach to ecosystem services. Such an integrated and cross-sectoral approach that targets multiple purposes and services requires support and concerted efforts both in local actions from stakeholders and civil society, and from political stances reflected in national policies. Particular emphasis is required on the scientific understanding of environmental services because existing measurement methods are demanding in terms of data and expertise,

and have not provided uncontested results, so they must be enhanced optimizing the limits in data, expertise, time and knowledge.

As contributed in session FT4.12 *“Water for Food and Ecosystems. The Way Forward”*, there are four key elements that will help to effectively strengthening local actions in this direction: i) development of unambiguous and irrefutable means of measuring environmental services in order to establish integrated partnerships; ii) application of stakeholder oriented water valuing to assess and plan multiple uses and productive services in water for food and ecosystems; iii) application of market based mechanisms and incentives to foster and manage WFE programs based on the full values of agriculture and ecosystems products and services; and iv) ensuring water governance of both local implementation and policy making structures through an integrated and multiple services approach to water for food and ecosystems to reach harmonization across the sectors.



Assessing Livelihood and Environmental Trade-offs and Synergies for Water Management in Agriculture

The Secretary General of the Ramsar Convention on Wetlands, Peter Bridgewater, in his panel address stated that practicing agriculture enhances a range of ecosystem services, and that many of the important sites listed under Ramsar are the product of human intervention, often for agriculture, even though “agriculture has a reputation of using too much [blue] water”. The main message is that being part of a global partnership ensures access to water for food and ecosystems, or better yet, ecosystems for water and food.

From session FT4.37, by the Consultative Group on International Agricultural Research

Rural poverty may be diminished and environmental conservation enhanced through environmental service payment

The benefits attached to a free flowing river need to be measured before internalizing them in the design of new water infrastructure projects. Session FT4.38 "Environmental Flows, Ecosystems and Livelihoods: A challenge for IWRM" asked for increased efforts to improve the scientific

understanding of the interaction of water flows, ecosystems, and their functions and services. Because many rural poor highly depend on such ecosystems, these efforts should be seen as an action not only in environmental conservation but also in poverty alleviation, as advocated in session FT4.04 "Wetlands, Water and Livelihoods: Healthy Wetlands are Essential to Help Make Poverty History". Mechanisms need to be developed to enable a better reallocation of water to various purposes.

Implementation Project of the Charge and Payment System for Environmental Services in El Salvador

Environmental service payment is an economic instrument that complements the traditional mechanisms of command and control in order to promote the improvement in the watershed conditions and to contribute to its integrated management. Up to now this instrument has been experimented at local scales or dependent on governmental funds. This local action seeks to consolidate an independent and decentralized national institution, with self-financing resources and with specific goals: to promote the economical acknowledgement of the environmental services, through the creation of local or national markets, according to the type of environmental service.

From Local Action LA1338, by the Ministry of Environment and Natural Resources, El Salvador

The economic valuation of environmental services should be given more attention, as it could be valuable for the development of new legislation, to stipulate allocation and reallocation of water resources as well as cross-sectoral collaboration and approaches among water, agriculture and the environment. Such valuation is also necessary to show the benefits environmental services might bring for food security, poverty reduction and income redistribution for the poorest in our societies. Session FT4.10 "Water Accounting and Information Platforms" stressed that existing valuation methods are demanding in terms of data and expertise. This is why efforts have to be concentrated on the development of affordable and manageable approaches, yet sound and credible.

Payment for environmental services as pursued in Latin America, appears to be a viable mechanism to increase rural prosperity of specific communities and to ensure better sharing of water. Particularly important is the connection between upstream dwellers – who must be rewarded for maintaining water quality through pollution prevention, water availability through water conservation measures, and flood mitigation through enhanced retention capacity – and downstream users such as urban and industrial centers and farmers for enhanced water security in terms of water availability, controlled sediment transport, and flood mitigation.

The multiple uses of rural water services should serve to improve sectoral coordination and the willingness and ability to pay in villages

Single-use water services provision in poor rural areas fails to meet inhabitants' multiple water needs and leads to scheme damage, allocation problems, and scheme collapse. The majority of rural people depend upon multiple strategies for their livelihoods and a number of activities are water-dependent. Increasing the amount of water, and its reliability and sustainability, can make a meaningful contribution to poverty reduction through improved health, food security and nutrition, income generation, and time saving. Multiple-use water services improve more dimensions of well-being: they are gender equitable by design, enhance willingness and ability to pay, improve water productivity and "use per drop", are owned by communities, address multiple health issues in an integrated way, and ensure sustainable and equitable water use at no or low incremental costs. Hence, water resources and water services are more sustainable when the multiple needs of people for water are understood and planned for in village water systems. However, municipalities often lack critical capacity to carry out integrated planning, so NGOs and national governments need to provide support to overcome these capacity constraints.

Multiple-Use Water Services

For a long time, it has been recognized that schemes in poor rural areas that are planned for one single purpose, either a 'domestic' scheme, or an 'irrigation' scheme or a 'livestock' pond, are in reality always used for multiple purposes. Therefore, planners designed 'add-ons', such as washing steps in irrigation canals, higher discharge pumps, or pipes with larger diameters, to accommodate such non-planned uses and avoid scheme damage. In an integrated 'multiple-use water services approach' people's multiple domestic and productive water needs are taken as a starting point and the sector-barriers within the water sector are dissolved. This form of Integrated Water Resources Management, at the level of the household or the community or a number of communities, is a highly appropriate and cost-effective way to contribute to achieving the Millennium Development Goals.

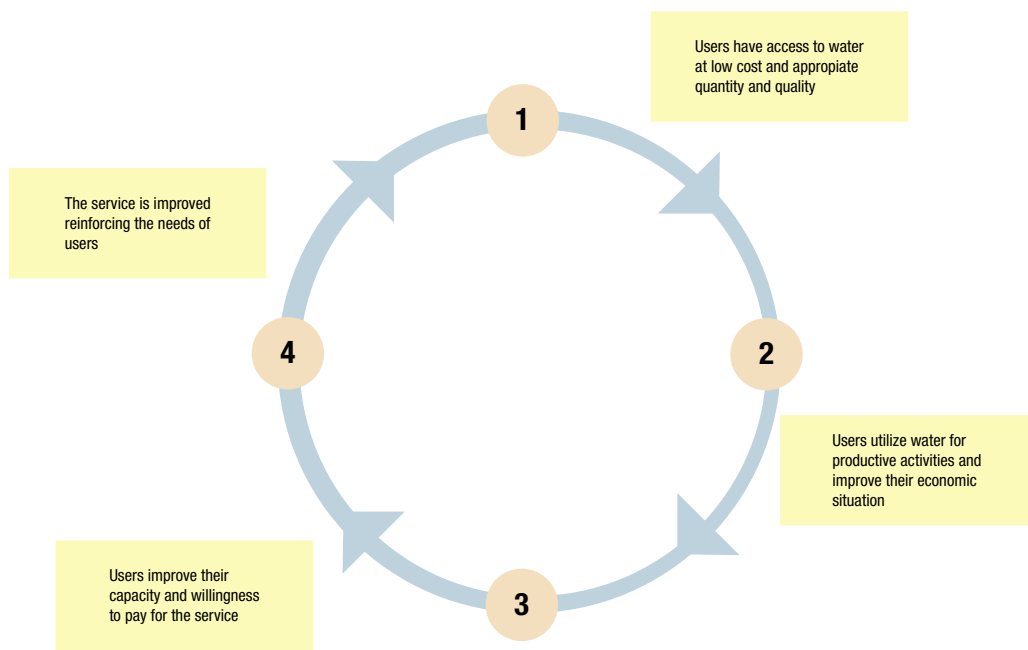
From session FT4.25, by the International Water Management Institute

Although systems are generally designed for a single purpose, their use is often multipurpose. In an integrated multiple use approach right from the start, people's domestic and productive water needs are taken as a starting point and the sector barriers within the water sector are dissolved, with the aim to enhance water productivity, willingness and ability to pay, health and other purposes at no or low incremental cost. Replication of the

presented multiple use efforts requires actions on i) empowering the users and the poor through participatory planning of water services in communities, ii) stimulation of public and private service providers to meet their client's multiple use needs at an intermediate reach, and iii) devolution of decision making and political, regulatory and financial support to local communities to span the national territory.



Illustration 5.3 Virtuous Cycle of Multiple-Use Water Services (MUS)



From Local Action LA1199 "Creation of Water Committees" in Peri-Urban Areas", by Agua Tuya Programme

The support of multi-stakeholder partnerships may help in internalizing environmental costs in ecosystems

Successful local actions to solve environmental problems in irrigated agricultural areas are established by people with common goals, through the building of partnerships and teams, which may contain very different groups, depending on the nature of the problem and the situation. However, in the end,

only agricultural producers can implement the necessary changes in landscapes and it is therefore important that producers are able to see the linkages between environmental and economic objectives. Multi-stakeholder platforms can bring water policy and policy-making into the public domain. Furthermore, local communities can develop the capacity for analysis of complex issues. The key is empowerment of "the people down below", *i. e.*, those outside the hierarchical power of governmental agencies.

The Role of Research in Providing a Foundation for Agricultural Practices to Protect Water Quality

The diversity of the case studies examined in this project demonstrates that there can never be simple or single solutions to complex environmental issues. Groups of people who have common goals will find any number of different ways to build partnerships and take action to solve environmental problems. The more we are able to share our successful strategies with others, the greater our chances of future success will be.

From Local Action LA0720, by Tri-National Initiative on Environmentally Sustainable Agriculture and Water Quality (Canada, United States, and Mexico)

Irrigation system development should keep receiving proper attention in order to increase food productivity per unit of water and land

Development of irrigation and supplemental irrigation in rain-fed agriculture has a critical role in increasing food security, especially in semi-arid regions since almost one third of the world's surface is covered by that kind of area. At present some 277 million hectares or 18% of arable land are irrigated and responsible for 40% of the world's crop production, and employ nearly 30% of the population spread over rural areas. The era of rapid expansion is over; in particular, large-scale public irrigation is coming to an end. However, there is still scope for medium and small-scale public, community and private irrigation system development, especially in Africa.

A major task is adapting yesterday's irrigation systems to tomorrow's needs. The recognition of performance problems in terms of service delivery and finance has stimulated the application of the concept of Participatory Irrigation Management (PIM) in many countries. In this concept, expounded in session FT4.19 "Effective Use of Irrigation Water through Participatory Irrigation Management (PIM)", stakeholders participate in various stages of planning, design, construction operation and maintenance. The local actions cases presented indicated that there are still many shortcomings in the application of the concept especially in scaled-up situations where PIM has become national policy. This is due to poor involvement of farmers because of 'top down' participation (not really giving 'voice and choice') and consequent lack of incentives for farmers.

The Network of Farmer Networks Involved in Participatory Irrigation Management in India

While PIM legislation enacted in south India had resulted in increased farmer participation for water management, farmers felt a lack of commitment by government in assisting WUAs. In January 2004, the network "Jalaspandana" was organized and funded by INPIM, to strengthen WUAs and work with them for policy reform. In 2004-2005, success was made through networking, establishing a communication structure and capacity building. Farmers increasingly are helped with the tools they require to effect legislative changes and improve the quality of the water they use for irrigation. This unique organization transcends state and WUAs boundaries to help farmers effect necessary changes.

From Local Action LA0130, by Jalaspandana, India

Irrigation and drainage schemes not only play a critical role in increasing crop yield and improving rural household income, but also help in accelerating the pace of development of rural infrastructure through improved communications and road systems, better healthcare, education facilities for rural communities, etc. Irrigation canals often serve as the only source of drinking water for the rural areas of the developing world. Properly functioning drainage channels may improve sanitation and disposal of wastewater in rural areas, where applicable. The viability of irrigation system improvement and modernization is very much related to the level of viable farming. In many systems hosting a number of smallholders, farming is often a subsistence activity and by just modernizing it, no enhanced return can be expected to finance operation and maintenance. Investments in off-farm employment generation activities could reduce pressure on landholdings

and facilitate the widespread implementation, allowing better returns to farmers' efforts and hence, enabling the so-required investments.

Investment in drainage should be realized to increase crop yields, improve sanitation and disposal of wastewater in rural areas, and contribute to flood protection

Land drainage is an indispensable component of the hydrological cycle and helps to maintain favorable water and salt balance in rain-fed and irrigated lands, thus increasing productivity and conserving important land resources, as discussed in session FT4.03 "Drain for Gain". Downstream reaches, estuaries and deltas of the river basins are fragile productive ecosystems, so drainage should be carefully planned to minimize negative impacts on their production and ecological functions.



Subsoil Parceling Drainage in Mexico

Irrigated lands with high salinity or phreatic levels present low productivity. As half the agricultural land in Mexico is irrigated, where huge investments have been made to put in place the required infrastructure for irrigation systems, the National Water Commission of Mexico (CONAGUA), with the support of the Mexican Institute of Water Technology (IMTA), began a project in 1994 to show how to recover soils through subsoil parceling drainage. The experimental program started in Irrigation District 076 Carrizo Valley, located in northwestern Sinaloa State, and has been extended to 35,000 ha. in another irrigation district's low lands. The cost of recovering a hectare is on average \$800 USD, about 8% of the total cost to build the hydro-agricultural infrastructure in a bare hectare. This local action provides a technically feasible and economic alternative to put unproductive irrigable lands back to render high crop yields and to overcome the abandonment of lands due to the presence of high salinity or phreatic levels.

From Local Action LA1055, by the National Water Commission of Mexico

Because of its multiple effects and impacts, within and outside the drained area, drainage needs to be viewed and handled from an integrated perspective. Its ultimate goal is to improve the quality of life for people through fair sharing of the economic and social benefits, while safeguarding key ecological functions. Governments and development agencies should give attention to investments in land drainage. National water sector strategies should address the drainage needs of irrigated and rain-fed lands in a basin for maintaining and enhancing the productivity functions of land and water resources.

Investments and financing water for agriculture should bolster food security and environmental protection

Large scale funding is required to build the projected additional water management infrastructure, and to replace, modernize and manage the existing one, as well as for implementing flood protection measures and carrying out the necessary steps to develop the required institutional capacity.

Improving financing for agricultural water is only at the beginning of a long process and there is an urgent need to better understand the issues and find innovative solutions from both the financiers and the users' side. As emphasized in session FT4.08 "*Financing Water for Agriculture*", clarity has to be obtained on i) what the needs are and whose needs they are, ii) who should pay for these investments in the context of an agricultural market that is distorted because of many different types of subsidies, tariff, customs, and political interests, and iii) what financing mechanisms are most appropriate given the wide spectrum of actors, functions and size of operations.



Economic Diversification Programme for Agricultural Farming in Zambia

Water for agriculture can be financed by a combination of several sources such as government treasury, CBO trust funds, private sector loans, NGO grants and micro-credits, IFI's loans, local and international capital markets or even through virtual water. In Zambia, revolving fund schemes, which include partnerships between the government and NGOs, have been scaled up to a National Irrigation Development Plan and to a Food Pact Programme. The economic principles of these trust funds are that communities furnish cost recovery, cost sharing, and operating and maintenance costs, and that capital investments are provided by the government. For instance, in Mwanachingwala Conservation community, there is a Food Pact Trust Fund in partnership with an NGO, whose main characteristic is that it is not administered by the government. Funds currently raised support small-scale irrigation developments, cattle management, restoration of community lands, improved school and health facilities, and pollution control. After reaping the benefits the communities have got the ownership, thereby advancing the goals of the program in enhancing food security.

From Local Action not registered: Financing Water for Agriculture: Addressing the Challenge in Zambia, presented in session FT4.08

In any case, to attract the required amount and type of funds for investments and management of hydraulic infrastructure, water institutions will need to make a strong effort for capacity development, including participation, empowerment, accountability and transparency, technical assistance, and organizational development, as urged in session FT4.24 *“Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities”*.

Water charges to users are a grossly under-tapped source of finance with great potential, and the only sustainable source of finances for recurring operations. Service agencies will need to be more customer-oriented and provide a better service if this potential is to be realized. The trend to give Water User Associations more delegated responsibilities needs to be accompanied by sufficient delegation of powers. *i. e.*, “voice and choice”.

It is essential to develop unconventional sources of financing such as co-financing structures, public-private partnerships, and micro-credit schemes. The latter provide a promising perspective, especially for the on-farm and small-scale systems. Cases show that the use of micro-credit schemes especially to women groups has proven very successful. Governments, donors and IFIs, local financiers and civil society organizations are called upon to find ways to promote gender sensitive micro-finance schemes for investments in agricultural water management infrastructure.

Agricultural research is an important contributor to the goal of meeting the food requirement of the population in 2025 without increasing present water use

Future efforts in research and education must adopt a “whole-systems approach” to unravel the cumulative impacts of land and water use on water and water use on land to connect demographic, agricultural, ecological and water quality and quantity components holistically. In session FT4.05 *“Water for*

Food, Livelihoods, and Environment: Bridging the Gap Through Partnership in Research”, it was underlined that international research-for-development networks should strengthen their links to local actions, ensuring that information about plans, actions and results flows in both directions. Farmers and other end-users should be partners in the research process starting at the planning stage.

The challenges include also ensuring sufficient “upward” linkage and identification of affordable and successful technology that does not create economic dependency or increased risk for users. Local development organizations need to develop their capacity to scale up the application of successful local technologies and knowledge.



Initiatives

- 1) Green and Blue Initiative proposal, a new framework of integrated land and water resource management for improved livelihoods and sustainability, to be launched at the World Water Week in Stockholm in August 2006;
- 2) Tri-National Initiative on Environmentally Sustainable Agriculture and Water Quality (Canada, United States, and Mexico);
- 3) Mexico and Spain extended their bilateral cooperation in the field of water resources, especially on sustainable water use and modernization of agriculture; and
- 4) The Gurria Panel on Financing will continue and extend its work on financing water for agriculture.



Risk Management

Main Issues and Recent Tendencies

The importance given to the theme of Risk Management in a World Water Forum is new, this importance being illustrated, among others, by the Ministerial Declaration, which confirmed that the 148 participating Ministerial delegations "recognize[d] the importance of domestic and international policies that foster and assist building capacities and cooperation at all levels to mitigate water-related disasters including prevention, preparedness, risk assessment, community awareness, resilience and response." This emphasis also reflects the rising awareness among sector professionals and the public on the growing risks due to climate change, increased vulnerability of our societies (especially the poorest populations) and recent disasters, in particular the Indian Ocean Tsunami, Hurricane Katarina, and cyclones/typhoons.

The topic-sessions under the Risk Management framework theme at the 4th World Water Forum aimed to present the progress in scientific knowledge and understanding of the impacts of these disasters, global and local warning systems, the developments in not just structural, but also non-structural coping measures, such as the required capacity development. Most sessions dealt with natural hazards and only a few were related to other risks such as those of conflicts over water. Accordingly, this chapter mainly focuses on natural hazards.

Main Messages, Lessons Learnt and Key Recommendations

Moving towards a new risk culture:

Creating awareness that life can never be totally risk-free

A new "risk culture" was promoted during the discussions in a number of sessions. This culture is central to the ethos of Risk Management, and its main features are:

- The acknowledgement and acceptance that zero-risk does not exist and that risk prevention must match social and/or economical gain. Melanie Schultz van Haegen, Vice Cabinet Minister for Transport, Public Works and Water Management, the Netherlands, stressed in her keynotes speech at the Forum that "you can't make the world totally free of risks, but you can reduce them and lessen their impact";
- The promotion of preparedness rather than reaction. In his own keynotes speech at the Forum, WMO Secretary General Michel Jarraud refers to this need as "stop(ping) many hazards from becoming disasters", advocating for the "risk management cycle... [to] be shifted from the response to the preventive phase";
- The recognition that local participation and negotiation among stakeholders is pivotal to satisfactory risk management. National policies should be tailored to local needs at the field level.

Considering climate change in water sector development and management plans

On a number of occasions, participants' attention was drawn to the problem of climate change. During his keynote speech, Mario Molina, 1995 Chemistry Nobel Prize Laureate, argued that the growing influence of climate change will only increase the frequency of natural disasters, creating "an intolerable risk". In addition, Ltj. Carl Strock of the USACE noted in his keynote speech that, "sometimes we accelerate risk by changing the environment".

Climate change was in fact addressed at the Forum mostly in an indirect way, since there were only two topic-sessions specifically devoted to this question. This would seem to demonstrate that for water experts, the growing influence of climate change is mainly an increase in the frequency of events that have always been at the heart of the concerns of water managers. This approach should be discussed and perhaps reconsidered: a thorough and comprehensive analysis of all possible direct and indirect effects of climate change on water-related phenomena remains highly necessary. Beyond this analysis, as noted by the statements endorsed by the International Advisory Committee of the Cooperative Programme on Water and Climate and presented to Melanie Schultz van Haegen for the Ministerial Conference, the possible effects of climate change and variability "are not [yet] considered in water sector development and management plans", nor in strategies to achieve the MDGs.

Facts and Figures on Risk Management

- The number of fatalities caused by natural disasters has been on a decreasing trend over the last 30 years. On the other hand, the economic impacts, the number of affected people and the number of hydrometeorological disasters have all greatly increased during the same period. It is worth noting that this general tendency can be upset by the death tolls resulting from one single catastrophe, such as the 2005 Indian Ocean Tsunami;
- Over the last three decades, about 90% of all natural disasters and 70% of all the associated deaths have been of hydrometeorological origin (source: WMO Secretary General Michel Jarraud in his keynote speech at the Forum);
- The order of magnitude of the damages caused by water-related disasters reached approximately 200 billion USD for 2005;
- The economic damages of natural disasters are mainly borne by developed countries but, when expressed as a percentage of GDP, developing countries suffer more. Between 1985 and 1999, the LDCs lost 13.4% of their GDP to disasters and developed countries just over 4%. In addition, on the Americas continent for example, over the last 30 years, "while the number of extreme natural events encountered by developed and developing countries has roughly been the same, three-quarters of the disasters and 99% of the human casualties have been in developing countries". In this way, natural disasters can greatly hinder the development of nations (sources: thematic document on Risk Management and Americas Regional Document).

The improvement of information and experience sharing is pivotal to reducing the effects of natural disasters

One of the main lessons from emergency situations such as Hurricane Katrina and the Indian Ocean Tsunami, as highlighted by sessions FT5.05 "*Hurricane Katrina and other Major Water-Related Disasters: Lessons Learned for Managing Risks*" and FT5.14 "*Tsunami - 15 Months Later*", is the importance of early warning systems and accurate communication and information sharing between the national and local levels, and across governmental and hierarchical boundaries. Early warning systems can help to evacuate and otherwise prepare populations in the areas to be affected by natural disasters, in particular floods, hurricanes, tsunamis, etc, while accurate communication and information sharing ensure better coordination which can avoid disasters becoming catastrophes, and is thus a preventive measure that can easily be adopted by governments at all levels. One example was given in session FT5.21 "*Environmental Vulnerability: The Importance of an Integrated and Multidisciplinary Approach*", which showed that a serious cyclone in Bangladesh in 1991, with a maximum wind speed of 225 km/hr and without any early warning systems in operation, caused a total of 138,882 deaths, whereas a similar cyclone in 1997, of 220 km/hr, but with an accurate and timely forecasting system now set up, caused only 134 deaths.

Building the resilience of local communities and protecting the poorest will prevent disasters becoming catastrophes

Building local communities' resilience and thus decreasing their vulnerability to water-related hazards was seen by participants as key to reducing the impact of disasters, and

many different means of increasing this resilience were presented and discussed. There was general agreement on the need for an integrated and coordinated approach between all stakeholders in designing risk management strategies, in which the local communities themselves play a leading role, thus catering to local needs, developing these communities' capacity and awareness. To achieve this goal, the creation of an enabling environment at the local governmental level is essential.

One interesting example of how to improve local communities' preparedness for disasters, thus contributing to the resilience of local communities was the development of micro-insurance schemes for the poorest populations. A good analysis of the outcomes of such schemes and of their relation with micro-finance schemes is nonetheless required before replicating them.



Insuring the Poorest Against Natural Disasters as a Tool to Reduce Poverty

Natural disasters create hardships which insurance, especially micro-insurance, can help to reduce by providing immediate and necessary funds which otherwise would not be available. Of the two billion people living in the world with less than two dollars a day, less than ten million have access to insurance. Micro-insurance provides affordable access to insurance to a segment of the population which until recently was generally ignored by the traditional insurers.

Most programs so far have been developed for health or life insurance. This is the case for example for AsSEF, a Benin-based association which offers health insurance for women for a premium of 0.75 Euros a month, and has reached 2,500 clients. This sort of principle needs to be applied more generally to help prevent the suffering of the most vulnerable people from water-related natural disasters.

From Local Action LA1825, by Munich Re Foundation

Protecting buffer functions contributes to mitigating floods and droughts

Another strong message was that buffer functions existing in catchments must be preserved and/or strengthened, not just to mitigate risks, but also to provide emergency sources of water during situations of natural disaster. Two examples in particular were stressed:

- i) Groundwater storage plays an important role in mitigating water scarcity risks such as droughts, in many watersheds of the world, due to its buffer function in the hydrological cycle, which also allows for the rehabilitation of water supply systems in the follow-up to natural disasters. While indicating this use of groundwater resources, session FT5.09 "*Groundwater and Risk Management: Coping with*



Water Scarcity, Climate Change and Emergency Situations", also noted that groundwater resources are at risk themselves from human pressures, climate change and sudden disasters, and should be included in IWRM plans.

- ii) As shown by topic-session FT5.10 "*The role of forests in water-related natural disaster risk management*", forests can also play an important buffer role, especially in terms of sedimentation management, depending on soil types and local conditions. This should be taken due care of in land management, and also included in IWRM plans. The Minister of the Environment and Energy of Costa Rica, Carlos Manuel Rodriguez, proclaimed in this session "when I see a national park or a watershed, for me this is not a national park. For me this is a water factory."

One example presented at the Forum of a local action that aims to strengthen the buffer function for a local community is that of the so-called Kenya sand dams, as shown below.

Moving from the concept of flood protection to flood management

Floods remain the most frequent risk associated with water: one billion people currently live in flood plains and the number of deaths due to flooding is on the increase. Session FT5.16 "*Role of Dams and Reservoirs in Integrated Flood Management*" revealed that "floods are responsible for 30% of the total number of natural disasters, 30% of all economic damages, and 20%

Enhancing Buffer Functions: The Example of Kenya Sand Dams

The district of Kitui in Kenya has been suffering from decreasing rainfall over the last few years, causing droughts and other undesirable effects associated with water shortages. To mitigate these impacts, brought on mainly by climate change, during the last ten years a Kenyan NGO called SASOL has implemented a methodology by developing so-called 'sand dams'. These low-cost dams are constructed through community inputs, and allow water to be stored within an artificial sand aquifer that is created behind the dam. In this way, water loss due to evaporation is reduced to a minimum, and rainwater is made available in times of water shortage.

Through this scheme, about 120,000 people have already been provided access to water with an investment of US\$30 per capita. The average walking distance to water per capita (one of the prime targets of the government) has also been reduced dramatically, from 3 to 1 km on average. As a result, economic growth has been increased in the region. Furthermore, the benefits are felt downstream, by maintaining a base flow in the watercourse and by reducing the risk of floods. The success of these dams as an affordable and effective technique for artificial recharge of groundwater resources, with full community participation, triggers a challenge of upscaling and transferring this local expertise to other areas.

From Local Action LA0385, by Free University Amsterdam

of fatalities caused by natural disasters". A general tendency (mainly) in developed countries, as presented in session FT5.16, is to look at floods in an integrated manner, acknowledging the fact that 100% protection is impossible, but instead the concept of flood mitigation should be adopted, within the framework of Integrated Flood Management. Furthermore, imbalanced reliance on structural measures would have detrimental effects on the

river and riverbed ecosystems. Allowing certain floods in areas that are less vulnerable is thus an approach that is gaining more support. This approach intensifies the need and added-value for local actors to negotiate land use measures, and in general to be involved with all other stakeholders in designing and financing flood management strategies based on their local knowledge, as is the case in Local Action LA0576, presented below.



Involving Local Stakeholders in Flood Management: The "Freude am Fluss" Approach

The Freude am Fluss approach is an innovative method of public-private partnerships between municipalities and water authorities, which combines land use planning with room for flood waters, and the environmental and economic interests of the government and private sector. The public sector is involved in designing and identifying possible flood protection measures, achieved through specially designed workshops. The private sector is involved in carrying out the selected measures. The local, regional and national administrative levels facilitate this process and are responsible for the final decision making. Before implementation, there was poor support at the local community level, and high costs for the government, but after implementation, there were local community initiatives to carry out flood protection measures at reduced costs for the government and new financing mechanisms creating job opportunities. Technological innovations for alternative land use are thus stimulated.

The Freude am Fluss project is based on two principles: an ecosystem-based approach to land use and water management; and the crucial role of local communities in identifying tailor-made land use plans and new financing mechanisms. New technological innovations are used to adapt various land use functions, thus preventing large engineering interventions in natural water systems. Examples include floating houses or flood resistant housing on mounds of decontaminated sediments, and new agricultural crops with a higher flood and/or salt tolerance.

From Local Action LA0576, by Ministry of Transport, Public Works and Water Management, the Netherlands

Drought: the neglected disaster?

Drought is more than a water disaster; it is generally accompanied by a mix of economic, political and agricultural difficulties that play a role as important as that of water. Nevertheless, topic-session FT5.11 "*Managing Drought Risks – Role of Improved Preparedness and Management*" stated that "drought is by far the most damaging but least understood of all natural disasters". Perhaps due to its slow onset and longer-lasting effects, as compared to more immediate disasters with a greater impact over a shorter period of time, such as hurricanes or floods, drought attracts less media attention. As a result, there is perhaps a general tendency for decision makers to neglect the need to adopt drought risk management programs as part of more general development schemes. Indeed, figures show that, in the decade 1993–2002, drought and famine accounted for 82% of all those affected by natural disasters in Africa, 48% in Oceania, and 35% in the Americas (source: International Federation of Red Cross and Red Crescent Societies), whereas the US drought in 1988 alone cost an estimated US\$40 billion. It is therefore important to raise the profile of drought prevention measures, to provide coping mechanisms and to make available appropriate technology to lessen their impact.

Setting targets for disaster risk reduction

Setting targets as a means of motivating efforts towards disaster risk reduction was suggested on a number of occasions at the Forum as a means of motivating the change in the collective mindset from reaction to prevention. One

interesting session in this context was session FT5.00 (*The Sustainability of Water and Sanitation Services in the Context of Disaster Risk Reduction – A Contribution towards the Implementation of the Hyogo Framework for Action: 2005–2015*), referring to the framework proposed by the UNISDR-organized World Conference on Disaster Reduction, which aimed to propose a holistic and integrated framework to build the resistance of nations and communities to disasters. One of the key messages of this topic-session was that, even if preventive measures are taken, events of exceptional intensity can damage basic infrastructure, and priority should be given in these cases to critical facilities such as hospitals, schools and shelters. In this way, "risk reduction is an indication of sustainability of services", and that the effort to "secure [water supply and sanitation] systems in the event of disasters triggered by natural hazards is a direct contribution to technical, economic and environmental aspects of its sustainability".

Furthermore, a complementary "Urgent Appeal", explained below, launched by the WMO, has been submitted to the UNSGAB, and was supported or referred to by several sessions at the Forum. The effective adoption of this urgent appeal would provide a greater incentive for the governments of the world to adopt Risk Management plans in their general development strategies. Furthermore, the UNSGAB itself announced a Compendium of Actions at the Forum, the second point of which, shown below, would indeed imply that the UN system has heeded the nature of this urgent appeal, although the Compendium is, for the moment at least, a list of recommendations that may or may not be implemented.

Initiatives Announced at the Forum

- The "Urgent Appeal", submitted by the WMO to the UN Secretary General, urged for the creation of a new MDG aiming to halve, by 2015, the number of deaths provoked by water-related hazards, calculated over the ten-year period 2006–2015, as compared to the figures for the period 1991–2000.
- The UNSGAB presented a Compendium of Actions, "Your Action, Our Action", which made specific recommendations to reduce the number of human lives lost through water-related disasters:
 - "The Board requests UNISDR with interested countries to harvest the knowledge and experience available to predict, prevent, prepare for and help with water related disasters to inform national plans, and/or IWRM and Water Efficiency Plans at national and local level;
 - The Board urges experts to work out an instrument that could create global awareness and commitment and to define and establish the rationale for an internationally recognizable target focused on the reduction of the loss of life and livelihood;
 - National and local governments should ensure immediate provision for safe drinking water and sanitation during and after disasters."



Water Financing

Main Issues and Recent Tendencies

To achieve, by 2015 the water related Millennium Development Goals, greater financial effort must be made. In many cases the problem is not the lack of water resources: in countries of Sub-Saharan Africa or Latin America, where water is abundant, between one half and a quarter of the population has no access to drinking water; while in some arid countries 100% of the population is served.

The problem is, above all, institutional, financial, technical and political. As stressed by Pedro Arrojo, President of the Foundation for a New Water Culture, providing people with water and sanitation services requires financial resources and a strong political will at all levels.

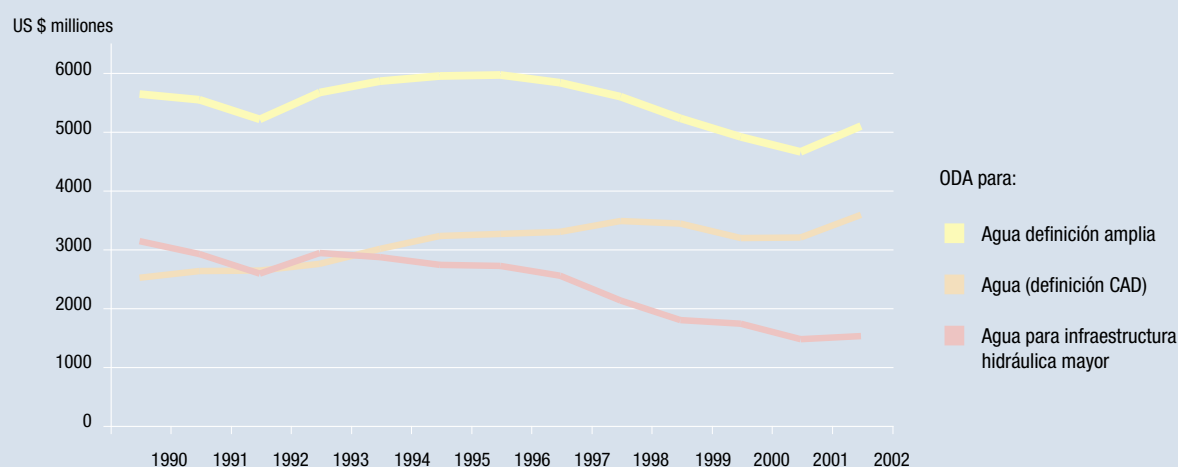
During the Roundtable Introduction to the Forum, Angel Gurría, Secretary General of the OECD, noted that although practices have been adapted and commitments have been made, an increase in financial flows has not really occurred.

However, financing the water sector does not only mean increasing financial flows to local authorities and service providers. It also requires creating the right conditions on the demand side to attract the necessary money and to use it in the best way. This new demand-side approach reveals the need for a strengthening of local authorities in project structuring and development and in financial management. The objective in transferring powers and fiscal resources is to make them creditworthy, able to design projects and to run water services efficiently.

Facts and Figures on Water Financing

- Current investment in WSS (excluding wastewater treatment) in the developing world, is estimated at between 14 and 16 billion US dollars per year (JMP "Global WSS Assessment 2000 Report");
- Estimated costs to achieve MDG Target 10 by 2015 vary from 9 to 30 billion US dollars per year;
- ODA* to the water sector increased slightly from 2.6 to 3.4 billion US dollars between 1990 and 2002;
- In 2004, ODA* commitments for water rose to 4.5 billion US dollars;
- Annual ODA commitments for large water infrastructure have fallen from 3 billion US dollars in the early 1990's to 1.5 billion US dollars in the early 2000's.

Compromisos de ODA para agua, para infraestructura mayor "ODA para agua en sentido amplio"
(USD dólares constantes de 2003, promedios móviles de 5 años)



Source: WWC 2006.

* The term ODA for water refers to water supply and sanitation, resource management and a few other headings like training but does not include large infrastructure such as dams or irrigation schemes. (DAC definition).

Main Messages, Lessons Learnt and Key Recommendations

On the supply side of financing: the doubling of money flows to meet the MDGs is still far from being realized

The supply side of financing refers to the stakeholders that make money available, i.e. MFIs, donors, private banks, etc.

During the 3rd World Water Forum, the Camdessus Panel stated that to meet the water MDGs, all funds from all sources needed to double: revenues from users, public budgets, ODA, MFI loans, private equity, decentralized cooperation and solidarity mechanisms. The call for more money and for making better use of money available still stands.

Only 3 to 5% of total ODA is earmarked for water. Donors should increase the share of water in ODA and coordinate their action better. Even if it represents only a small part of the total amount required to achieve the water-related MDGs, ODA can

and should play an important role in leveraging other funds and creating confidence in the local capital markets.

Solidarity mechanisms and decentralized cooperation constitute a small but non-negligible contribution which complements ODA mechanisms, ensuring a more grassroots-level support. According to the French NGO PsEau, 2 billion Euros are potentially mobilizable from OECD countries, session FT3.03 "Solidarity and Decentralized Forms of North/South and South/South Funding".

Such cooperation should not only be developed between countries from the North and South, but also between countries from the South themselves. For example, in the MENA region, high-income countries could finance regional cooperation programmes benefiting their lower-income partners, session FT4.06 "Capacity Building in the MENA Region". Countries of the South often face common difficulties, radically different from those faced by developed countries; sharing their experiences in solving these difficulties is therefore relevant.

Solidarity Between Users from France (Cents/m³) and from Niger

The French local authority SIVOA takes 0.15 Euro cents per m³ billed, and contributes it to development projects in Niger. Its engineers also contribute expertise to these projects. These two actions represent 0.2% and 0.4% of the authority's budget. With the passing of the recent Oudin-Santini law in France, allowing local authorities and water agencies to contribute up to 1% of their budget to international cooperation actions in water and sanitation, SIVOA will be able to increase its contribution even further.

Such solidarity actions also create a leverage effect, attracting further financing for the projects from other sources such as ODA.

From Local Action LA0124, by Inter-Communal Union of the Orge Valley, France (SIVOA)

Unconventional sources of finance must be further developed through innovative Public-Private Partnerships, micro-finance, improved banking terms, new co-financing structures and smart mitigation of risk.

Micro-finance for example is a promising approach to provide funding for investments for water services or small-scale irrigation and drainage schemes, especially

in rural areas and in low-income peri-urban or urban areas. Potential beneficiaries of micro-finance operations are households (to finance water connection at home or latrines) and small-scale water service providers (to finance their investments). Micro-finance is particularly adapted to support community initiatives, especially led by women's groups.

Kyoto World Water Grand Prize Won by the Indian NGO Gram Vikas

Gram Vikas' Rural Health and Environment Program (RHEP), an integrated rural development intervention, has helped over 200 rural villages acquire good quality toilets and bathrooms, coupled with at least 3 taps per household and 24 hour water supply. Providing water and sanitation is RHEP's core rallying element that brings communities together, and serves as a springboard for collective action in Gram Vikas' other programs.

Accepting the prize, Joe Madiath, Executive Director of Gram Vikas, recognized the efforts of local people in the province of Orissa who contributed to the success of the project.

From Local Action LA0115, by Gram Vikas, India

However, generating more funds will not be successful without complementary efforts to create the right conditions on the ground. This means improving creditworthiness and capability of responsible entities to make better use of resources and adapting financing mechanisms better to the needs and possibilities of national and local governments and water service providers.

Strengthening local stakeholders on the demand side of financing

The demand side of financing refers to the stakeholders in need of finance, i.e. at the local level, service providers and local authorities.

Provision of water services is a local affair. The main sources of revenue are customers and taxpayers through water

fees and the public budget. The central government has a key role in creating the required enabling environment and local capacity for the provision of retail water services (water supply and sanitation, sewerage and wastewater treatment, urban drainage and flood protection, irrigation and land drainage). Some progress has been made in sub-sovereign financing and the development of financing instruments for local governments since the 3rd World Water Forum. However, due to a lack of local capacity, national water budgets are hardly ever fully spent. Utilization rates range from 9–65% often because of many factors that lead to delays in disbursements (Source: Wateraid, 2005 Getting to boiling point).

Decentralization must be made effective. Central governments should devolve secured and sufficient budgets and remove blockages in financial flows to local governments.



Decentralization also includes fiscal empowerment and strengthening of local governments.

The move towards cost recovering tariffs can be progressive and should be made socially acceptable through accompanying subsidies to make tariffs affordable to the poorest. People are more willing to pay if service quality has been improved. Therefore, one important problem is to mobilize financial capacities in advance to improve the quality of the service, which will make a higher tariff more acceptable. Tariffs and subsidies determine the repayment

capacity of the service provider, which conditions its access to finance for new investments to connect the unserved and the poor.

Tariffs, possible subsidies (state or municipal), the required level of services and the choice of technology should be agreed upon among the users, the providers of water services and the local authorities.

The late Ryutaro Hashimoto, in presenting the recently released Compendium of Actions (COA) "Your Action, Our Action" on behalf of the UN Secretary General's Advisory Board

Output-Based Water Consumption Subsidies in Chile

Chile started to reform its water and sanitation sector in the late 80's. A new tariff methodology aimed at raising water prices to the economic cost of the service was established. It introduced individual means-tested and output based water consumption subsidies in the early 90's. Households that otherwise would be unable to pay for subsistence level consumption can benefit from the subsidy, which covers the shortfall between actual charges and the ability to pay (5% of the monthly household income). The subsidy follows as a rising block tariff model. By law, the subsidy can cover 25-85% of the water and sewerage bill for up to 20 cubic meters a month, with the user paying the rest.

The subsidy scheme has allowed Chile to raise water tariffs to levels reflecting costs without compromising its social and distributional goals.

From session FT1.26, by the World Water Council

on Water and Sanitation, said on the subject of financing that governments should install an appropriate mix of equitable tariffs and subsidies. Noting that available financial resources often fail to effectively address water and sanitation issues, he called for better governance and transparency; programs to expand knowledge on developing local markets and water funding focused on capacity building.

Limited local capacity constitutes a major obstacle to financial flow increase. To raise money, people need to be able to make bankable projects. Central governments should empower, facilitate and strengthen the capacity of local stakeholders in development, structuring, implementing and managing local projects and services.

Capable and accountable institutions, transparent management, well informed citizens and clear development strategies are essential elements to move forward. Anywhere in the world, it is estimated that from 10% to 40% of water sector finances are being lost to dishonest and corrupt practices, session FT1.07 "How to Overcome Corruption in Water Resources and Service Management". Working under transparency principles will not only increase the coverage and quality of the services but also

improve opportunities for investments from community groups and the private sector.

National and local governments need to develop and implement National and Local Water Service Action Plans to establish the required enabling environment needed to build confidence and attract finance into the water sector and increase investments in water at municipal and district levels.

These action plans should comprise objectives and measures such as the number of people to reach, policy reform for tariffs, subsidies and sustainable cost recovery, and enhance access to local capital markets, a strategy for the strengthening of local capacity for project structuring and development based on partnerships, national monitoring mechanisms, etc. Local governments should in addition emphasize in their Local Water Service Action Plan short-term and long-term funding schemes; phased investment plans; a tariff structure including subsidies and the development of investment partnerships of government, users, public and private operators, financiers and local monitoring mechanisms, session FT1.26 "Access to Finance for Local Governments".

**Matching demand and supply of finance:
multi-stakeholder partnerships, local currency and
non-sovereign finance, local capital markets development**

The necessary increase of sub-sovereign or non-sovereign and local currency financing requires concerted donor support to mobilize the necessary local funds to meet the MDGs.

National governments, with the help of IFIs and bilateral agencies, should stimulate the development of local capital markets to allow local currency borrowing and avoid

foreign currency risk. They should expand their use of local currency, debt and risk mitigation to support water sector finance, session FT1.13 "*Financing Mechanisms for Local Water Initiatives*".

Pooling mechanisms can enhance the creditworthiness of cities and allow the issue of local currency bonds and the development of dedicated trust funds for long-term local currency loans. Ministries of Finance should allow local governments and service providers better access to local capital markets as part of their empowerment process.



Municipal Bond Issue for Water Infrastructure Financing, Ahmedabad, India

In 1998, Ahmedabad Municipal Corporation (AMC) issued bonds totaling Rs1.000 million. AMC sold 25% of the bonds to the Indian public and the remaining 75% of the issue to private placements and institutional investors.

The interest rates dropped after AMC bonds were issued; the availability of the cash flow however permitted the AMC to rapidly implement an emergency bulk water supply scheme.

The USAID Financial Institutions Reform and Expansion Project (FIRE) played a multifaceted role in assisting Ahmedabad in developing the bond issue. The FIRE project also assisted Credit Rating and Information Services of India (CRISIL), an independent rating agency, to develop a methodology to carry out credit ratings for local governments in India, and Ahmedabad was the first city where this methodology was applied. CRISIL initially assigned an "A+" rating to Ahmedabad municipal bonds.

From session FT1.26, by the World Water Council

Participants at the Ministerial Roundtable on Financing Local Water and Sanitation Initiatives, chaired by Hon Donald Buchanon (Jamaica), stressed that partnerships are needed to "bridge social divisions, bring technical and political entities together, strengthen capacities and empower the local level".

All parties involved, i.e. local and national governments, users, public and private operators, local and international financiers, should work together under dedicated partnerships to prepare the structure and implement investment projects, session FT1.26 "*Access to Finance for Local Governments*".



Projects have to be supported by local communities, indigenous people and other minorities, especially rural women, not only by targeting them, but they must also be empowered to take part in participatory processes and actions. This implies supporting capacity building for all local stakeholders.

Multi-stakeholder partnerships would create dialogue, transparency, accountability from operators, responsiveness to communities' needs and then more willingness to pay for water services and sustainability. All parties have to assume their share of the risk. The resulting projects would gain in creditworthiness, which at the end reduces the cost of finance.

All parties should cooperate under such dedicated partnerships to better match demand and supply of water services and their financing.

There is a strong need to initiate dialogue within civil society, on the involvement of the private sector to choose a model people want to follow for provision and enhancement of their water services. Water service provision is and will remain mainly public. However, financing water services requires development of a repayment capacity of the service provider itself (public and private alike) to enable all available financial resources to be tapped for further investments. It is up to the (local) government to decide in partnership with the service provider and users, what actions are to be undertaken to strengthen the existing service provider and whether and to what extent the private sector might be involved in the development and management of water services and under what conditions. Private sector participation must be considered as only one of the possibilities taking into account the accumulated knowledge and previous experiences.

Will we miss the Sanitation Target?

Meeting the sanitation Target means providing 1.4 billion people with improved sanitation by 2015 and has a much higher cost than meeting the water supply Target. The Joint Monitoring Programme has recently warned that "without a

sharp acceleration in the rate of progress, the world will miss the sanitation target by half a billion people" (WHO/UNICEF JMP 2004).

Sanitation receives less attention than water supply, and less funding too. Sanitation is not an appealing sector and suffers from cultural taboos. However, improved sanitation has a huge impact on health, environment and global development.

As such, governments should give sanitation more priority in their budgets and be prepared to invest in this sector. Governments should transfer powers to local authorities and provide them with the necessary financial support, and promote community-based actions.

Focus on water for Africa

In Africa, only 3.8% of total renewable water resources of 5,400 billion m³ are developed for water supply, irrigation and hydropower use, session FT1.13 "*Financing Mechanisms for Local Water Initiatives*". Sub-Saharan Africa made impressive progress between 1990 and 2002, increasing drinking water coverage from 49% to 58%, but it is still far from the progress needed to achieve the MDGs (UN 2nd World Water Development Report, 2006).

Kordjé Bedoumra, Director of the African Water Facility (AWF), noted that 300 million Africans currently lack access to basic water and sanitation. Obstacles to progress include local conflict and political instability, high rates of population growth, and low priority given to water and sanitation. African countries need to increase the volume of financing to the water sector from internal and external sources. They need major water infrastructure and development of human, social and institutional capacity.

ODA should be targeted to those countries, in Africa and elsewhere, where the most remains to be done to achieve the MDGs, while in reality, countries that are in the greatest need only receive a small part of Official Development Assistance.

The African Water Facility

The AWF was established in 2004 as an initiative led by AMCOW. The Facility is hosted and administered by the African Development Bank.

The AWF makes funds available to eligible water projects in Africa on demand from central or local Governments, Municipalities, NGOs, civil society organizations, community-based organizations, regional, sub-regional and sectoral organizations (regional economic organizations, river basin organizations, etc.).

Eligible activities are those aimed at creating the right environment for sustainable investments such as developing and implementing IWRM policy at the national and transboundary basin level, water information and knowledge management systems, monitoring and evaluation systems.

The Facility also makes strategic direct capital investment aimed at leveraging additional inflows and includes pilot or demonstration projects, promoting innovative and appropriate technology and multiple water use schemes.

From session FT1.13, by the African Water Facility

Focus on water in Asia and the Pacific

In Asia, the volume and quality of water investments must increase if the needs of the region are to be met and the goals of poverty reduction, livelihood improvement and economic growth to be achieved. For water supply and sanitation alone, 8 billion US dollars - at the very least - will be needed over the next decade to meet the MDG targets for safe drinking water and sanitation. Additional investments are needed for irrigation services, river basin management, flood management and mitigation, and wastewater management to ensure the future of this precious resource. However, such investments face a wide range of governance, institutional, social, environmental and political challenges that go beyond the availability of finance alone. The need to move beyond the "business as usual" scenario and catalyze much needed water financing, along with reforms and capacity building is urgent, as advocated by the recently launched Water Financing Program of the Asian Development Bank.

Financing water for agriculture: institutional reform and empowerment of user associations

Agriculture as the greatest user of water requires much investment in small and large scale rain-fed and irrigated agriculture to enhance local food security and make water use more productive. However, financing water for food is a complex issue involving many different kinds of interest in a very politically loaded sector, operating in a disturbed market environment. The next generation of investments will be considerably different from the last in terms of type, scale,





sponsors and models of finance (session FT4.08 "*Financing Water for Agriculture*").

Reforms are needed in water institutions to mobilize additional resources. The adoption of a cost recovery principle is essential: in many cases the users would be willing to pay, provided that services are improved and reliable. Water users associations should be more empowered by giving them a voice and a choice in development and management of infrastructure. Investments must prioritize farmer-led and farmer-need projects (session FT4.24 "*Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities*").

Micro-finance, co-financing structures and Public-Private Partnerships are new financing mechanisms that are developing. Risks specific to the agricultural sector must be identified and allocated among stakeholders. A new irrigation development paradigm, based on market-driven profitability and an enhanced role of the private sector, is required to enhance investments in agricultural water (session FT4.24).

Financing socially and environmentally viable large water infrastructure

Annual ODA commitments for large water infrastructure fell from 3 billion US dollars in the early 1990's to 1.5 billion US dollars in the early 2000's. Donors have been reluctant to support major water infrastructure in developing countries like dams for storage and hydropower because of unexpected negative consequences of some past water infrastructure projects. New investments should be subject to adequate social and environmental safeguards.

Infrastructure projects in developing countries are highly capital intensive, have long gestation period and often weak financial returns. Therefore, financing options tend to be limited. The financing of large-scale water infrastructure

was traditionally left to the public sector, but public budgets are unlikely to be able to fund the coming demand for such infrastructure alone.

The international donor community should support developing countries to renew, rehabilitate and modernize their water infrastructure. In Sub-Saharan Africa, 2 out of the 7 Mha of land equipped with water infrastructure are simply not exploited (session FT4.24 "*Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities*").

Involving the private sector is a challenge. IFIs have a strong role to play through loans and/or grants and credit enhancement mechanisms.

South-South cooperation is particularly suitable: for example, there are some very skilled South African companies with potential to assist in bulk water finance and delivery elsewhere in Africa (session FT1.34 "*Water Infrastructure for Sustainable and Equitable Development*").

Financing and IWRM: involving communities

Financing IWRM is a government responsibility but communities are willing to share the cost if they are part of the process. Community cost-sharing and cost recovery for water services should be an objective, but it should not be imposed on communities. The level and mode of cost recovery should be the outcome of a participatory process. Tariffs can be combined with cross-subsidies from productive services (tourism, hydropower, industry, etc.) to less productive ones (such as domestic chores and sanitation) and with other mechanisms that ensure that cost recovery does not deprive the poor.

Awareness about water, the different uses and the benefits from sustainable water management should be raised. Through education and communication, communities' willingness to contribute financially to IWRM projects may be increased (session FT2.01 "*Financing and IWRM*").



Commitments and New Initiatives

- The Asian Development Bank launched a new five-year Water Financing Programme that will substantially increase its investments in the water sector over the next five years. The Water Financing Programme, in addition to ongoing water operations, will direct new investments at rural communities, cities and the heart of the water sector, river basins. Under the Water Financing Programme, the ADB proposes to increase its water investments to well over US \$2 billion annually between 2006 and 2010.
- The Water Integrity Network (WIN): an initiative to combat corruption in the water sector. On March 17, 2006, the NGO Transparency International presented its initiative to create a new dedicated network to fight corruption in the water sector. The purpose of the WIN network is to initiate and support pro-poor actions to combat corruption in the water sector. The network will operate worldwide, will establish an appropriate balance between advocacy work and concrete action and will cover all aspects of water, including water supply and sanitation and water resources management. Members shall be from governments, utilities, regulators, private sector, donor community, policy advice organizations, universities, research organizations and civil society organizations.
- The Inter-American Development Bank is going to approve an Infrastructure Project Preparation Fund (InfraFund). The new fund will provide grants for the preparation of infrastructure plans, programs and projects to be financed by the IADB. The activities may include pre-feasibility and feasibility studies; assessments of technical, economic, financial, environmental, social and legal viability; project design and document preparation and review for financing requests or bidding processes.

Empowerment of Local Actors

Current Trends

The empowerment of communities, user groups, local governments, women, and minority groups seeks to provide them with the possibility and means to make decisions or participate in the decision-making process, and to take part in the implementation of those decisions. This issue was a central subject from the beginning of the Forum's preparatory process, due to the huge potential for local actors to have an impact on their environment and achieve better livelihoods. In the crosscutting perspective thematic document corresponding to Institutional Development and Political Processes, the concept of "governance or citizenship" is not limited to the exercise of formal political power but includes the action of large businesses, political parties, civil society organizations, international agencies, non-governmental organizations, and community based organizations. In the Capacity Building and Social Learning crosscutting perspective thematic document, empowerment is appreciated as leading to social learning and therefore is recognized as an important driver of policy reform and social change.

Empowerment was also very much at the heart of the Forum, as related debates could be found scattered throughout more than 50 topic-sessions, in particular Session FT3.51 "*Empowerment and Democratization Multi-stakeholder Panel*" and its two preparatory workshops carried out at the Citizen's Water House in the Water Fair, and was introduced by a statement from HRH the Prince of Orange at the opening ceremony: "We need the kind of leadership that does not produce more followers but produces more leaders at all levels of society."



"From its Origin is Every Power" Leticia Moguel Diaz



"Empowerment, competency in water management and efficient access to transparent information are the three pillars of a cooperative, responsible and solidarity-based civilian management."

Final Statement, 4th Youth World Water Forum

The Forum also hosted the 2nd Children's World Water Forum, the 4th Youth World Water Forum, and 35 civil society topic-sessions including five on gender issues, two on youth perspectives, three on indigenous viewpoints, and two on children interests.

The Ministerial Declaration underscored the crucial importance of involving all stakeholders, particularly women and young people, in water planning and management; the Mexico Declaration of the World Encounter of Water Legislators reiterated that all programs for water supply and sanitation must promote gender and ethnic equity; and, the Local Government Declaration on Water states that women play a pivotal role in development, particularly in the supply, management and conservation of water, and that local leaders should ensure the close link with citizens and actors, implement awareness raising campaigns, and promote proactive citizen involvement in defining water policies in communities in a democratic and inclusive manner.

In the Empowerment and Democratization Multi-stakeholder Panel (Session FT3.51) nine local actions were presented: two on drinking water in peri-urban areas, two on drinking water in rural and urban areas, one on drinking water in rural areas, one on monitoring natural resources and livelihoods, one on aquifer stabilization for urban drinking water, industrial use and irrigation, one on the restoration of the socio-economic, cultural and environmental situation in rivers, and one on water quality restoration from untreated sugar mill residual waters.

Perhaps the most robust example presented in this panel was the case of the Agua Tuya Programme in Cochabamba, Bolivia, because it is a multi-sector approach that has been institutionalized. This peri-urban drinking water action consists of: i) a CBO Water Committee that identifies genuine demands, ii) a private enterprise, Agua Tuya Program, which contributes technical expertise and construction, iii) an NGO, CIDRE, that provides micro credit, iv) a municipal water utility, SEMAPA, that carries out the technical supervision and ensures the interconnection to the main

"One cannot empower people... but people will empower themselves"

"While the Water War in Cochabamba is seen worldwide as a huge anti-privatization movement, what people were really defending was their own private investments and local efforts in developing community-based water services."

- Gustavo Heredia, Agua Tuya Programme

Local Action not registered, Agua Tuya Programme: Lessons Learnt in Cochabamba, Bolivia

water system, v) the municipal government of Cochabamba that furnishes fiscal funds, and vi) most important of all, the country's Parliament that enacted the figure of Water Committees into a new law for the water sector.

The least prototypical case of empowerment was the project in which eight municipal governments in the states of Nayarit and Jalisco, Mexico, joined forces to address environmental management actions to restore the water quality from untreated sugar mill discharges. It is not a case of empowerment, properly speaking, since the municipal government has already enacted attributions to engage in those endeavors without the need to be empowered. However,

this is a case in which several authorities have to collaborate in order to solve a problem that transcends their boundaries. The federal government honors the subsidiarity principle and does not intervene, except in the normative role, unless the conglomerate of municipal governments are unable to solve their own problems. Nevertheless, the municipal governments complain that in spite of having attributions for environmental management within their territories, they lack institutional capacity to carry out decisions and have insufficient financing to implement them.

A clear cut case of empowerment from federal to municipal governments is the drinking water and sanitation

service in peri-urban Caracas, Venezuela. In the new water legislation, municipal governments were empowered with the attributions of providing those services through participative democracy. The population now takes part directly in water policy-making through Technical Water Desks and without the need for NGOs' mediation. The approach constitutes a shared State-community responsibility in social problems solving, based on the viewpoint that the "less State and more market" principle is not necessarily required to accomplish the challenge of providing better water and sanitation services.

An incipient case of empowerment is the one related to restoration of the socio-economic, cultural,

and environmental situation along the Sesan, Srepok, and Sekong Rivers in Cambodia due to uncompensated impacts from upstream hydropower activity in Viet Nam. The communities and indigenous groups were empowered through NGOs' awareness raising efforts, capacity building, and communication activities. All of these activities resulted in an increased ability for the communities to express their opinions with key stakeholders. However, although improved transboundary surface water management was expected from an international advisory group, Cambodian communities have not succeeded in obtaining compensation from Vietnam.

Empowerment for Providing Water Services Boosts Participation in Other Services

The main conclusions of the Empowerment and Democratization Multi-stakeholder Panel are that:

- i) Local empowerment enables new forms of innovating local organization;
- ii) The innovation in the local organization is an important driver of policy reform and social change;
- iii) Local empowerment implies a channeling of power to local organizations, granting them the necessary political, financial and social resources to influence the policy processes and negotiate outcomes; and
- iv) Empowerment leads to social learning.

From Session FT3.51 "Empowerment and Democratization Multi-stakeholder Panel"

Main Messages, Lessons Learnt, and Key Recommendations

One of the first goals of empowering local stakeholders is to achieve better water services

Empowerment is the increase of political, social or economic strength of individuals or groups in such a manner that they can solve their own problems. Empowered bodies become authorities or receive a delegated authority in such a way that their actions are mandatory, but the most important characteristic is that, if properly implemented, communities develop confidence in their own capacities to improve their quality of life. Empowerment addresses the convenience or inconvenience of redistributing power among different levels of government and social groups, the ways in which this power may be conveyed to legitimate actors, and the fashion in which new entities assume accountability and transparency. In general terms, empowering local authorities decreases the powers of state or national authorities, and empowering civil society diminishes the powers of local, state or national governments in favor of community-based organizations,



public-private partnerships or local, national or transnational private concessionaries; however, empowerment might also increase the usefulness and legitimacy of the State if citizenship leads to a better service and helps citizens' actions to flourish and encourages contributions to social welfare.

Session FT3.10 "Voicing People's Interests - Civil Society Innovating Change in Water and Sanitation Policy", stressed that local governments, water utilities, users and

user associations, civil society organizations, community based organizations, and marginalized groups such as women, indigenous peoples, and young people, especially for their contribution to changing habits and mindsets, should be empowered in order to provide not only a better water service but also to strengthen the community social weaving and political conformation. The various means of empowerment include but are not limited to awareness raising through information sharing, encouraging willingness of individuals to become empowered, capacity building through education and knowledge transfer, wider consultation with those populations that are affected, greater and more balanced representation in decision making, increased funding, recognition of the role of NGOs as a link between local governments and the people, the facilitating position of donors, and the juridical adequation for the empowered bodies to perform mandatory acts.

However, caution must be exercised in the design and implementation phase to avoid delegation of attributions without sufficient means to carry out decisions, ambiguity in the division of responsibilities, and the lack of accountability and transparency in empowered entities. Hence, the empowerment of local actors should be accompanied by rules at least defining:

- i) Mechanisms for legitimate and balanced representation, monitoring, and accountability;
- ii) The decision-making process thorough which local authorities and involved stakeholders should reach policy agreements;
- iii) The way of obtaining scientific information so that policy makers may effectively use this knowledge;
- iv) A process for building public awareness through communication of common and informed understandings for defining consensual policies; and
- v) A way to build social awareness in regard to problem responsiveness, in order to evaluate how well decisions correspond to water management goals, including sustainability, equity, and efficiency.

Empowering local actors requires coordination of several governmental strata

Empowering communities or local authorities poses the problem of coordinating different governmental strata. If water services are municipal responsibilities but water allocation and distribution are a state or federal faculty, municipal authorities or their public-private partnerships may be empowered to

deliver potable water and treatment services but might not be empowered to address environmental or risk management issues. A similar situation arises in irrigation districts, where water user associations can provide the irrigation service but may not engage in watershed decisions reserved for the federal government, diminishing the possibility of fully empowering local authorities. Empowered local communities must also take into account crosscutting perspectives in public policies, since water policy is immersed in a more general national development policy and even in regional development policies.

Session FT2.02 *"Integrated Management and Governance: A Framework for Making Empowerment a Reality"*, pointed out that all successful and sustainable water management schemes require a sound institutional framework, consisting of proper legislation for defining the attributions of each institution, legitimate representation of stakeholders, fundraising by taxation, tariffs and external financing, and capacity building in order to empower local organizations. Local Action LA1037 *"Involvement of Local Governments in IWRM in Southern Africa"*, recognized that even though local government legislations are explicit on the roles and responsibilities for water management within their territories, the jurisdictional boundaries of water institutions and local governments seldom coincide, leading to conflicts on authority and in some cases to outright power struggles.

In some other cases, such as in Session FT5.04 *"Partnership Building at Community Level"*, it was shown that public participation in community-based organizations may help in addressing natural risks by mapping hazard zones, raising public awareness, and implementing warning and evacuation programs. Additionally, as discussed in FT4.25 *"Multiple-Use Water Services"*, sector barriers may be dissolved following a multiple-use water services approach whereby domestic, livestock, irrigation and other productive water needs are taken into account from the beginning in the household, community or micro-region.

Some other empowerment coordination problems are present when dealing with transboundary waters, as was shown in session FT2.05 *"Water Management in Transboundary Basins"*. The multi-governance of water may lead to two opposite situations. If water is regarded as a national security issue, the national government will perceive itself as the sole and only entity responsible for managing water resources. Consequently, border municipalities may not engage in water service agreements with the municipalities or states of the neighboring country, for instance, as they will need to seek assistance from national governments to find a solution to a

local problem. However, an increased cooperation through the joint management of transboundary waters may lead to a fuller and more meaningful empowerment of local authorities.

A proper institutional setting is needed for effective empowerment of local actors

In Session FT3.48 “Public Policies for Water and Sanitation Services”, it was stressed that delivering drinking water, sanitation or irrigation services is ultimately a local action according to the principle of subsidiarity for policy

implementation. However, according to Local Action LA1346 “New Austria Water Sector Policy and its Local Implementation”, defining water policies, allocating water use rights, river basin management, and cross-sectoral coordination are decisions to be made by state, watershed, national or even international authorities, following the principle of “supersidiarity” for policy support. It is therefore essential that the regional and national authorities in charge of formulating development policies ensure that the appropriate institutional setting is in place for water policies to be implemented locally.



Empowering Through Autonomy, Financing, and Proper Regulation Leads to Accountable Results for Policy Makers and Users

Even when infrastructure improves, service provision of utilities can remain poor if managerial practices are not improved. In the case of the National Water and Sanitation Corporation (NWSC) of Uganda, service provision improved only when reforms were introduced. The government of Uganda signed a performance contract with the NWSC in which debt service obligations were suspended in return for a commitment to operational and financial improvements and an increase in coverage. This contract gave the NWSC management autonomy but also made it accountable for results. Several reforms were implemented, such as more autonomy transferred to the Area Service Providers, along with defined performance targets and automatic tariff indexation to keep the tariff levels in line with inflation. As a result, improving internal communication and setting tougher performance targets and corresponding incentives enhanced employee commitment. The corporation has begun to generate an operating surplus and services have been expanded and improved.

From Local Action LA1744 Turning Around the NWSC: Improving Efficiency, Providing Service, and Creating Financial Sustainability



Representation and Accountability to Citizens Must Be Practical

Until the mid-1990's, the Ghana Water and Sewerage Corporation (GWSC) had sole mandate for water and sanitation services, and there was no democratic governance over water issues. Amid a public health crisis, ineffective and uncoordinated non-state actors were focusing on stop-gap charity services for poor communities, but no dialogue was taking place with essential stakeholders. A coalition of NGOs involved in water and sanitation was then formed through the actions of a group of local stakeholders that converged in the tiny and remote village of Mole to discuss solutions. They took the initiative to facilitate multi-stakeholder dialogues with professionals, academia, engineers, politicians, citizens, the private sector, traditional authorities and the local government, on an annual basis.

The Mole Conference, thus created, annually reviews progress and processes. By Mole 4, proposals for drastic water sector reforms had been discussed, not to mention that trust and confidence between CSOs and the government had been restored. The Mole conference is now in its 17th year. Vibrant civil society is impacting on national and international processes, providing leadership within the process and witnessing that, with sufficient support and coordination, situations can evolve. For example, investment in the rural water sector increased coverage from less than 8% in 1994, to 40% in just 4 years, now reaching 52%. The Mole series also created the conditions for nationwide convergence on the right to water.

From Local Action LA0772 The Mole Conference Series: A Rallying Point for Civil Society Advocacy in the Water and Sanitation Sector in Ghana

Empowerment in Water Management Decisions Through Capacity Building Provided by NGO

In a rural community of Nigeria, a reliable, accessible, adequate and cost-effective water supply project was carried out. The system made use of the existing borehole and introduced cheap sand-filters at Water Households. Women were trained in water management and took over management of the borehole. This proved to be a very effective strategy for promoting local ownership, efficient management and establishing a sustainable water service.

From Local Action LA1658 Gender Intermediation in Uboma, Nigeria: A Model for Sustainable Access to Clean Water for the Rural Poor

Empowered local actors need to be legitimate representatives, encourage public participation, and be accountable for their acts

The implementation of coordinated water policies requires empowering local communities and local governments, which means, above all, increasing their political autonomy, technical capacity and financial resources in order for them to make appropriate decisions on water services, as discussed in Session FT3.18 *"Capacity Development and Empowerment of Civil Society"*. Local Action LA0201 *"Stakeholder Dialogue for Better Water Resource Management"*, stressed that empowering farmers, women and CBOs through capacity building provided by NGOs allowed marginalized groups and women in Jordan to be able to prioritize water problems, negotiate with the government and propose water plans, and engage within their community; however, a warning is sent because disempowered intermediate level actors serve as "conduits for instructions from above", the information and communication gap is worse than originally thought, and setting up country partnerships requires a careful involvement in networks.

This means that empowered communities need legitimate representation and informed decision-making processes to better serve users and the interests of broader social goals and water policies. Means of accountability and public participation are also necessary to prevent the use of the newly invested power in local communities or authorities to better serve their own interests or those corresponding to private organizations embedded within the global governance.

Empowered local authorities have an obligation to engage in permanent institutional development, educational programs, and knowledge transfer processes, as explained in Sessions FT4.06 *"Capacity Building in the MENA Region: Ministerial Panel"*, and FT4.20 *"Capacity Development Strategies and Social Learning Among Stakeholders for a Sustainable Irrigation and Drainage Sector"*, since empowerment is not

an end in itself but a means for decision-making. The first challenge is to determine which representatives to include in the new procedures and institutions, and another is to develop decision-making mechanisms that satisfy the groups involved in the process. A reasonable understanding of what the represented group favors out of a likely range of policy outcomes, an ability to translate these choices into policy options, and resources and skills to gain approval of preferred policies, all contribute to effective representation. When representatives have restricted access to information or technical knowledge and are not given the possibility of actually making decisions, participatory processes may simply become a guise used to claim legitimacy, as purely advisory deliberations may have little impact on final decisions made elsewhere.

Governance incorporates civil society's actions into public affairs

The subsidiarity principle as applied to water services can and must play a role in the establishment of a democratic and decentralized model of governance in our societies. Session FT2.48 *"Water Governance: From Analysis to Action"*, pointed out that governance addresses collective problems in a fragmented and multi-level political environment characterized, first and foremost, by a multitude of actors and interests with different purposes and objectives, such as political actors and institutions, corporate interests, civil society, and transnational organizations. What were indisputably governmental responsibilities previously are now increasingly seen as more common, generic, societal issues which can be resolved by political institutions, but also by other actors. Political institutions no longer exercise a monopoly in the practice of governance. Beyond growing interrelatedness, interdependency and complexity, this slow but steady ascent of non-State actors characterizes the phenomenon of globalization.



Empowered local governments or authorities must make decisions and execute their actions, while taking into account a wide range of needs, such as the visions of indigenous peoples, proposals from youth organizations, the concerns of NGOs, gender issues, and public-private partnerships. In order to attain provisions defined by local stakeholders, it is imperative to recognize that men's and women's knowledge and experience are equally important and valuable and that awareness and education are essential for both men and women in order to solve problems sustainably.

Women are an important agent of change

Session FT1.17 *"Gender Mainstreaming and Water for Growth and Development: Diversity as an Agent of Change"*, stressed the fact that women, especially in Africa, Asia and Latin America, are responsible for collecting, transporting and using water for daily needs. As a consequence, women are essential partners in water management, preservation, use, and disposal. So, gender

mainstreaming means involving women as well as men in all aspects of the planning, implementation and monitoring of water policies and programs in all ranks of decision-making.

Currently, men's comprehension and expertise is dominant in the water governance arena, which is often quite detrimental to effective water management. To promote better decision-making without perpetuating the bias in gender equity, it is essential to support capacity building for women to promote their involvement in water management as actors in their own development without overburdening their workload and to ensure that proposed solutions are appropriate for their needs, as presented in Session FT3.12 *"Safe, Accessible, Private and Nearby: Making Services Work for Women – The Key to Meeting the MDG Water and Sanitation Target"*. As recognized in the UN Secretary General's message on World Water Day, women's involvement and empowerment is essential to poverty eradication and environmental regeneration, however the lack of access to water and sanitation also deprives many women of access to education, automatically reducing their level of empowerment.



Gender-Sensitive Water Management

Countries require that their national policies and institutions for water supply and sanitation service delivery respond equally to the different roles, needs, and priorities of women and men. Actions should focus on:

- i) Formulating gender-sensitive strategies and policies that cut across water, social, health and education ministries;
- ii) Providing specific and practical examples of how to translate the water community's commitment to gender mainstreaming into consistent action on the ground;
- iii) Strengthening legislation for land and water rights, particularly for women and indigenous people;
- iv) Developing capacity and encouraging equal participation among men and women in training and decision making; and
- v) Providing technical assistance to local authorities and communities regarding low-cost technologies and access to information.

From Session FT3.12, "Safe, Accessible, Private and Nearby: Making Services Work for Women – The Key to Meeting the MDG Water and Sanitation Target"

In addition, women can be catalysts for community development, agents of change and important role models. Through their own empowerment, women's groups can also empower other marginalized groups that are working together focused on indigenous peoples, HIV sufferers, the elderly, children, and others. Projects that are gender equitable are also more economically efficient and effective, since small investments in building women's capacity yield huge returns, notably in increased productivity and decreased health-related expenditures, provided that both women and men feel a sense of proprietorship for local projects and are free from the influence of corruption.

Public communication is essential to develop information awareness

Sessions FT1.40 *"The Mass Media: Key Elements for a Conscience and Social Participation in the Problematic of the Water"*, and FT2.49 *"The Mass Media as a Detonator of a Water Culture"*, emphasized that for the participation of a well-informed public to occur, an adequate flow of communication between authorities and citizens is necessary. Present communication efforts have proven insufficient for the general public to appraise water problems and alternative solutions in a timely manner, in order to prioritize policy issues.

Whereas newspapers have traditionally been the preferred means of communication over other media, the advent of the Internet has enabled the research of relevant policies and technical information essential to forming policy stances, at least for people with access to this service. In any case, mass media tools play a very important role in empowering local communities, and authorities should develop specific communication programs using various channels, to inform the public adequately in view of improving water services and policy formulation.

Throughout the Forum, it was made clear that the choice between public, private or public-private management in providing water services must be communicated to local stakeholders and agreed upon Session FT3.43 *"The Public-Private Controversy in Water and Sanitation: Lessons in the Light of the MDGs' Requirements"*, since local authorities should be able to freely choose among the various management models. There is no one best solution, so whether water utilities are public, private or mixed, they should be able to provide quality drinking water and sanitation services to everyone in the community, or at least commit to reaching the Millennium Development Goals, as agreed in the Local Government Declaration on Water issued by the organization United Cities and Local Governments, during the 4th World Water Forum.

Neoliberalism and Water: Millions Have Lived Without Love, No One Has Lived Without Water

"Converting finite resources to 'scarcity' is a shift in the political economy of water that produces oligopolistic private water services where the citizen is absent: We are in the presence of new actors with gray accountability. Therefore, we have to think out of the water box and recognize the political nature of water, address the limits of the market, evaluate the convenience of financing the MDGs through markets or fiscal measures, and clarify whether we are subsidizing the market or the public."

Erik Swyngedouw, Oxford University

Local Action not registered, Private Sector Participation in the Water Sector and the MDGs: Turning Local Waters into Global Money?

Hydro-solidarity is an effective means to deliver water services for the poor

The Local Government Declaration on Water calls for increasing financing for local water and sanitation infrastructures as a means of addressing the needs of poor populations without access to those services. However, even empowered communities are sometimes unable to provide safe water and sanitation services to the poor due to the utility's insufficient

financial resources or to the low payment capacity of people in some areas of service. In order to keep advancing in the MDGs, hydro-solidarity is emerging as part of an ethical agenda in which wealthier water users support the marginalized and the poor through cross-subsidies or differential water tariffs. This humane action is not only locally applicable; it can be extended from one city to another, from one state to another state or city, or even from one country to another country, state or town.

Hydro-solidarity does not necessarily empower a local community but it can always help in achieving the main goal empowerment seeks: to provide better water services, especially in the extension of coverage for the poor, whether or not local actors are empowered. For example, this ethical help can be achieved by the allocation of a portion of revenues raised by local and regional authorities for water and sanitation services, earmarked for cooperation projects with partners in developing countries, as expressed in the Mexico Declaration issued at the World Encounter of Water Legislators. Another way to channel this kind of help is, for instance, the public aid provided by the government of France for the implementation of national water strategies, the promotion of appropriate water governance and the involvement of local stakeholders in order to assess progress and the appropriate use of funds through follow-up and evaluation mechanisms, as expressed by the French Minister of Foreign Affairs, Nelly Olin, in her speech of March 21, 2006.

Hydro-solidarity is also related to sharing water and the benefits it brings, as well as being useful in preventing armed conflicts. At the Ministerial Conference, the Holy See stated that sharing water and its benefits, in a mutually agreed, equitable and sustainable way, is the key to preventing conflicts over this precarious resource, regardless of local or international scope or extent of the project. Furthermore, it has been increasingly recognized that local authorities should solve local conflicts; however, when struggles over water become armed conflicts, international organizations are needed to help mitigate disagreements through a multi-stakeholder approach as proposed in Session FT4.39 *"Multi-stakeholders in Local Conflict Mitigation"*. It was also shown in Session FT5.17 *"Managing Safe Drinking Water in Areas of Armed Conflict and Ecological Disaster from a Gender Perspective: Learning from Good Practices in Central Asia and Latin America"*, that in negotiations with armed groups in situations of conflict, women's groups are considered to be more neutral, acting in the public's general interest, and are thus able to obtain more positive outcomes.

Hydro-Solidarity

"Hands that help are holier than the lips that pray."

Satya Sai Baba

From Local Action LA0899, by Sri Satya Sai Drinking Water Supply Project

Democratization, decentralization, public participation, and empowerment are key actions to improve local water services

Governance and empowerment are circular processes. Whether decisions are made centrally or locally, both central and federal governments and local authorities are representatives of the people and must adhere to the principles of accountability, democratic participation, transparency, and to a water management ethos. Session FT3.41 *"Governance of Local Water and Sanitation Services"*, showed that empowerment and decentralization are kin concepts in recognizing and allowing public participation. Hence, the representative relationship between the public and policy-makers is central to many concepts of democracy, especially in measuring the extent to which the public's preferences are reflected in public policy or in the attitudes and behavior of those who formulate and implement public programs and policies. The

public's power or control over those who manage public affairs is a fundamental, yet circular, political question: empowered community representatives must also be subject to control. The assumption that greater public knowledge will lead to greater public control does not always hold true because the relationship between holding information and the exercise of power is a two-way relationship in most, if not all, policy domains.

Empowerment and democratization are closely linked. Nevertheless, federal, state and local attributions for water management should be unambiguously defined to avoid ill-conceived overlappings. The objective of empowerment must be clearly defined in order to overcome conflicts in authority, since to solve problems related to access to safe water and sanitation, current governance includes national governments, international agencies, the private sector, and local communities. Hence, more attention must be given to coordination and cooperation among these actors at every level.



Science, Technology and Knowledge Sharing

Main Issues and Recent Tendencies

With "Local Actions for a Global Challenge" as its overarching theme, the 4th Forum highlighted the importance of local knowledge for solving local water issues. Recently, this knowledge has received greater attention, owing to a number of unsuccessful attempts to implement technologies, which failed to pay proper attention to local conditions and knowledge. However, research and development still remain important for innovative technologies, and the decision now focuses on the proper mix of traditional, technological and scientific knowledge.

Capacity-building is a key element for successful knowledge dissemination, and significant progress was made at the Forum in awareness raising and mobilizing decision makers and stakeholders on its crucial role. In this perspective, the role of networks and partnerships was strongly emphasized during the Forum, such as capacity-building networks, scientific networks, river basin interdisciplinary networks, national, regional or global networks, and so on.



Facts and Figures on Science, Technology and knowledge Sharing

Investments in research and development (R&D) activities show an interesting correlation with the level of development of a country. In most developed countries, 2% of the GDP appears to be a minimum investment (2.4% for Germany and 2.9% for Japan between 1996 and 2004), of which 70% come from or are managed by the private sector; and in developing countries, research investments are often scarce (0.15% of the GDP for Egypt and Pakistan) and more often than not come from and are operated by the public sector. Nevertheless, some developing countries have been developing their research and development investments, such as Uganda with its investment in R&D gaining 0.3 percentage points in 8 years, to attain 0.8 % of the GDP in 2004; and emerging countries such as China or Brazil are now allocating over 1% of their GDP, with a strong increase in recent years. (Source: UNESCO Statistic Institute, 2004, available in www.vis.unesco.org).

It is worth pointing out that of the 1,631 local actions registered in the Forum, 50% had capacity-building or the application of science, technology and knowledge, or both, as one of their crosscutting perspectives. Furthermore, these local actions came from all over the world with a geographical distribution that balances the picture of investments in research and development.

"Yes, let us demand a fairer distribution of progress. Of all progress, and especially technological progress, which, today, is reserved for too few. Desalinization and treatment of saline waters, pumping of deep groundwaters, transfer of water over greater distances, and even thoughts on virtual water, every contribution of human intelligence must be shared." Loïc Fauchon, President of the World Water Council, in his Opening Speech at the 4th World Water Forum.

"It has been observed that due to a lack of information, knowledge and financial resources, technologies are applied in physical, social, and economic environments which are different to those for which they were originally designed, a situation that leads to subsequent negative impacts on their operation and maintenance." (Application of Science, Technology and Knowledge Thematic Document).

"While investments in water infrastructure over the past 30 years have totaled US \$600 billion dollars, about half of all investments in developing countries have been unsuccessful due to lack of capacity". - Jan Luijendijk, UNESCO-IHE

Main Messages and Lessons Learnt

So important is knowledge to water resources management that two crosscutting perspectives, "Capacity Building and Social Learning" and "Application of Science, Technology and Knowledge", were selected in order to guide the debates in the sessions at the Forum and to provide a framework for the focus of the local actions.

The overarching theme of the Mexico Forum was "Local Actions for a Global Challenge", which stands as one of the basic premises in water management: that actions have to be carried out at the lowest appropriate domain with local actors – actors which should be provided with the necessary tools, as well as supporting the development of their technical, financial, self-management, and coordination capacities. The main sub-topics addressed under these two headings were:

- Progress of knowledge and development of technologies;
- Transfer and adaptation of knowledge;
- Importance of indigenous knowledge;
- Improvement and dissemination of successful local actions;
- Capacity-building; and
- The paramount role of networks in the context of knowledge sharing.

Science and technology development requires an appropriate environment

In several sessions, it was stressed that there is a constant need to carry out research and development and, as underlined in session FT3.04 *"Knowledge Generation and Innovative Technologies for the Sustainable Management of Water Resources in Europe and Worldwide"*, this requires an appropriate environment. In order to invest, capital markets

look for adequate infrastructure, governments that create an institutional environment to foster productivity, universities that actively contribute to the progress of science, technology and knowledge, and companies that convert society's needs into opportunities for business, all of which are regarded as essential elements for an innovative society.

The reduction in the science, technology and knowledge gap will require deliberate measures to build scientific and technological capacities in poorer countries. However, many new scientific and technological developments can be provided to the least developed countries, even if they do not have the capacities to develop and use them directly session FT5.08 *"Coastal Development and Defense in the Low Lands"*. For instance, space-based observations can help developing countries to overcome the problems caused by a lack of data, and their involvement in its analysis can be useful to train staff in order to approach more complex problems and build their capacities.

The European Water Supply and Sanitation Innovation Platform (WSSTP)

Since 2005, the European Water Supply and Sanitation Technology Platform (WSSTP) has been examining the challenges associated with innovative technology. This platform is one of the most extensive consultations on water research needs ever undertaken in Europe, and involves industry, governments, consumers and specialist research organizations. The remit of the WSSTP and its various stakeholders is to improve the competitiveness of the water sector (as per the so-called "Lisbon Objectives" defined by the European Union) and contribute to the Millennium Development Goals. So far, the WSSTP has produced a "Vision to 2030", which has been broken down into shorter deadlines for the most urgent goals, and a "Strategic Research Agenda", for which work on an Implementation Plan is ongoing.

The following four water-related challenges, some of which are technological and some more organizational, have been identified by WSSTP:

1. Increasing water stress—which arises from excessive quantitative or qualitative demands on scarce water resources;
2. Urbanization—which creates acute conflicts between water users. This problem is increasing due to population and migration trends. Systematic solutions are needed to address complex problems using both institutional and technological innovations;
3. Extreme events—the frequency and severity of which are linked to climate change. In addition, pressure for action has increased because of greater public awareness of the toll taken on vulnerable people outside Europe; and
4. The needs of rural and less developed areas—which are affected by the unfavorable conditions occurring there.

From session FT3.04, by the Directorate General for Research of the European Commission



The main objective of the transfer of technological know-how should be to improve local autonomy

Innovations have to be disseminated, and training and transfer of know-how are of prime importance to the future of developing countries. In their ongoing attempt to build modern economies, they often have high expectations on these transfers. When it is appropriate and well managed, the transfer of know-how can be one of the driving forces behind development and economic growth. Session FT3.33 *"Transfer of Organizational and Technical Know-How Between Northern and Southern Countries"*, convened by private companies, insisted on training and management: "Transfer of know-how is not only about technology, but also training and management. Failure to transfer organizational know-how in parallel with technology transfer can greatly diminish the associated benefits". This session also recognized that for this transfer to be sustained, it is essential to give people what they need, with respect to cultural diversity, and in order to be successful in that respect, the transfer should reap mutual

benefits. Both parties involved in a transfer should gain from it, although the benefits may be of a different kind. Various innovative approaches set up in less developed countries are relevant to be implemented in developed ones.

The European Regional Report produced for the Forum added that technologies that would be easy to use, cost-effective, and affordable, are indeed more likely to be disseminated in the world. Strategic perspectives of proposed solutions to this effect might vary between public and private sectors. Public-private participation in the entire cycle of water technology research projects could become an essential first step in accelerating such processes, and the dissemination policy has to be designed from the earliest stage of the innovation plan.

Finally, several sessions, such as FT4.31 *"Ecological Management and Rainwater Catchment Systems"* and FT1.34 *"Water Infrastructures for Sustainable and Equitable Development"*, called for the intensification of South-South know-how transfer, especially within areas sharing a similar culture. Regional training centers in order to boost this South-South transfer should be set up and financed.



China's Transfer of Know-How on Rainwater Harvesting to Southern Countries

In the agricultural scene, China's work carving mountains to catch rain for its crops in a semi-arid area and the dramatic increase in farmers' income changed the perception of the usefulness of rainwater catchment systems (RCS). The impact of 20 million hectares of RCS-fed agricultural fields on the lives of farmers and the local economy was enough to convince the national government to create a RCS Committee in the Chinese Engineering Society. The micro watersheds in fruit plantation also showed the flexibility of RCS principles in dealing with water needs. The benefit of conditioned soil and water availability from RCS contributed much to the resolution of issues of food security and productivity. Since 2003, the Chinese Ministry of Trade decided to support the Gansu Research Institute for Water Conservancy (GRIWAC) to carry out every year the International Training Course for Rainwater Harvesting and Utilization. Since then, a total of 99 participants from Africa, Asia and South America have attended the 45-day courses and obtained significant knowledge and assessed experiences on rainwater harvesting (RWH). The GRIWAC is now assisting Gigawa state of Nigeria to build the rainwater harvesting systems. Some of them have already supplied water for those without safe water access in the past.

From Local Action LA0866, by the Gansu Research Institute for Water Conservancy

Local knowledge also needs to be replicated elsewhere

Science and technology can provide innovative solutions, but innovative and interesting solutions also exist at the level of local communities that do not come from research centers or private companies. Local knowledge and adaptive technology development has historically been neglected, even though being aware of, spreading, transferring, and sharing available existing knowledge could be more relevant in some cases than defining new technologies.

The need to replicate successful local actions in order to achieve results on a large scale was strongly advocated in session FT4.20 *"Capacity Development Strategies and Social Learning Among Stakeholders for a Sustainable Irrigation and Drainage Sector"*. Furthermore, session FT4.05 *"Water for Food, Livelihoods, and Environment: Bridging the Gap through Partnership in Research"*, stated that replicating successful local actions is vital, both for effective local water management and effective research and development. If an investment produces results locally, then it has not finished its task. The main question that arises on spreading local actions is whether it means turning a small-scale solution into a large scale implementation, or having many small scale applications disseminated all over the world. Documenting the lessons learned and looking at local technology development in the context of a diaspora of successful local actions, has the

potential to improve water management and drinking water, sanitation and irrigation services delivery.

The use of local and traditional knowledge should be evaluated before adopting and adapting technologies

Sometimes local knowledge exists but only in the memories of local communities, and is not used in a systematic and wide fashion. The notion that people without an academic degree are incapable to provide innovative solutions was repeatedly challenged, especially in the irrigation and drainage sector (session FT4.20), where forgotten traditional solutions can be especially effective and efficient. Hence, the participation of local communities in water projects is crucial. In regard to risk management for instance, the lack of data can be compensated by memories of communities.

The Compendium of Actions, presented by the United Nations Secretary General's Advisory Board on Water and Sanitation, stressed the need to involve women in a more meaningful way for decision-making on how water is used and managed so that their countries can make full use of their knowledge, skills and contributions.

Respecting local cultures means evaluating local knowledge and verifying whether a local approach could be a proper solution (session FT2.33 *"Advancing Local Actions"*). Otherwise, external technology may be used, as long as it is sensitive to local conditions and knowledge.

Giganawendaamin Nibi (We All Must Take Care of Water)

2006 is a decisive year in fighting for the involvement of local Native American women in the social and political struggle to develop a Minnesota legacy on clean water. Environmental contaminants are affecting the reproductive and general health of Native People to a greater degree than the general population of Minnesota; however, young Native women do not feel they have a voice in the policies and decisions that are made about water as an issue that affects them.

As part of its commitment to strengthen the health and education of Native People, the Indigenous Peoples Task Force has identified a unique opportunity to build community leadership capacity among Native American women to fulfill their traditional and contemporary roles as those who stand up for, look after, and know about water. A core of 20 Native American women will be trained in scientific and cultural methods for assessing and restoring the health of Minnesota waters. The long term goals of the project are to equip this core group of Native American women, girls and elders in Minnesota, with the tools to scientifically and culturally fulfill their role as caretakers in maintaining the health of our natural water systems. In the contemporary context, this includes a set of skills that integrates knowledge about science, environmental regulation and policy, and cultural practice. The project is designed to build the knowledge capacity of Native American women to test their own community waters, organize their families and communities to address any toxic or pollution problems, and become active in holding tribal, state and federal governments accountable for the environmental health of Native communities. "The project will put scientific knowledge and information back into the hands of indigenous women who historically were the nurturers of our families and communities."

From Local Action LA0549, by the Indigenous Peoples Task-Force

The proper mix of science, technology and local knowledge

Knowledge coming from several sources may be relevant to solving water issues locally, and has to be adapted if it is to be transferred elsewhere; they are indeed complementary and reinforce each other. Technology has to be implemented through local actions: on-site adaptation and demonstration with the full involvement of local stakeholders is indispensable for transferring it. On the other hand, existing local actions can provide input to research. The demonstration of the success of a local action is a prerequisite to its replication. New approaches, in particular the ecological sanitation discussed in

sessions FT3.13 *"Ecological Sanitation: Closed-Loop Sanitation Approaches to Attain Healthy and Sustainable Cities and the MDGs"* and FT3.24 *"Emerging Sanitation Paradigms-Economics and Capacity Building in ECOSAN"*, rainwater harvesting examined in session FT4.31 *"Ecological Management and Rainwater Catchment Systems"* or eco-hydrological approaches presented in session FT2.38 *"Ecosystem and Ecohydrology Approches to Integrated Water Resources Management"*, should prove their success and their adaptive potential in different local conditions and regions. We must also build research and local development organizations that develop capacity to extrapolate successful technologies and knowledge more widely.



Ecohydrological Approach in Lake Naivasha, Kenya

Lake Naivasha lies in the Eastern Rift Valley and is the second-largest freshwater lake in Kenya. The lake has international recognition as a Ramsar wetland. During the last two decades it has grown to become the main site of Kenya's horticultural industry, one of the largest earners of foreign currency. The lake naturally had a most effective natural purification filter nearby its shores. This was a belt of Papyrus, tens of meters thick around the shores, and many square kilometers at the delta of the two permanent inflowing rivers. The degradation that has been imposed on to the natural functions of the lake's riparian zone has been caused by a number of human activities that have had an additive effect. The worst activity is the extraction of water in the whole catchment, at higher rates than are naturally replenished by the hydrological cycle.

This first proposal for restoring the lake is based upon the demonstration of the feasibility of phytotechnologies to rehabilitate an intact vegetated ecotone that will buffer the lake against sheet surface runoff during storm events, to restore an intact papyrus fringe and minor reconstruction of temporary stream channels, which will buffer the lake against intense sediment input during storm events, and to create a sequentially constructed wetland at the delta of the main inflowing river. The second phase of developments in Lake Naivasha is a demonstration site that will promote the message of ecohydrology through education at all levels from schools to universities. Already it is promoted in schools by short, locally-made videos and DVDs with the message *"Maji ni uhai"* – Water is Life, in Swahili. The purpose is to encourage a wise water use among adults – all of them, from illiterate farm workers to horticultural experts holding doctorate degrees, so that they understand the principles of the demonstration sites. The third phase will be then to spread this educational campaign into the catchment, concurrently with the extension of demonstration sites up the riparian zone of the river Malewa, further incorporating principles of ecohydrology such as the use of floodplain plantations of native trees as fuel plots and new wetlands as human waste treatment facilities in downstream rural towns.

This action is not yet implemented. The innovation however, lies in the combination of its ecohydrological basis, which is itself an innovative scientific example for achieving the sustainable future of river basin management, with the sites located in equatorial, arid East Africa. Ecohydrology has been called the "low cost – high technology" solution for sustainable river basin management, to minimize threats to human health and biodiversity, maximize water availability and ecosystem services for society.

From Local Action LA1187, by UNESCO-International Hydrological Programme

Capacity-building is the key to moving from knowledge management to knowledge development

As underlined by many sessions, and specifically addressed in a few others, knowledge is also intrinsically related to capacities, and capacity-building will help countries to move from knowledge management to knowledge development. Together with knowledge, enhancing capacity development remains one of the most critical challenges in water resources management. New tools and methods have been proving their success, such as *Training of the Trainers* that allows cascade learning, or e-learning, for instance (session FT1.27 *"New Concepts and Tools for Education and Capacity Building to Achieve the MDGs"*), in

which UNESCO-IHE called for these activities to be urgently scaled up. According to previous statements on knowledge, building capacities in local communities should be the first priority. Monitoring and reporting capacity-building impacts are essential to motivate people to take part in these activities (session FT2.03 *"Strengthening Institutions and Stakeholders Capacity for IWRM Implementation at the Local Level"*).

While many speakers advocated for a small capacity component in each development project, session FT4.20 claimed: "[capacity building components] can and should be projects by themselves". In any case, funding for capacity-building must increase, and long-term commitments appear to be crucial.



Revitalization of Smallholder Rain-Fed and Irrigated Agriculture in South Africa

Limpopo Province is one of the driest and poorest provinces in South Africa, with 70% of the population living below the poverty line, and is characterized by high unemployment. The previous (apartheid) government established 171 smallholder irrigation schemes in the province with the objective of improving the livelihood of smallholder farmers and their families. However, most of these irrigation schemes are not performing optimally. As a result, the original objective of generating employment and reducing rural poverty through the establishment of these schemes has not been achieved in many instances.

Through a Water Research Commission (WRC) research project, guidelines developed by the WRC were tested as a means of increasing the accessibility of meaningful training and capacity building where small-scale irrigation forms part of integrated sustainable rural development initiatives. The research included the development of training material and training of farmer trainers. They further tested how training can be provided through the two Agricultural Colleges in the Limpopo Province. The Limpopo Province Department of Agriculture (LDA) now has several years of experience with the revitalization and rehabilitation of smallholder irrigation schemes. The impact assessment of the LDA's actions to date has convinced farmers of the value their training and capacity building activities have had on improving livelihoods. However, farmers requested that the training subjects be broadened from a basic agricultural production focus to also cover business and marketing skills, and water management training to improve equitable sharing of water between users. In view of the higher level of training needed, the LDA requested the International Water Management Institute (IWMI) to broaden smallholder irrigation farmers' access to training and capacity building in South Africa. Training and capacity building have been ongoing in the province for the past few years and are now extended throughout the province within the current expanded program for Revitalization of Smallholder Irrigation Schemes (RESIS). This process is viewed as a pilot exercise for national expansion, aligning to the development of the South African Government's National Strategy for Education and Training for Agriculture and Rural Development.

This research action and capacity-building project, aimed to transfer practical skills to previously disadvantaged individuals, institutions and communities, targeted resource-poor farmers, youth and women's groups for enhanced skills in agricultural production, water use and management, business and entrepreneurial skills.

From Local Action LA1363, by the Water Research Commission, South Africa

Networks and partnerships as knowledge tools

Networks and partnerships are essential tools for knowledge development and management. Many sessions emphasized the crucial role of networks and partnerships for capacity-building, scientific inter-disciplinary exchange and public-private participation to boost technology transfer, and local connections and civil society partnerships to expand local

actions. Networks and partnerships are essential to adequate knowledge creation and dissemination. Indeed, in addition to sharing costs and advancing the frontiers of knowledge, networks were appreciated as an efficient strategy to adapt knowledge to local stakeholders' specific needs (session FT2.03). In networks – for research and other actions – we must learn to consult widely with other partners to get the benefit of their experience. However, even large networks must learn to



Capacity Building and Networking for the Water Sector in the Nile River Basin

This network, supported by UNESCO-IHE, involves research and educational institutions from all countries belonging to the Nile river basin. Development of joint and common educational programs, together with joint research activities have been in focus within the network. Internet-based platforms for facilitating knowledge sharing have been established, and the emergence of communities of practice has been stimulated.

The project has succeeded in creating national networks in six countries and six regional research clusters (including thirteen research groups); each to study and focus on a specific research topic and to be led by a Nilotic country: Egypt (GIS and Modeling), Sudan (River Morphology), Ethiopia (River Structures), Kenya (Flood Management), Uganda (Environmental Aspects) and Tanzania (Hydropower Development). It is worthwhile to mention that all the ten Nile River basin countries are contributing to the research activities and benefit from the training activities in the various clusters.

Based on the achievements of the first phase of the project, an initiative on "Establishing a Nile River Basin Capacity Building Network for River Engineering (NBCBN-RE)", as a second phase of the project, is being launched, with the support of the Dutch Government. This Initiative has regional ambitions in building and strengthening human resources and institutional capacity for a sound development of water resources in the Nile River basin.

From Local Action LA0178, by UNESCO-IHE

connect locally (session FT4.05 *“Water for Food, Livelihoods, and Environment: Bridging the Gap through Partnership in Research”*) for proper efficiency.

Session FT2.41 *“IWRM in the North”*, advocated for the creation of catchment or country networks of water professionals and stakeholders in order to enable the sharing of all the experiences with other countries or basins through North-South, South-South or North-North basin twinnings, for instance. Information sharing among regions with similar natural, socio-economic and cultural conditions is crucially

effective to strengthen water governance in the countries concerned. The elaboration of information platforms in partnerships involving relevant organizations in the region will help to create and reinforce networks of interested parties and boost mutual understanding (session FT4.10 *“Water Accounting and Information Platforms”*).

In the case of international transboundary river basins, making self-sustainable networks of educational and research institutions can fundamentally change the management of transboundary water resources (session FT1.27).

Initiatives

Global Network of Water Anthropology for water action: NETWA

NETWA is a global computerized network of anthropologists dedicated to collecting resources related to water, including water engineering and policy, in order to reach the Millennium Development Goals. It promotes UNESCO-IHP's guidelines to shift toward the integration of the cultural dimension of water, as well as UNESCO's policy in education, human rights, ethics, and governance for promoting best practices. It is designed to encourage interaction between anthropologists working on water issues and water professionals such as hydrologists, geologists, engineers, policy-makers, etc.

At the Forum, the late Ryutaro Hashimoto, former Japanese Prime Minister, announced the establishment of the Asia-Pacific Water Forum, a platform to share knowledge and experiences related to water-related issues in the Asian monsoon region, with four databases: policy, technology, activity of NGOs, and information sources. They will be completed and presented at the 5th World Water Forum in 2009.

Torkil Jønch-Clausen, recipient of the 2006 King Hassan II World Water Prize, announced his intention to use the prize money to create a fund for young women from developing countries to study water.

Loïc Fauchon, President of the World Water Council, announced the launch of the WWC's initiative “Water for Schools”, seeking to provide access to water for one thousand schools in ten countries and to create training schools for high level technicians.



Targeting and Monitoring

Main Issues and Recent Tendencies

In order to achieve an integrated management of water resources and in particular, to reach all of the MDGs, it is of prime importance for decision-makers at all relevant levels to have easy access to comprehensive, representative and reliable information on the status of water resources, both from quantitative and qualitative viewpoints, on the biotopes and the aquatic environments, on the water uses and the sources of pollution, on the risk of extreme phenomena and on the economic parameters of the water sector.

Monitoring is essential to assess and understand the real impact of actions and investment by both national governments and the international community towards meeting water targets. For the attainment of these targets, national governments need monitoring and reporting systems to manage their own programs effectively. As the custodian of the MDGs, the UN is responsible for providing both the methodologies and reliable data necessary for measuring global progress towards these goals.

Unfortunately, information is often dispersed, heterogeneous and incomplete. There is a significant lack and decline of in-situ hydrological observations with a huge imbalance in intensity of monitoring from the more to the least developed countries. When and where data is available, it is

rarely comparable and adapted to the prerequisites for objective decision-making. Definitions of performance criteria, indicators, etc. are different according to levels of use (national or global) and aggregation of data is impossible because of the use of different rationales, objectives and types of indicators. In addition, data is not always easily accessible and accuracy is even questionable by experts, as monitoring systems in many parts of the world have been allowed to deteriorate and may consequently lack effectiveness. The main reason for this is the absence of political commitment and weak stakeholder involvement which might allow monitoring actors to have access to sufficient means and capacity for handling, exchanging, gathering, standardizing, summarizing and capitalizing on data among them, especially in the developing world.

The major water-related issues for which targeting and monitoring activities must be undertaken are: Water as a

key factor for human well-being and economic development; Water for Growth and Development; Implementing IWRM; Water Supply and Sanitation for All; Water Management for Food and the Environment, with particular attention to the ecosystems in coastal areas; Risk Management to reduce flood and climate change impacts; Governance; and, Watershed Management and Water Resources in time, space, quality and quantity.

Targeting and monitoring are key to all water and sanitation issues, not only to provide data pertaining to Target 10 of MDG7, but also to create leverage for the other MDGs aimed at reducing extreme poverty and hunger, achieving universal education and gender equity, reducing child mortality, improving maternal health, combating disease, ensuring environmental sustainability and developing global partnerships for development.

Facts and Figures on Targeting and Monitoring

- There is currently no comprehensive global system in place to produce a systematic, ongoing, integrated and comprehensive global picture of freshwater and its management in relation to the MDGs. The World Water Assessment Programme is designed to close this gap;
- About Water for Growth and Development, at present, the MDGs do not contain targets on important economic variables concerning industry and energy, both vital sectors for development and human well-being but with a high impact on water resources. Social development, for example effectiveness of schools and hospitals, should also be monitored;
- As for Integrated Water Resources Management, monitoring of the extent to which national governments have complied with the incorporation of the IWRM concept and water efficiency strategies into national plans by 2005 has not been clearly undertaken;
- In Water Supply and Sanitation, the lack of safe drinking water and poor sanitation lead to an unacceptable toll in human life. The Joint Monitoring Programmes (JMP) mandate appears difficult to achieve given its limited resources and its focus must change from measuring infrastructure provision to measuring sustainable access to safe and adequate services, and from collecting provider system data to collecting data on actual service delivery according to agreed norms;
- On the subject of Water Management for Food and the Environment, there are enormous changes taking place within ecosystems as a direct or indirect result of human activities. Ultimately, human well-being will be critically jeopardized by environmental degradation. The ecosystems in coastal areas require particular attention;
- As regards Risk Management, the majority of disasters are water-related. With climate change, land-based floods seem to be increasing in frequency and intensity. There has been a call for targets to be set to reduce the number of deaths caused by natural disasters and for monitoring progress towards achieving these targets;
- In terms of governance, there is a lack of targeting and monitoring of effectiveness of institutions, legislation, financial instruments and in general of capabilities of human resources; and
- For water resources themselves, there is a fundamental need to monitor their status. This includes monitoring surface and ground waters in space and through time, in quantity and quality. It also includes monitoring the influence that human activity is having on water resources.

Source: Thematic Document on Targeting, Monitoring and Implementation Assessment, prepared for the 4th World Water Forum by the United Nations World Water Assessment Programme and the World Water Council

Main Messages, Lessons Learnt and Key Recommendations

Targeting and monitoring are crucial to triggering progress in the water sector

Setting targets is essential to focus the attention of all stakeholders, from users to decision-makers, on critical water issues, and to provide incentives for required or corrective action, session FT5.13 "Creation and Development of Shared Information Systems". The MDGs, defined at the global level,

need to percolate down and be translated into targets that make sense at the local level (session FT3.20 "Monitoring and Targeting Drinking Water Supply and Sanitation").

Monitoring is a critically important planning and action instrument, which allows the effectiveness of actions to be assessed and the impact of policy and institutional reforms and investments at the national and local levels to be measured.

Targeting and monitoring are therefore critical in triggering progress towards the implementation and achievement of the Millennium Development Goals.



Inclusion of IWRM in National Plans

One conclusion and a key recommendation on monitoring from this "mega-session" highlight the importance of refining monitoring mechanisms.

- Monitoring at all levels is important to ascertain progress in meeting the IWRM target and to alert agencies and organizations capable of providing support to those countries or regions lagging behind and in need of assistance. With countries taking different approaches to planning and interpreting IWRM in a manner deemed appropriate to local conditions, the difficulty of effective monitoring cannot be overemphasized. Most monitoring efforts to date have tended to rely upon largely subjective assessments and have focused more on planning than implementation aspects.
- The challenge is to develop indicators sensitive to local differences and priorities while being able to deliver at the global level. More effective monitoring demands, better communication and cooperation between the institutions and organizations involved in the IWRM process in order to improve coherence and comparability of the results. Above all, there is a great need to be able to show the relevance and impact of adopting an IWRM approach, that is, specific evidence of solving water problems and creating sustainable management of water resources. Systems for collecting, managing and disseminating water information need to be better integrated with information presented in a widely accessible, easily understandable format.

From sessions FT2.07, FT2.19 and FT2.20, by UNWWAP

Exchange of experience, knowledge and information should be strongly supported

Plans are needed for broad "North-South" and "South-South" partnerships that will involve developing expertise, infrastructure and indigenous sustainable capacities supported by industrialized countries to reduce disparities in science and technology. This need for partnerships was strongly advocated in a number of sessions.

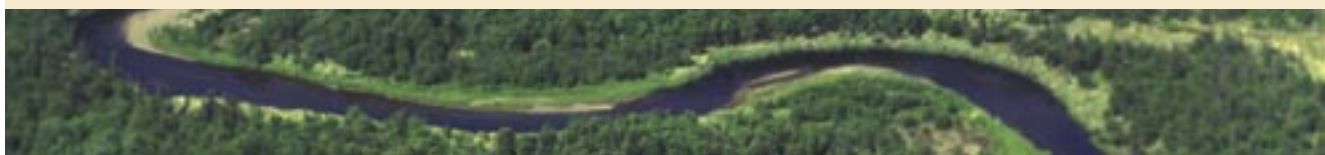
It is important to arrange information platforms (session FT4.10 "Water Accounting and Information Platform") and to develop international partnerships of various scales for a better interlinking and coordination among monitoring programs and initiatives worldwide. It is also important to promote the development of means and specific engineering proficiency in this field. Capacity-building programs should be strongly encouraged in order to successfully implement WSSD targets and to achieve the Millennium Development Goals.

Euro-Mediterranean Water Information System

In order to build effective cooperation and exchange of know-how, the Ministries in charge of water of the Euro-Mediterranean Partnership (35 countries: 25 European Union members and their 10 Mediterranean partners) decided to set-up a regional information system built on a federation of national systems. Each country finances its own system, harmonizing the exchange of information between the stakeholders and implementing the regional recommendations that will guarantee inter-operability. This action provided:

- A unique point of access to all relevant inland water information for each country with a guaranteed quality;
- Better cooperation and information flow between all national stakeholders, including providers and users of information;
- Indicators for monitoring effective implementation of national policies and international agreements, such as MDGs and Sustainable Development, etc.; and
- A better participatory approach thanks to the sharing of information, expression of needs and requirements, public consultation between all the stakeholders: public administrations, user associations, private sector, etc.

From Local Action LA0470, by EMWIS / SEMIDE Technical Unit



AQUIFER: Tunisia Exploiting Space for the Management of the Transboundary Aquifer NWSAS (SASS)

The European Space Agency (ESA) launched, within the framework of the CEOS WSSD Follow-up Programme adopted in November 2002, a new initiative focusing on "Earth Observation for Integrated Water Resources Management in Africa", called the TIGER Initiative. AQUIFER is an ESA-funded pilot project within the TIGER Initiative that aims to support national authorities and international institutions in international transboundary aquifer management through tailored and GIS-compatible products and services that facilitate daily operations. AQUIFER is user-oriented and built around a user group consisting of national authorities responsible for water resources management in Tunisia, Libya, Algeria, Niger, Nigeria and Mali. These users are grouped around two transboundary aquifers, the Northern Sahara Aquifer System and the Lullemeden Aquifer.

The specific objectives of the AQUIFER project are to:

1. Support national authorities and international institutions with Earth Observation (EO) applications to better manage transboundary surface and groundwaters;
2. Strengthen integrated water management practices on-site; and,
3. Establish an independent service provision capacity to ensure local service delivery beyond the project cycle, to achieve long-term service sustainability.

Earth observation has proven to be a cost-effective tool for mapping and monitoring on an area-wide basis, and it can provide a uniform spatial data layer to complete sparse, isolated and discrete observations and to correlate and extrapolate isolated field data. It must be noted that Earth observation is not a stand alone tool to work in the groundwater domain: It relies essentially on ground truth for in-site calibration and on data integration and assimilation by GIS technology and modelling approaches.

The expected outcomes of the AQUIFER project will give information about the actual water abstraction needed for agricultural use in the involved countries, constituting the base for a sustainable water resource management plan. For the future this information can be used to monitor the resulting international water treaty governing the water distribution for each country from the transboundary aquifer.

From Local Action LA0464 by the Ministry of Agriculture of Tunisia

External support agencies should strengthen their support activities to countries willing to develop sound national monitoring systems

As the quality of information is closely linked to the monitoring system in place and the involved actors, target-oriented information systems constitute one of the priority tools to be implemented in order to support an efficient water policy. Such systems should focus not only on coverage statistics at national and sub-national levels but, as pointed out in session FT3.50 *"Monitoring session 2: The Way Forward for MDG Country-Level Monitoring"*, they should also deal with drinking water quality, affordability and sustainability of services, costs and benefits of access to services, the health impact of the absence of drinking water and sanitation, gender equity, and relevant institutional and management issues.

The Global Monitoring Report information should include data on quality of drinking water, as access data alone does not mean so much if water is not usable for the populations most basic needs. Monitoring programs should also include more gender-specific data and sex-disaggregated targets and indicators (Women's Caucus Declaration).

Goals, action plans and country programs on information availability are urgently needed

A set of goals and action plans on information availability for efficient water development and management should be established, such as to double the extent of data collection, handling and implementation of actions in the least developed countries by 2015.

Country programs, the so-called road maps, which include targets, indicators, monitoring tools and reporting activities, should urgently be prepared to trigger progress in achieving the MDGs. At the national level, monitoring tools should be developed and strengthened to facilitate actions by governments and other stakeholders, and to bring about consistency with global mechanisms. The use of household surveys has significantly increased the quality and comparability of information on improved drinking water sources and sanitation globally and regionally. The monitoring systems at the country level should be encouraged to use such a tool as a powerful instrument to evaluate the use of drinking water and sanitation services rather than only accessing to such services (session FT3.50 *"Monitoring session 2: The Way Forward for MDG Country-Level Monitoring"*).





Blue Books in Burkina Faso, Mali and Niger

The Blue Books have been developed by and for all partners in the water and sanitation sector in three African countries (Burkina Faso, Mali and Niger). They provide an independent assessment of the achievement of the Millennium Development Goals regarding water and sanitation and cast a critical eye on sectorial policies and strategies.

There are already, at the national and global level, numerous initiatives that aim to promote access to water and sanitation and to measure the effectiveness of this access. The Blue Book does not seek to substitute these initiatives. On the contrary, it builds on these efforts and complements them by using an approach that is far more qualitative than quantitative. With regard to national policies, the Blue Book is a citizen's initiative, which measures the progress of these policies in an independent manner and which aims to ensure that all users have access to services, regardless of their standard of living, their capacity for paying for the services, their political weight and the distance between them and the country's decision-making centres. In order to measure the degree of equity in the access to water and sanitation, the Blue Book bases itself on a critical analysis, which is undertaken by an independent group of individuals.

Whenever deemed necessary, the Blue Book develops its own assessment capacity, for example by conducting surveys among users. The Blue Book lobbies strongly for an increase in the quantity and, above all, in the quality of financing and to ensure that these resources are available at the local level in communities. It also demands the right to response in order to ensure that good intentions expressed by political decision makers and donors are put into practice. The interest of the Blue Book is also to put forward an assessment method that makes it possible to compare progress from one country to another. In addition to geographical comparisons, the Blue Book aims to monitor progress over time. It regularly establishes benchmarks which aim to determine the extent to which commitments of governments and donors are being met.

At the level of each selected country, ensuring that all possible stakeholders are involved creating a dialogue and making sure that they can work in a collaborative environment, is part of the Blue Book process.

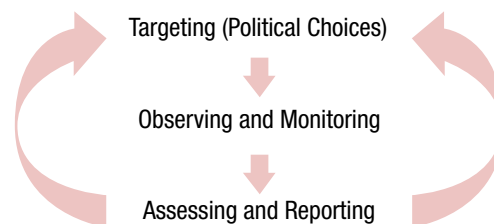
From Local Action LA1839, by the International Secretariat for Water (ISW)

It is also now urgent to promote the setting-up of national information systems for water resources at river basins scales, whether the basins are national (session FT2.24 *"Information in support of IWRM"*) or transboundary (session FT5.13 *"Development and Implementation of Water Information Systems"*), and the building of shared regional information systems.

Setting targets from global to local scales to involve society at all levels

The importance of the need to involve people and institutions at all levels cannot be overemphasized, since, if local people become involved and motivated at the community level, tangible results are much more likely to be achieved (session FT3.20 *"Monitoring and Targeting Drinking Water Supply and Sanitation"*).

Effective monitoring must be built on collaboration at local, national, regional and global levels, and ideally organized in the following sequence:



A sustainable monitoring program must be based on simple and target-oriented indicators. Observations and measurements must be made periodically, and data analysis and interpretation should be target-oriented. In addition, crosscutting, gender-sensitive indicators and capacity-building programs must be developed in order to successfully implement WSSD goals and to achieve the Millennium Development Goals.

Transparency and reporting are crucial for public participation and effective monitoring

Many crucial decisions must be made at the community and the household level, by developing public participation mechanisms. One key factor to achieve public interest is the transparency in the

monitoring process. For this, communication through reporting and coordination are essential (session FT3.41 “*Transparency, Performance and Democratic Control for a Better Governance for Local WSS*”). Another key factor is to clearly specify institutional and community responsibilities for the permanent organization and operation of such monitoring systems.



Use of Satellite Observations in the Mekong River Basin

The satellite data on the meteorological and geographical conditions of the basin are used for most in the activities of the Mekong River Commission. The current innovative technology, which can offer a wide range of capabilities for acquiring geographical data, land use and coverage, especially soil humidity and groundwater, enables the diagnostic tool for flash flood alert and warning to be applied.

The Mekong River Commission is providing the flood and water availability information to the local communities in the basin. Their use of satellite data, together with all the ground-based data, has a long history and includes the involvement of many donor nations. Their success in prediction and information dissemination is vital for the sound development of the region. The local communities have their own dissemination networks, which ensure the best utilization of the information for their daily activities. The users are the local people in the flood prone areas who receive the flood warning from the Commission and will then take appropriate action to protect themselves from the flood. The users are also the farmers who receive the advice on future water availability and then interpret it for use in planning their work. The provision of the information allows farmers to better schedule their practices and offers warnings of floods and other natural hazards.

The cost of maintaining all the current activities is relatively high and will certainly require support from all riparian countries and other donor countries as well as regional and international organizations.

The information is for now mostly limited within the mainstream of the Mekong River or within a small scale pilot project, so the extension and expansion of the activities to the tributaries or to a greater scale is extremely important. Furthermore, the improvement of the flood forecasting, monitoring and warning system is also a subject of consideration for a long-term commitment and targets.

From Local Action LA0577, by the Mekong River Commission

Efforts should be made to interlink and harmonize existing monitoring and reporting activities in the water sector in order to increase their effectiveness

In order to exchange, compare and summarize the information between involved partners at all relevant observation levels, common standards and nomenclatures for data administration should be defined for effective data management (session FT5.13 "Development and Implementation of Water Information Systems").

The implementation of regional monitoring mechanisms should be conducted in close cooperation and coordination with the Joint Monitoring Programme. This should allow the duplication of uncoordinated monitoring mechanisms and the duplicity of reporting and unrelated statistics to be avoided.

The financing of monitoring means securing long-term commitment

Session FT5.13 insisted on the prime importance to guarantee not only sufficient resources for investment costs of monitoring

networks, but also the compulsory financial mechanisms which will secure their long-term continuity as the qualification of intervening experts and the functioning and operating costs are, by far, the most significant and recurring items of expenditure. The monitoring is more valuable when the information is long lasting. For example, reliable results from scientific research are based on long-term data; long-term environmental planning and management require long-term data from the past. Currently, most monitoring programs do not last sufficiently long, mainly due to financial restrictions and poor management.

To be cost-effective, monitoring should be a needs-driven process, which complies with the specific requirements from all stakeholders. Thus, it is important to take into consideration local and regional characteristics, as well as cultural backgrounds when formulating policy objectives. Designing national water programs including technical, institutional and legal components is an effective step to achieve financial stability and to focus donor assistance on the use of appropriate technology approaches and capacity building.

Monitoring as a Fundamental Tool for Improving Information

A far-reaching international initiative, centered on "monitoring water policies" has been launched by Italy, targeting the criteria used to interpret information about the water and sanitation sector, and the way in which relevant facts and figures are used for planning, implementation and risk prevention. The initiative aims to rationalize the way in which information is reported and interpreted, and the mechanisms through which data is collected, aggregated and used. Two major components substantiate the Italian initiative:

- 1) Monitoring and Reporting Working Group (M/R-WG) of the EU Water Initiative (EUWI), jointly led by the Italian Ministry of Foreign Affairs and the European Commission since June 2003. The EUWI M/R-WG is an international forum where methodological improvements about water monitoring are being developed, and specific tools for complex water policies are set up.
- 2) Support provided to the "CSD Water Action and Networking Database" (WAND), establishing a data-storage and data-analysis web-based system to follow-up the implementation of internationally agreed commitments, such as the relevant MDGs and the CSD-13 decisions. The specific contribution of Italy is the "Global Initiative for Rationalizing Water Information Systems" (GIRWI), a project implemented through UN-DESA which intends to develop robust monitoring tools through a consistent methodology, covering both water resources and related infrastructure services.

The entire Italian initiative is moved by the need to inject a radical innovation in the principles and methods that govern the flow of information between multi-lateral monitoring agencies and different national and international monitoring agencies. The expected impact is a major departure from how monitoring has been carried out so far, by giving the right emphasis to complementary, sometimes neglected, but undoubtedly important information. The effort is directed to finding robust techniques to provide meaningful links between the overall international objectives and the various initiatives, and then between the latter and what is concretely undertaken in the field, in a way that retains the consistency among these temporally, spatially and subjectively different phases. In this respect, it is pivotal to reinforce the effectiveness and responsiveness of decision support and early warning systems in the water sector.

From Local Action LA0368, by the Italian Ministry of Foreign Affairs and IPALMO

In its *Compendium of Actions*, the United Nations Secretary General's Advisory Board on Water and Sanitation points out that the WHO/UNICEF Joint Monitoring Programme (JMP) needs greater attention. UN Water should be adequately funded so that it can play a leading role in the ongoing efforts to obtain a clear picture of progress or lack of it in water issues:

- The Secretary General is requested to work with UN Agency Heads to increase the priority accorded to the JMP in resource allocations;
- UN Water should take a highly visible role to coordinate the various monitoring and reporting systems worldwide;
- National governments are requested to support efforts to improve monitoring tools and to measure and report the number of people obtaining access to water and sanitation by access category in their countries;
- Donors are requested to measure their own contributions to these achievements in terms of service goals; and
- The OECD is requested to develop better knowledge of all water expenditures in coordination with multilateral financial institutions.

Initiatives Announced at the Forum

- Launch of CSD WAND: Developed by the UN Department of Economic and Social Affairs (UN-DESA), the CSD Water Action and Networking Database is a tool to provide a growing database to those working on water and sanitation issues.
- Interactive Global Database on Ecosan by EcoSanRes and its partners. This program aims to monitor implemented Ecosan projects around the world, and to assess the contribution of the Ecosan approach to reaching the MDG target on sanitation by 2015.
- The World Water Council is developing the Water Monitoring Alliance (www.watermonitoringalliance.net), an Internet portal designed to disseminate knowledge on the ongoing monitoring activities, to facilitate access to water related data and to better interlink the various monitoring programs.





Promising Initiatives Proposed in session FT 5.13

- The initiative inspired by the WMO, "Whycos" (*World HYdrological Cycle Observing System*) aims to significantly improve the precision and continuity of field measurements by possibly resorting to advanced technologies whose final objective is the setting-up of regional databases. Some regional Whycos programs are ongoing or in the qualification phase, for example in the Mediterranean, Southern Africa, Western and Central Africa, Equatorial Africa, and the Caribbean, among others;
- The "FRIEND" program (Flow Regimes from International Experimental and Network Data), organized within the UNESCO International Hydrological Program (IHP), deals with the main topics related to hydrological regimes of rivers using a regional methodology for databases, inputs, low water flows, floods, heavy rainfall, but also physical processes for run-off, trends, hydrology and Integrated Water Resources Management;
- The Global Environment Monitoring System, GEMS, "Waters" program, implemented under the aegis of UNEP and in liaison with WHO, is also promising;
- The FAO AQUASTAT program is a remarkable initiative, due to its relevance on national scales and its capacity to provide more global estimates on the agricultural uses of water;
- The work that has been carried out for three years within the "Inland Freshwater" Topic Center of the European Environment Agency, has also enabled the definition of the conditions necessary for the creation of a future **European Water Network (EUROWATERNET)**, that will gather in time the information necessary to make an inventory of the status of the environment in this sector in the Member States of the European Union, Norway, the countries of Eastern Europe, candidates for accession, the Balkans and in the Mediterranean region;
- In France, the National Water Information System (WIS), which relies on SANDRE (National Data Reference Center for Water Resources), enables the exchange of data between inter-related databases, either nationally or at the level of the six river basins, the dozen specialized databases that already exist;
- Other integrating projects of this kind already exist, or are under study, at federal or national levels, such as, for example, in Brazil, with the setting up of a National Data System for Water Resources, or the SINA and SIRAs (National and Regional Water Information Systems) in Mexico, or in large river basins, such as, in Poland, the system for monitoring the water quality of the Vistula River, or the system for monitoring the environment in the Senegal River valley, shared by Mauritania, Senegal and Mali, and their equivalents for the Irtysh River (Russia and Kazakhstan) or the Körös-Crisuri river (Hungary and Romania), etc. "Basin Information Systems" are also ongoing or planned in India (Sabarmati River), in Turkey (the Aegean rivers - Izmir Bay), in Poland (Gdansk RZGW), for instance;
- Standardized data exchanges have also been organized for a long time in International Commissions, set up for the Protection of Geneva Leman (French-Swiss CIPEL) or of the waters of the Rhine, Maas and Scheldt (Belgium, France, Germany and the Netherlands) in particular; and
- The European Water Framework Directive introduces obligations of results, methods and timetable and imposes regular reporting on the actions, obtained results and delays or foreseeable failures allowing possible remedial actions to be defined as soon as possible. As of today, the systems for assessing water quality vary considerably from one country to another within the European Union, the Water Framework Directive plans the establishment of a common frame of references to allow real assessments of the situations and strategies of the Member States. It guarantees transparency.



Right to Water

Main Issues and Recent Tendencies

Never has the right to water received as much coverage at an international meeting as was the case at the 4th World Water Forum. In his inaugural speech, President of Mexico Vicente Fox stated that "*Water is above all a human right which no one can renounce*" and that "*it is our moral and political obligation to ensure that nobody is denied his or her right to this vital liquid*". In the same way, the President of the World Water Council, Loïc Fauchon, stated that "*the right to water is an indispensable element of human dignity*".

The right to water, as a key issue, was clearly addressed and eagerly debated during the World Water Forum through three official sessions (FT3.35 "*Securing the Right the Water; From the Local to the Global, Civil Society Perspectives*", FT3.36 "*The Right to Water: What Does it Mean and How to Implement it*", and FT3.47 "*Human Right to Water*") and several side events.

In each of these sessions, it was recalled that the right to water was officially recognized by the United Nations as a human right, through General Comment No 15. Through the 4th World Water Forum, more clarity was obtained on the scope of the right to water, its different perceptions were discussed, and different approaches to its implementation with its strengths and weaknesses were presented. The necessity to involve communities in the decision-making process and the contribution of CSOs appeared as key factors for a successful implementation of the right to water.



Main Messages, Lessons Learnt and Key Recommendations

More clarity was obtained on the scope of the right to water

There is much debate on the right to water. The 4th Forum gave the opportunity to provide clarification on its background, meaning, status and scope. Basic right to water concepts, approaches for its introduction and implementation experiences were discussed in particular during the session FT3.36 *"Right to water: What does it mean and how to implement it"*, where the World Water Council report entitled *The Right to Water: From Concept to Implementation*² was released.

The right to water focuses on the amount of water necessary for basic human needs (about 50 liters per person per day), which is a small amount in comparison to the large quantities devoted to other uses. It should be distinguished from water rights: individuals can be allocated water rights which may consist of a predefined share of average water available in each source for predetermined uses under specific conditions (i.e. farmers have water rights for irrigation). The implementation of the right to drinking water affects issues linked to environmental protection and the integrated management of resources. Nevertheless, allocating water rights to implement the human right to water diminishes only marginally the water availability for other uses.

An ecosystem approach where the right to water exists for all living beings was also advocated in the Forum but the practical application of this concept is still in development. Providing human beings with their basic needs in a sustainable way implicitly means that water quality and ecosystems should be considered since water is part of ecosystems.

Pedro Arrojo, President of Spain's Foundation for a New Water Culture, considered that when water is used for economic purposes it must be paid for, but when used by the population at large, the cost can be handled in multiple ways and proportions, through taxes, cross-subsidies or social-sensitive tariffs. According to Ricardo Sanchez, UNEP Director for Latin America and the Caribbean, *"We need to have an ecosystemic approach, it's vital"*, a posture shared by Abel Mamani, Bolivian Minister of Water, who considers that the natural right to water exists for all living beings. Some NGOs went further by calling for a UN treaty to protect the right to water both for people and nature, but it was not sufficiently clear what would be multilaterally negotiated.

Some interesting debates also took place in the Citizen's Water House around two themes: *"Citizen's testimony on the right to water"* and *"The implementation of the RTW: an issue of powers, which ones?"*. The cultural aspects of water were broached and several local actions¹ illustrated problems encountered by nations to implement the human right to water, such as limited financial resources, the lack of political will, the potential conflict between land rights and human rights, and environmental pollution.

The issue of the right to water was in several instances linked to the privatization issue. This was especially debated during the International Forum in Defense of Water, a parallel event to the 4th Forum organized by the Mexican Coalition for the Right (COMDA). Participants were especially confronted with the difficulties and opportunities experienced by communities and the poor as a consequence of the development of different models of private-public partnership. A number of the participants at the Alternative Forum also had the opportunity to express their point of view during the 4th World Water Forum, in particular during the session chaired by the Blue Planet Project and in the Citizen's Water House. This allowed a bridge to be established between the Forum and the alternative events.

The provision of water supply and sanitation services implies a cost that has to be borne by users and taxpayers in proportions decided by each community, local authority or national government. It is the sharing of costs between taxpayers and users, and the extent to which the poorest can be provided with low-price services that should lead the debate. Some government representatives pointed out that the right to water does not mean that water and sanitation provision is

costless. They fear that such misunderstandings could preclude the payment for water services, needed in the majority of developing countries, which do not have sufficient fiscal resources for the huge subsidies required in such situations. So the right to water ought to be recognized as the right to access to water services – in the amount needed for the sustenance of human life and dignity – at a fair payment to cover the cost of providing the service and for future infrastructure expansions.

Other Official Statements

- Children's Declaration, 2nd Children's World Water Forum

"We ask all adult decision makers to fulfil the human right to sustainable, safe drinking water supplies and basic sanitation, through the provision of child-friendly facilities in all schools and communities, taking into account the needs of girls, very young children and children with disabilities."

- EU statement annexed to the Ministerial Declaration

"The EU considers that water is a primary human need and that water supply and sanitation are basic social services as mentioned in the resolution of the EU Development Council adopted on May 30, 2002, 8958/02. The EU emphasizes that public authorities must take adequate measures to make this effective and affordable".

- World Encounter of Water Legislators' Mexico Declaration

"We seek to make sure that actions carried out locally by everyone of us, are joined for the shaping of an international commitment that will recognize access to water as an essential right of all human beings, irrespective of their place of birth or the country in which they live."

- Youth Statement, 2006, 4th Youth World Water Forum

*"Water is a universal and unalienable human right that must be incorporated into the constitution of each country. This water should be clean, readily available, from a secure source and sufficient for the population's needs; sanitation must be guaranteed."
"Access to water and sanitation must be guaranteed for the poor."*

There was a general agreement about the existence of a human right to water...

The 4th World Water Forum succeeded in bringing the right to water to the forefront. There was a broad consensus about the existence of a human right to water. Mayors who are more likely to be primarily responsible for providing access to water and sanitation stand firmly for the right to water³. Representatives of various Christian churches are also involved in the debate over the right to water, and statements or reports in this sense were issued by American Catholic churches⁴ and the Holy See⁵. They all demonstrate the

unanimous views of churches in favor of the right to water. The declarations from NGOs⁶ and from the Women's Caucus⁷ show that the organized civil society gives recognition to this concept; several reports and briefings show evidence of it. Representatives of private water operators (AquaFed, which federates local, national and major multinational water service providers) issued a statement in which it recalled that business officially endorsed the right to water in 2005 at UN CSD13. There also was strong support for this concept from Parliamentarians⁸, local authorities, private enterprises and more generally, civil society. It is thus a big step forward since the 3rd World Water Forum.

"Let us etch into the constitution of each state, let us engrave this right in the facade of each national and municipal place, and let us write this right in our children's notebook in every school"

Loïc Fauchon, President of the World Water Council

...Even if there is no mention of the right to water in the Ministerial Declaration

This convergence remains to be accepted by world ministers. The fact that the right to water is not mentioned in the final Ministerial Declaration reveals the difficulty to get consensual ministerial views on this issue. Although most of the delegates said they agreed with the principle, some argued that it was not feasible to include it in the final declaration, because it would have committed many countries to modifying their legislation and would have

forced international bodies to create new legal instruments. Some delegates did not want to assume any position on this matter, which is entirely the responsibility of another rank of government. Consequently the Ministerial Declaration made no reference to the right to water although the issue was vigorously debated.

However, the majority of ministers expressed their support for the right to water⁹. The annexes to the working session recognize the right to water as a human right, and were added to the Complementary Declaration to the Ministerial Declaration from four Latin American countries¹⁰.

"A rights-based approach to water would be a very important means for civil society to hold their governments accountable for ensuring access to an adequate quantity of good quality water as well as sanitation"

Parliamentary Assembly's Recommendation 1731 (2006), Council of Europe

Let us etch the right to water into each nation's legislation

The law has a critical role to play to ensure access to water for all, and a rights-based approach would lead to acceleration in achieving basic and improved levels of access to safe water. It may also help in the achievement of the MDGs. As was recalled at the beginning of each session dealing with this issue, the right to water has been explicitly recognized in a number of legally binding treaties¹¹ and clearly stated in UN General Comment No 15¹² (2002). This acknowledgment helped to not only clarify the meaning and scope of the right to water, but it also stimulated civil action and increased legislative acceptance of this entitlement in a growing number of countries. For effective implementation, the human right to

water should be included in the national legislation but also in public policies and action plans. National governments are primarily responsible for enabling the implementation of the right to water through legislation, regulation, policies, work plans and associated budget allocations. As in other human rights, the international community, developed countries and the donor community must share the responsibility for implementation and show solidarity, especially towards the poorest countries.

The case of South Africa, presented during session FT3.36 *"The Right to Water: What Does it Mean and How to Implement it"*, illustrates how a legislative approach can help to implement the right to water. Indeed, South Africa is one of the few countries in the world that has recognized

The Right to Water in South Africa

South Africa is one of the few countries in the world that has recognized water as a human right in its Constitution. South African policy treats water provision for basic human needs as a right and the government has invested substantial resources in providing access to safe water and sanitation. As part of its strategy to alleviate poverty and improve public health, the South African government and the DWAF established a policy for the provision of "free basic water", where every poor Water Household receives 6,000 liters of water per month free of charge. The target is for all people to have free basic water in 2008. Furthermore, the South African government has a program that explicitly targets sanitation. According to government figures, access to basic water services improved from 60% of the population in 1994 to 86% in 2004. By late 2004, almost 31 million people (66% of the total population) were served by 'free basic water'. Nearly 90,000 toilets have been built between 1994 and 2004, and around 150,000 people have been reached through various health and hygiene programs. Community participation is identified as a key requirement for the success of the programs.

Source: E. Sinanovic et, al. (2005)



water as a human right in its Constitution¹³. Recently, in 2004, Uruguay became the first country in Latin America to enshrine the right to drinking water and sewage services in its Constitution.

A group of NGOs, represented during session FT3.35 *"Securing the Right to Water; From the Local to the Global, Civil Society Perspectives"*, promoted the strengthening of the right to water in legislation and called upon governments to:

- Adopt a resolution at the UN Human Rights Council to strengthen the right to water;
- Establish an international mechanism to monitor the implementation of the right to water, such as a UN Special Rapporteur on the right to water; and
- Bring, as a matter of priority, their national water and sanitation laws and policies in line with UN General Comment 15 on the right to water.

In practice, however, even though a legal framework may exist, the right to water is often not applied for a variety of reasons: lack of financial and human resources or absence of political will. But the lack of an explicit mention to the right to water in national laws should not limit the pursuit of its implementation.

Raising public awareness

Many people, particularly the most deprived, are not aware of the legal existence of a human right to water. As stressed in session FT3.47 *"Human Right to Water"*, chaired by Mexico City's Human Rights Commission, it is necessary to raise public awareness about its existence, particularly among the poor and marginalized and to recognize the human right to water in laws and transform it into actions. It is a task already undertaken by many NGOs all over the world, but it must be continued to help communities to concretize their right to water based

"Water is a public good that every government must guarantee. We, the Mexicans, know that the access to water is a fundamental premise for the fight against poverty and to promoting the integral development of our families and our nation."

Vicente Fox, President of Mexico
4th World Water Forum

"By its very nature, water is a public good. Nobody can claim ownership of it. It is up to the community to define rules for ensuring adequate supply and proper sanitation along with rules to limit waste in the spirit of social justice, sound economics and respect for the environment."

Jacques Chirac, President of the French Republic
3rd World Water Forum

Incidence of Social Organizations in the processes of elaboration of Water Laws in Central America

There is a lack of legal framework for water conservation in Central America. FANCA members are working to introduce water laws in Costa Rica, Nicaragua, Guatemala and Honduras to ensure that water supply is properly managed. CALAS use existing processes and institutions to conduct public consultations with members of society who are usually excluded, as well as with entrepreneurs, parliamentarians, local authorities, and local water boards. CALAS organizes workshops with local communities to make sure that their principles are included in water legislation and legal texts. Using this model, the development of water laws has made significant progress in Guatemala, and similar approaches have been applied by civil society organizations in Costa Rica, Nicaragua, and Honduras.

From Local Action not registered, by FANCA and You SOAK, Guatemala

on existing laws and international treaties that support this right. These legal frameworks should enable communities to strengthen their capacity to engage in advocacy for access to water, to understand their entitlements and responsibilities regarding access to water and to develop strategies to improve their situation (i.e. participation in the decision-making processes and negotiations with different stakeholders).

Water is a common and a public good

Water is a common good because it is shared and beneficial for all and no one can be excluded from using water in its natural state.

Several political personalities have also characterized water as a "public good", which is an expression used in General Comment No 15. However, confusion often exists around the use of the terms "public good" and "privatization". "Privatization" of water is in a sense a misnomer since the water itself remains under government regulatory authority and control. The expression "public good" is not used in the way an economist would¹⁴ but rather as a jurist would to convey the notion that water belongs to the public-at-large.

The statement that water is a public good means that providing clean water to people is first and foremost the responsibility of governments. In light of the contemporary controversy over the privatization of water supply systems, this term is often used to send the message that governments must ensure that the human right to water is safeguarded if they place management of water services in private hands. The conceptual debate of public and common goods recalls that public authorities must keep control of the tariffs and investments, whether the water services are managed by public, private, or mixed providers. On the other hand, the total amount of charges and targeted subsidies must be enough to cover at least the cost of sustainable service provision. Hence,



Social tools to guarantee an equitable access to water in Belgium

In Belgium, the institutional setting means that the price of water is a regional competence. Three regions of Belgium (Flanders, Brussels and Wallonia) each developed independently a social policy regarding the access to water and sanitation.

Different types of tariffs to maximize solidarity between users have been developed:

- Via the provision of 15 cubic meters a month free (Flanders);
- Via mutualization of the costs and progressive tariff structures (Wallonia); and
- Via progressive tariffs per person (Brussels).

This public policy is effective on several categories because it allowed:

- No more water disconnection for Water Households except by court decision or water quality threat;
- To avoid users' interventions near the most underprivileged Water Households;
- To reduce the volume of uncollectable debts for distributors and allow moderate increase of prices; and
- To ensure a fair redistribution of complete service cost recovery among users of different social standings.

In conclusion, applying a water policy with equitable and social purposes has not created any major problem of implementation nor in common use, and has contributed to the well-being of all the citizens.

From Local Action not registered, by Walloon Water Company, Belgium

the assertion of water as a public good, made especially during session FT3.35 *"Securing the Right to Water; From the Local to the Global, Civil Society Perspectives"*, convened by the Blue Planet Project, has often referred to the privatization issue in the water sector:

- Danielle Mitterrand stated that *"Water is a common good of the living for which human kind is responsible"* and *"water is not a marketable good, only the service of access to water may be paid for"*;
- Bolivian Minister of Water, Abel Mamani stated that *"Water must be treated as a human right, not as another tradable commodity for profit"*. He also stressed that drinking water should be withdrawn from all free trade agreements.

Several local and international NGOs supported the 'Declaration of the Movements in Defense of Water' which emphasized that water management has to be "public, social, community-controlled, and participatory". The difficulties for implementing successful private-public partnerships were also discussed, essentially during session FT 3.35 and the Alternative Forum, which instead promoted public partnerships. However, from the financial viewpoint, the discussion on water services should not focus on whether the supplier should be public or private. What is important is to identify who can provide this service in the most efficient manner and at the lowest cost. The decision on whether or not and to what extent to involve the private sector must be taken locally by concerned

stakeholders, affirming their group identity and their solidarity with different decisions.

Implementing the right to water

The unanimous view is that the right to water must not be just a theoretical concept, now is time to act in its implementation.

Implementing the human right to water means prioritizing the access to essential amounts of water for those who do not have it yet, as well as protecting current access to water supply and sanitation. However, implementing the right to water in developed countries where almost all the population has access to safe water has a different meaning than in developing countries where a large portion of the population does not have access as of yet. The right to water can be implemented in various ways, many of which can be effective if they are appropriate to the national and local context, and actively involve all relevant stakeholders. The decision depends mainly on local authorities and citizens, but coordination with responsible branches of public administration has to be assured.

Making access to water and sanitation an effective right requires:

- A clear definition of rights, obligations, duties and responsibilities for each stakeholder;
- The identification of a public authority to oversee the implementation of this right;



Incorporation of NGOs' Contribution into Water and Sanitation Sector Performance Measurement in Uganda

The Ugandan national constitution recognizes the right to water and government policy recognizes the importance of coordination of all stakeholders. Until recently, NGOs' contribution to water and sanitation was not reflected in central government management information systems, and there was thus a lack of comprehensive understanding of the physical and financial input by NGOs, which was therefore not reported upon in the Government Sector Performance Review. UWASNET has successfully changed government policy so that now the NGOs' contribution to the sector is monitored and reported on by government in its sector performance measurement. Government recognition of NGOs' contribution is improving water and sanitation services. There is political will to work with NGOs because their contribution is recognized. This is much more effective than a conditional grant that is given to a local government from a national one.

From Local Action LA0830, by Harriet Nabunnya, Uganda NGO Water & Sanitation Network

- The allocation of adequate human and financial resources; and
- Solidarity in cost sharing so that tariffs are affordable by everyone.

According to some NGOs, what is lacking in many countries is the political will to govern water effectively and to devote the necessary resources to ensure safe water for all.

Several case studies presented during sessions showed that for a successful implementation of the right to water, local initiatives and community participation should be fostered.

Meeting the costs associated with the implementation of the right to water requires solidarity between citizens,

cities, regions, countries and donors, to make access to water and sanitation services affordable to all people, especially the poorest. This solidarity must be institutionalized.

To ensure continued exercising of the right to water, a sustainable management of water sources – both in quantity and quality – is essential. Local as well as national governments should include protection of the hydrological cycle, water resources and aquatic ecosystems as a main element in any program on the right to water. In other words, the implementation approach for the right to water must be sustainable, ensuring that this right is guaranteed for present and future generations.

At the Forum, three main points were addressed and debated as regards the implementation of the right to water:



Case Study: Ukraine

In Ukraine, there is a participative approach to the population in decision-making processes. The population participated in the elaboration of the water legislation.

Within the scope of water sector reforms, in 1999 the Ukrainian Government initiated a law draft process on "Drinking Water and Drinking Water Supply". From the very beginning, the NGO Mama-86 participated in this process, organizing public consultations on the law draft in different regions of Ukraine. The consultations resulted in 155 amendments, which were delivered to and discussed with the authorities responsible for the law draft – the Parliament Committee on Environmental Policy. Thanks to the participation of the NGO in the draft process, a third of the amendments were incorporated in the law, which finally passed in 2002. These amendments included the right of individuals and groups to participate in decision-making that may affect their exercise of the right to water and sanitation.

Again, in 2004, the NGO Mama-86, together with the Ukraine Water Association (UWA), organized public consultations on the draft of the State program "Drinking Water of Ukraine" (2006–2020), which resulted in 110 amendments to the draft. Half of the amendments were incorporated in the State program, adopted in 2005, including special provisions to address the needs of the vulnerable and marginalized individuals and groups concerning water and sanitation.

Source: Anna Tsvetkova, NGO MAMA-86

1. The key role of local authorities

Local authorities are relevant for the organization of the public utilities of access to water and sanitation. They organize the service performing their duties through laws and regulations, contracts and other juridical arrangements they subscribe to. Central governments have to aim to work in a joint way, to decentralize powers to the local authorities and to look for subsidiarity. Local authorities must be able to establish priorities according to the local context. As stressed in the Ministerial Declaration, parliamentarians and local authorities play a key role in increasing sustainable access to water and sanitation services. However, this does not exonerate the State, even though it is no longer the center of political actions and decisions, the international community, nor the citizens, from sharing responsibility for the implementation of the right to water.

2. The contribution of the organized civil society

In order for the right to water to be implemented, the leadership and initiative of key actors, including government

departments, NGOs and international agencies, are required as "boosters" to help to review laws and policies, provide education and assist communities, and to ensure their effective participation in decision-making. The fact that the right to water and sanitation is implicitly included in international agreements – and is starting to be included in national law – is only a preliminary step and will not automatically lead to its application. However, these conventions and rights provide the tools for authorities and key actors to advocate for and implement the right to water.

Strong and continued Government-NGO/community partnerships and capacity building are prerequisites to achieve total sanitation and access to safe water. Money alone cannot solve problems. NGOs should not always assume the needs of the community and they must be held accountable by legal measures and through continuous dialogue with local action and water user groups.

The collaborative force of NGOs working in harmony with governments has resulted in improvements in the

Initiative Announced at the Forum

The great initiative taken by the Mexican Chamber of Deputies following the Forum must be highlighted. They campaigned for the provision of 40 liters of free water per day to all citizens. They asked the government to take an initial step and to mobilize the budget to provide this free water to the 33,000 rural and peri-urban communities that do not currently have access to drinking water in Mexico, which concerns still nearly 10 million people. According to Legislator Fernando Ulises Adame de Leon, this could be achieved in 2 to 3 years. The total cost for covering everyone's needs in Mexico has been estimated at \$700 million USD per year.

access to water supply and sanitation. They can provide direct implementation of services and develop funding niches for investment in the sector. They also have an important advantage over government and the private sector as some of them are focusing on hard-to-reach communities and gender, HIV and AIDS issues.

3. The necessity of involving communities, particularly women and the most disadvantaged

It is necessary to involve the population in the management of water services. During session FT3.36 *"The Right to Water: What does it mean and how to implement it"*, and in the Citizen's Water House, many case studies and local actions demonstrated the value of an organized and informed local civil society, able to listen to the communities they work with and contribute to progressive policy formulation in their countries. Community participation is identified as a key requirement for the success of the programs aiming to provide access to water and sanitation.

The key role played by women in solving problems linked to drinking water and sanitation was also illustrated in a local action *"Women's Voices: Sustainability in Water and Sanitation"* presented by the Gender and Water Alliance (GWA) in session FT 3.47 *"Human Right to Water"*. The gender approach is essential in all processes of community empowerment.

It is essential now to help governments to implement the right to water by identifying successful experiences in practice and sharing them through existing networks. Good practices need to be improved and success should be replicated.

List of documents edited for the 4th World Water Forum that mention the right to water

- The French Water Academy report entitled *"Right to Water, a Right for All Citizens"* prepared by the AFD, the Water Academy and the European Council of Environmental Law.
- Pamphlet entitled *"Access to Water and Sanitation for All"* prepared by the French Partnership.
- *"The Right to Water: From Concept to Implementation"* prepared by the World Water Council in partnership with the French Water Academy, Green Cross International, the International Secretariat for Water, and ALMAE.
- *"The Implementation of the Right to Water and Sanitation in Central and Eastern Europe"* prepared by Solidarity Water Europe.
- Report *"Water, An Essential Element for Life: An Update"* prepared by the Holy See.
- The 2nd United Nations World Water Development Report: *"Water, a Shared Responsibility"* devotes several chapters to the right to water.

Endnotes

¹ More information in *Proceedings of the Citizen's Water House "The Implementation of the Right to Water: An Issue of Powers, Which Ones?"* by R. Jost (2006).

² Available on www.worldwatercouncil.org

³ Local Government Declaration on Water, proposed by the UCLG Committee on the Local Management of Water and Sanitation: "*All human beings have the right to water in the quantity and the quality required to meet their essential needs, as well as to sanitation, a key factor in human health and the preservation of ecosystems.*"

⁴ Interfaith statement "Water: Essential for Justice and Peace": "*Access to enough safe, clean and affordable water for personal and domestic use is a basic human right.*"

⁵ Contribution of the Holy See to the 4th World Water Forum: "*Water is much more than just a basic human need. It is an essential, irreplaceable element to ensuring the continuance of life. Water is intrinsically linked to fundamental human rights such as the right to life, to food and to health. Access to water is a basic human right.*"

⁶ Joint Declaration of the Movements in Defense of Water: "*Water in all of its forms is a common good and access to water is a fundamental and inalienable human right.*"

⁷ Women's Caucus Declaration, 4th World Water Forum: "*The human right to water must be implemented and enforced by all stakeholders at all levels.*"

⁸ World Encounter of Water Legislators: "*We expect that actions undertaken by each one of us locally could be added to build up a world-wide commitment, by which the access to water is recognized to every human being as an essential right, without concerning the place where he or she has been born or lives.*"

⁹ Algeria, Argentina, Belgium, Benin, Burkina Faso, Brazil, Bolivia, Cameroon, Colombia, Costa Rica, Chile, Congo, Cuba, Ecuador, Ethiopia, Finland, France, Gabon, Gambia, Guatemala, Germany, Hungary, Indonesia, Italy, Ireland, Luxembourg, Kenya, Madagascar, Mauritania, Mexico, Morocco, Nicaragua, New Zealand, Niger, Nigeria, Norway, Panama, Peru, Philippines,

Portugal, Romania, Senegal, South Africa, Spain, Switzerland, Uganda, Ukraine, Uruguay, Venezuela and Vietnam. This list, not exhaustive, is based on official declarations, national laws and jurisprudence which implement the right to water. From H. Smets (2006) "*The right to water at the 4th World Water Forum in Mexico*" *Environmental Policy and Law*, Vol.36 (2), p.88.

¹⁰ Complementary Declaration to the Ministerial Declaration from 4 countries of Latin America (Cuba, Venezuela, Bolivia, Uruguay): "*Access to water with quality, quantity and equity, constitutes a fundamental human right.*"

¹¹ The Convention on the Elimination of Discrimination Against Women (1979), The Convention on the Rights of Child (1989), The African Charter on the Rights and Welfare of the Child (1990), The Protocol on Water and Health (1999) and the Senegal River Water Charter (2002).

¹² General Comment No.15 on the right to water is an official legal interpretation issued in 2002 by the UN Committee on Economic, Social and Cultural Rights. This document is not legally binding itself. However, it is based on the provisions of the International Covenant on Economic, Social and Cultural Rights.

¹³ South African Constitution, Bill of Rights (1996), Section 27.1 (b): "*Everyone has a right to have access to sufficient food and water.*"

¹⁴ The most common use of the expression "public good" is in the field of economics. Basic textbooks on the subject define the term as "a good or service for which exclusion cannot be applied and for which the marginal cost of an additional user is zero". A "private good", on the other hand, is "one for which exclusion is possible and for which the marginal cost of an additional user is positive." These definitions suggest that in economic terms, water is a private good, not a public one. It is in fact possible to exclude others from the use of water: many legal systems allow private individuals to acquire rights in freshwater, rights that allow the owner to exclude others from their infringement. Moreover, the marginal cost of an additional user of water is not zero, whether the user withdraws or pollutes the water. (From Stephen C. McCaffrey "*The Human Right to Water Revisited*" in *Water and International Economic Law*, E. Brown Weiss, L. Boisson DeChazournes and N. Bernasconi-Osterwalder, eds., Oxford University Press, 2004).





Participation of Parliamentarians and Local Governments

Main Issues and Recent Tendencies

Undoubtedly, the participation and commitment to water issues shown by a great number of elected officials representing national or regional parliaments or local governments was one of the main features of the 4th World Water Forum. Politics was in the spotlight, a return to politics and policy making was noted and this issue received much attention. A growing awareness of the political dimension of water issues was emphasized through the recognition that governments should take primary responsibility for paving the way through their legislation, regulation, policy development, planning and finance allocating. The overarching theme of the Forum, "Local Actions for a Global Challenge", enabled these stakeholders to promote their roles and discuss their responsibilities in the management of water resources and water and sanitation services.

The principle of subsidiarity¹ was very much present in official declarations of Ministers, Parliamentarians and Local Governors, which emphasized the respective roles of each and possible solutions to the most important issues as seen from their varying points of view. However, each stakeholder group also explicitly or implicitly recognized the roles of the others (local, national, regional, international). For the first time in the history of the Forum, a dialogue among Ministers, Parliamentarians and representatives of Local Governments was organized, allowing each stakeholder to deliver messages to the others and insist on the necessity to work together.

¹ Underlying to the process of decentralization. According to this principle, public responsibilities should be exercised by those elected authorities at the lowest appropriate level (from Draft Guidelines on Decentralization, as proposed by UCLG)





Photo courtesy of UNDP/Earth Negotiations Bulletin

Facts and Figures on Participation of Parliamentarians and Local Governments

More than 120 local government representatives attended the seminar organized and jointly chaired by the Head of the Federal District of Mexico, the Governor of the State of Mexico, the WWC President and the Mayor of Quito, co-chair of UCLG. In the Banamex Center, seven sessions were also organized by local authorities.

Over the course of two days, 250 Parliamentarians met and called on developed countries to implement cooperative solidarity programs to help developing countries provide access to water and sanitation to the poorest. Finally, they committed to promoting, within their respective congresses, the idea of creating a "Water Parliament" at the global level that would design international water legislation.

One hundred and forty eight countries were officially represented by their ministers, vice-ministers, officials from national bodies in charge of water or their ambassadors, from various regions including Africa (27), MENA (15), Europe (14), Latin America (14), Asia (14), CIS (6), Balkans (2), Central and Oriental European countries (1) and North America (1),

- i) Representing Botswana, Belgium, Canada, China, Columbia, Indonesia, Equador, Spain, USA, France, United Kingdom, Italy, Lebanon, Mali, Mexico, Nepal, Niger, Portugal, Russia, Salvador, Senegal and Sweden.
- ii) Representing national or regional assemblies: Argentina, Belgium, Bolivia, Brasil, Chile, Columbia, Cuba, Costa Rica, Ecuador, France, Greece, Guatemala, Mexico, Panama, Paraguay, Spain, Switzerland, Thailand, Uganda, United Kingdom, Venezuela, the Council of Europe, the European Parliament, the Parlatino and the Congress of the Andes (Congreso Andino).

During the Forum, each stakeholder group organized specific meetings to debate, exchange and compare practices, in order to agree on their specific roles and on the necessary coordination between different levels and stakeholders. Meeting the MDGs in developing countries, sustainable water resources management, providing water and sanitation services, IWRM and risk management, and crosscutting perspectives on financing, institutional development, political processes and capacity

building were among the main themes addressed. Solidarity mechanisms, both among stakeholders of communities in the same country and between countries and regions of the world, both downstream and upstream, were also widely discussed.

Another main issue addressed by Parliamentarians and Local Government representatives was the right to water. Parliamentarians committed themselves to act at national and international levels so that access to basic water needs may

be recognized as an essential right for every human being, provided that it is supported by a financial framework. Local governments recalled that all human beings have the right to water and sanitation to meet their essential needs and committed to making every effort to facilitate universal access to these services at an affordable and equitable price.

Regarding the financial needs associated with the provision of services, Local Government representatives and Parliamentarians called for increased solidarity between the North and South through the establishment of cooperative programs that could fund capacity building on a long-term basis.

Selection of Declarations by Local Government Representatives, Ministers and Parliamentarians

We, Mayors and local elected representatives, undertake to make every effort to:

- 3.1. Implement policies to achieve the Millennium Development Goal to reduce by half the proportion of people without sustainable access to safe drinking water by 2015;
- 3.2. Manage water and sanitation services in our areas, and within the remit of our powers, in such a way as to facilitate universal access to water and sanitation in sufficient quantity, quality and continuity, and at an affordable and equitable price;

We, Mayors and local elected representatives, call on national governments, regional and international organizations and the United Nations to:

- 4.1. Recognize the fundamental role played by local authorities in the protection and sustainable management of water, and in the organization of equitable and transparent public services to manage drinking water and sanitation.
- 4.2. Encourage decentralization and devolution, and actively implement subsidiarity, to ensure service delivery close to citizens based on close co-operation among all levels of government.

We, the Ministers assembled in Mexico City on the occasion of the 4th World Water Forum, "Local Actions for a Global Challenge", on March 21 and 22, 2006,

Reaffirm our commitment to achieve the internationally agreed goals on integrated water resources management (IWRM), access to safe drinking water and basic sanitation, agreed upon in Agenda 21, the Millennium Declaration and the Johannesburg Plan of Implementation (JPOI). We reiterate the continued and urgent need to achieve these goals and to keep track of progress towards their implementation, including the goal to reduce by half, by the year 2015, the proportion of people unable to reach or afford safe drinking water.

Recognize the important role that Parliamentarians and Local Authorities are playing in various countries to increase sustainable access to water and sanitation services as well as to support integrated water resource management. An efficient collaboration with and between these actors is a key factor to meet our water-related challenges and goals.

World Encounter of Water Legislators, Mexico Declaration

We, as parliamentarians, commit to propelling a legal framework from our sphere of activity that responds adequately to the policies and perspectives posed by each country, that promotes and recognizes the participation of citizens, and that contributes with proposals of public policies and legal norms within the international arena.





Main Messages, Lessons Learnt and Key Recommendations

Provision of water and sanitation services is primarily a local affair

Local Governments hold a critical role in enabling local stakeholders to provide water and sanitation services. A population's needs and financial resources are, indeed, better assessed at this level than at the national level, which is why this is the most appropriate level for ensuring equity between different segments of the population and for establishing cross-subsidies between rich and poor users.

As former French Prime Minister Michel Rocard stated at the Forum, "the only efficient systems are those implemented and managed at the local level, as close as possible to the resource and the users."

In OECD countries, elected Local Government representatives may legitimately arbitrate between different water users and uses². In partnership with civil society organizations including the business sector, Local Governments can and must facilitate and foster participatory and consultation processes in order to generate socially and environmentally responsible water consumption. In this domain, their role is to demonstrate responsible municipal water use, provide hygiene education, adopt and enforce pollution-prevention regulations and create a civic ethos that supports water efficiency. Local Governments are suitable political actors to accomplish these tasks because the protection of local water resources and provision of water and sanitation services are fundamentally linked to other policies and basic services³ that are under their responsibility.⁴

For different reasons, some countries have not yet transferred the responsibility for the provision of basic services to the municipal level. However, if a water authority remains a central government entity, this entity can be deconcentrated through regional offices, with some functions being delegated to them in order to be closer to local problems and users.

The Regional Document for the Americas stresses that the provision of water supply and sanitation services in several countries of the region has traditionally been the role of municipalities. This idea has been reinforced over the last two decades with sub-sector reform and the ensuing

² Domestic, industrial, agricultural, tourism, environmental, cultural, etc.

³ Building code requirements, local flood control, prevention of industrial pollution, health services, gender considerations, etc.

⁴ Seventy percent of the MDGs are implemented at the local level, and many are interlinked. (UCLG)

trend to decentralize these services to the lowest possible administrative level. Now, municipalities participate in these services as direct providers with the related responsibility and as supervisors of utilities.

As far as water resources are concerned, Local Authorities and Local Governments at the watershed level are also key actors in IWRM and in the prevention and mitigation of extreme events such as floods and droughts.

Appropriate governance results in quality water services

Governance at the local level was amply debated: public vs. private operators, cost recovery, transparency, etc. A consensus was reached on the fact that local authorities should be responsible for the definition, implementation and control of water policy, investments and pricing. Local authorities should

be able to freely choose between various management models and operators (public, private or mixed).

The operator and the public authority responsible for services should ideally be separate entities, even under public management, in order to define more easily and clearly their roles and responsibilities and to set public service objectives.

In addition, for successful provision of services:

- Relevant performance indicators must be defined to monitor service provision;
- Terms of reference for contracts with private operators must be transparent;
- Good governance practices and equitable tariffs must be integrated into private or mixed service contracts and public regulation;
- The mode of management reversibility, with equitable compensation, must be clearly agreed upon.

How Local Governments in China Will Cope With the Sustainable Provision of Water and Sanitation to All Rural and Urban Citizens

In China, targets have been set at the local level for the Millennium Development Goals for provision of safe and adequate water for drinking purposes and domestic use for all and future generations and enforcement of sanitation and conservation systems. Relevant policies to be completed by 2010 have been defined to allow local authorities to face some major challenges both in the cities and in rural areas. Regarding water quality in rural areas, the 11th Five-Year Plan adopted by the National People's Congress has set out to provide 100 million farmers with safe drinking water. In achieving that, virtually all Chinese citizens will have access to safe drinking water. To address urban water quality challenges faced by some Chinese cities, such as water shortages due to rapid industrial development, China will reduce water use per unit of industrial output by 30% annually. This will reserve more water for domestic use.

A Methodology has been defined consisting of:

- Integration of water supply systems in terms of source (rivers, wells and reservoirs) and treatment facilities, to face the scarcity of resources due to urbanization;
- Decentralization: Local Governments believe in decentralization. For this reason, they also outsource water projects and supply to public and private providers through BOTs, PPPs or public tender. By doing so, multiple financing is introduced and the private sector becomes involved, contributing to the improvement of efficiency and to reaching targets previously believed unreachable;
- Technology: In cities, fresh drinking water supplies are separated from water for domestic and other civic uses. For the latter, use of recycled water is encouraged through funded programs. Water saving schemes and techniques are adopted through water-conserving equipment, and multiple-level scales are introduced, corresponding to the different amounts of water used per household per time unit. Basic vital needs are met while more must be paid when greater amounts are used;
- Wastewater treatment: Charges are introduced to households for wastewater treatment. Wastewater is treated and returned to the ground;
- Improvement of the water ecosystem while keeping underground water levels stable in major cities, as a conservation measure for the future; and
- Education campaigns for water conservation: NGOs, community-based volunteer organizations and environmentalists improve public awareness and the active participation of citizens in water management and in water conservation campaigns.

Case presented by Councillor Bin Ji, China in the international meeting of Local Governments

Another key factor in successful governance consists of the creation of effective mechanisms for the participation of civil society and empowerment at certain levels. Water users and water users associations must be associated with decision-making through a participative process (evaluations must be published) for which mechanisms must be developed or reinforced. The role of women and the water vision of indigenous populations should not be overlooked in local water management.⁵ In fact, women often also play an essential role within indigenous populations with regard to water use, so legislation for land and water rights for both categories must be strengthened. Mechanisms and governmental policies for giving priority to women's leadership at every level are vital, and Governments need to be held accountable for commitments to gender equity and access to water through evocation of existing international agreements.

Institutional, financial, technical and professional capacities of local governments must be strengthened

Local Governments⁶ at the Forum promoted decentralization, which has proven efficient throughout the world, given the appropriate conditions (adequate capacity, human and institutional resources and authority). Decentralization of water service provision is necessary but is not, however, a panacea, and therefore, a mix of models may be needed for specific situations. Decentralization also requires accountability. Thus, Governments should support a legal framework that ensures application of the principles of good governance, including the "rule of law." In implementing decentralization, measures to prevent and fight corruption at the local level are highly necessary. Corruption must not be tolerated in any circumstances.

A French Law to Stimulate Innovative North to South Solidarity Mechanisms

A French law, referred to as the *Loi Oudin Santini*, was recently voted, allowing French Local Governments to allocate up to 1% of their water and sanitation budget to actions supporting cooperation within the scope of access to water and sanitation. Other countries have also developed similar initiatives. A global initiative to extend and strengthen existing solidarity mechanisms was launched during the Forum by pS-Eau, UCLG and the WWC. A platform is under construction in order to share experiences and promote these forms of financing access to water and sanitation. The objectives of such a promotion are, in the North, to increase the volume of funds and to sustain the commitment of those who support such actions. In the South, it is to demonstrate the viability of locally-driven water and sanitation provision and to strengthen the legitimacy of local authorities.

Solidarity mechanisms should be further developed

To meet the MDGs, there is a need to increase the level of funding that reaches the local level and, at the same time, a need to build capacities in order to prepare and implement good quality projects and to ensure good management of water resources and services. Solidarity financing mechanisms, based on voluntary funding from individuals, NGOs, water professionals or local governments wishing to redress inequalities in access to water and sanitation in poor countries, contribute to meeting both needs. These solidarity initiatives, developed throughout the world, harness the energy, commitment and financial support of water users, local authorities, water and sanitation organizations and their staff and respond directly to local needs and requests. This type of

cooperation generally builds long-term partnerships between all local stakeholders—local communities, local authorities and users—while fostering local capacity building.

National or supra-national levels are essential to set up rules, coordinate policies, and restore equity between different territories

Water is a common good that must be protected and made available to different users and territories equitably. Water has no borders and, thus, must be shared within national and international watersheds. Such a mission belongs to the highest political level.

To achieve the integrated management of water resources, it is of prime importance for decision-makers at all

⁵ As stated in the UN Secretary General's message on World Water Day, there is a need for women to participate more meaningfully in decision-making on how water is used and managed in order to make full use of their knowledge, skills and contributions.

⁶ During the Palacio de Minería meeting "Water supply and sanitation for all: Service delivery closer to the citizen"



Photo courtesy of IISD/Earth Negotiations Bulletin

Decentralization of Water Resources Management in Uganda: from Planning to Practice

Uganda, with a population of 26 million and a per capita GDP of US\$300, is one of the least developed countries in the world. Following the Rio UNCED (1992), Uganda was one of the first countries in the world to adopt the Rio IWRM principles and to incorporate them into a national Water Action Plan (WAP). Over 10 years of WAP implementation have passed and, over this period, Uganda has moved from IWRM planning to implementation. In the process, Uganda has encountered a number of challenges, made significant progress towards addressing them and learned a number of lessons. As a result, Uganda is on course to achieve the water-related WSSD targets and Millennium Development Goals.

Key achievements over the last 10 years include, among other things:

- Setting up a comprehensive policy and legal framework for the water sector (New Constitution, 1995; Water Statute, 1995; Water Policy, 1999; Environment Statute, 1995; Local Government Act, 1997; and several other related legislations);
- Setting up an efficient institutional framework for water resources management at national and local levels, with emphasis on vertical integration;
- Improved water governance through clear definition of roles and responsibilities, multi-stakeholder involvement and consultation, and empowerment of local communities to participate in the decision-making process;
- Empowerment of Local Governments through devolution of planning and management powers and decentralization of service delivery;
- Enhanced private sector involvement in the delivery of water services through leveraging technical and financial resources from the private sector for water resources management and development;
- Improving the efficiency of service delivery through promotion of a demand-responsive approach, use of indigenous skills and resources, and voluntary local community contributions to implement projects; and
- Promotion of transparency and accountability through rigorous monitoring, evaluation and reporting mechanisms at all levels.

All these measures have contributed to the significant increase in access to improved water supply and sanitation services in the country. Rural water supply coverage has increased from 20%⁷ in 1990 to 55% in 2005. Over the same period, access to improved sanitation in rural areas rose from 55.1% to 85 percent.

From Local Action LA0783, by the Water Resources Management Department, Uganda

⁷ Percentage of people within 1.5 km of a potable water source.

relevant levels to have easy access to information regarding the availability of the resource (quantity, quality and location), the functioning of ecosystems, sources of pollution, risks of extreme events and economic parameters of the water sector. It is the State's responsibility to provide this information.

As far as financial resources are concerned, political will is necessary to give priority to water and to put it on the political agenda. Sound national (and regional) water policies and legal frameworks covering institutional and financial aspects of successful and sustainable water management are necessary to establish rules, to define the roles and responsibilities of stakeholders and institutions and to develop their capacities.

In session FT2.02 *"Integrated Management and Governance: A Framework for Making Empowerment a Reality"*, Carlos Fernandez-Jauregui from the WWAP stressed that "The world water crisis is largely a governance crisis, whose major problems include the lack (or multiplicity) of institutions, weak legal frameworks, limited human and financial resources and limited involvement of major stakeholders".

The business-as-usual approach has created more problems than solutions. To move forward, localizing water management can be achieved by delegating powers and resources to sound and strong institutions. However, the activities and responsibilities of these institutions must be incorporated into national and regional policies and strategies. Vertical integration is key, in both bottom-up and top-down approaches.

Parliamentarians have a strong role to play in proposing and voting water policies and relevant legislation

Parliamentarians are endowed with the role of voting laws proposed by Governments or proposing laws to be submitted to the executive powers. In this context, they are key decision-makers and must have a good understanding of water challenges (including the impact of water on other sectors), both within their countries and at the regional and international levels, since water flow does not stop at the border.

Some principles were discussed on the development of water laws:

- Transparency and knowledge are necessary in order to improve the capacity of parliamentarians to make decisions;
- Each water law must answer to the needs of the country's society. In this respect, Colombia conducted a virtual inquiry and organized workshops to assess the country's needs and interests; and
- Participatory processes and consultation between users and the Government secure the viability of water laws.

For the first time at the World Water Forum, the issue of the payment for environmental services was raised, with the Costa Rican law that internalizes and takes into account environmental costs in economic, agricultural and other policies. It is based on two principles: users must pay for the environmental services from which they benefit, and suppliers must be compensated for delivering them.

During the Forum in Mexico, Parliamentarians committed to:

- Acting at the national level in order to build up worldwide commitment for recognition of the access to water for every human being as an essential right, regardless of where he or she was born or lives; and
- Proposing an initiative to their respective parliaments for the creation of a coalition that would seek agreement on water issues within the framework of a worldwide legislature.

In addition, during the 2nd Children's World Water Forum, the need was expressed to establish a children's Parliament in each country, so that the voices of children may be heard and so that Governments and donors may jointly consider their proposals.

Finally, the message from the Congress of Local and Regional Authorities of the Council of Europe summarizes the conditions necessary for sharing responsibility efficiently.

"We need to foster a new water culture, a culture of sharing responsibility. We need a clear division of competences, including both the public and private sector. We need to back coherent water policies with competent elected representatives and their staff, as well as competent educators in civil society."

-Keith Whitmore, City of Manchester, President of the Committee on Sustainable Development of the Congress of Local and Regional Authorities, Council of Europe

Concluding Remarks

Strengthening The Local Level

The 4th World Water Forum undoubtedly provided several opportunities to develop a shared understanding of the many issues that make water so important to our life, to initiate new partnerships between the many organizations that make up the so-called "water community" and to pave the way for the strengthening of local actors and local actions. Local actions presented during the Forum provided not only illustrations of the important issues: they actually helped to substantiate the problems on the ground and to generate understanding of the complexity of the local realities. Several recommendations were made, but it is mainly through the reflections triggered by the debate and through the many partnerships that were initiated, that future action will be influenced.

Strengthening the stakeholders at the local level was finally not so extensively debated, as if it were agreed by the participants that this is an evident need. However, maybe also the definition of the local level as being the lowest appropriate level, according to the subsidiarity principle, was clearly understood so that each stakeholder was able to feel comfortable in the discussions. Whatever the reason, the fact remains that the relationship between the local level and the regional or national levels are critical in many places, both for political reasons, and because they obey different, if not contradictory logics. It is for instance customary for the central governments to look at water more as a resource than a service to be provided to their citizens, which is more the interest of local governments. Creating an enabling environment from legal, knowledge and financial perspectives to strengthen the local stakeholders is the responsibility of the State. The desire and extent to do so is often a political decision. Obviously there is room for further discussions on these issues.



The political nature of water

One of the main achievements of the Forum is to have exhibited and emphasized the political nature of water issues. Water is complex, as it is at the same time an essential resource, a common good, an economic factor and a basic human right, as well as performing other functions that make it critical to each citizen in different and sometimes contradictory ways. This is why water is a political issue: all decisions pertaining to its management and use require that these considerations and interests be taken into account. Hence, those in charge of public decisions and elected officials need to keep control of its overall management. In this way, water is a tremendous vehicle for the enhancement of democracy, of public participation and of the empowerment of local stakeholders, as clearly demonstrated by the Forum. These basic rules are simple in principle but if they are forgotten and if politicians disregard their role in water issues, water may become at risk.

The importance of the political nature of the Forum was highlighted not only by the 148 ministerial delegations that attended the Forum but also through the participation of local authorities and governments as well as parliamentarians, which was perceived as innovative and bringing new blood to the political discussions on water. This is indirectly a result of the focus of this Forum on the local level: the local dimension of water issues makes it critical to involve various political levels in the debate.

It is clear that comparing local water policies with national and regional ones and extracting the best of them is pivotal to the success of future reforms. It is also probably essential to the success of IWRM, which should not be perceived as only a *horizontal* integration between users. In fact the *vertical* integration between institutions and individuals at the local level, often representing the demand side of management, and institutions and individuals at the regional or national levels, representing more the supply side as well as the regulatory role, is probably one of the greatest challenges presently faced by IWRM.

Progress on the issues

It is not possible to totally summarize the progress made on the numerous issues dealt with in the Forum. Let us recognize first and foremost that the peaceful atmosphere of the Forum facilitated quality discussions, even if the time allocated was probably not sufficient. Let us also stress here that improving

the common understanding of the issues alone is not enough and is not even the main purpose of the Forum, which is more to convince those not directly involved in the water community, starting with decision makers, of the importance of water and the need to take appropriate action.

However, significant progress may be reported on several issues:

- Water for food and the environment: progress here was triggered by a move from an opposition between food production and ecosystem protection to a more integrated vision of the interactions between land, water, livelihoods, terrestrial and aquatic ecosystems, and irrigated and rain-fed agriculture;
- Risk management: risks are clearly a concern and the need to develop new approaches was acknowledged; environmental issues associated to hazards are also relatively new and probably need to be given more emphasis in the future;
- Right to water: a better understanding of what this right entails and how it can be implemented was achieved; there are still contrasting views on this issue, but the various political declarations show that the concept is not merely ideological, but that it has a concrete meaning for all and is endorsed by many, starting with the local authorities and the parliamentarians; and
- Financing water for all: local authorities have an essential role in generating finance for investments in water services. The development of local financing capacity and of local financial markets was emphasized, and a number of ways to achieve this were proposed, but require more debate and testing in real terms. This necessity is founded on the recognition that users and taxpayers are in the end the main financiers, and on the associated shift from full cost recovery to a solidarity system of fair tariffs combined with targeted subsidies.

One of the lessons learned is that in all cases, broadening the overview, taking increasingly into account the complexity and the diversity of water issues, as related to the development of our societies, is paramount to achieving progress.

On the other hand, some issues remained insufficiently addressed, which gives us some more work for the future. Among these issues are:

- Health issues: the role of clean water and untreated water on health is stressed regularly, but little debate and in-depth discussion took place on this subject at the Forum; we are still lacking a clear assessment on this matter, which would be helpful to convince decision makers on the importance of clean water and sanitation;
- Demographic issues: population growth, migration and population densities are decisive factors to nearly all water issues. They need to be better analyzed in forthcoming World Water Fora, not only as reported data but as variables that both influence and are influenced by water quality and quantity;
- Water and energy issues: the interactions between water and energy are numerous and are becoming more and more important within the present energy context. It is important that we develop a better

understanding of these interactions in order to improve the sustainability of the global water management.

Pursuing the movement

Finally, let us recall that the World Water Forum is not and should not be a conference or an end in itself. It must be a triennial process through which the water community interacts with the rest of the world, the week of the Forum being simply a pause in the water management improvement processes. Between two World Water Fora, action has to take place, and follow-up on the various recommendations and commitments made needs to be carried out. Monitoring of this follow-up will be organized in the coming years in order to report at the 5th World Water Forum on the results, achievements and corrective actions to be taken.

Annexes

Abbreviations Used in the Document

ADB	Asian Development Bank	EU	European Union
AfDB	African Development Bank	EUWI M/R-WG	Monitoring and Reporting Working Group of the EU Water Initiative
AFD	French Development Agency	FANCA	Freshwater Action Network Central America
AHREP	Andhi Khola Rural Electrification and Hydropower Project	FIRE	Financial Institutions Reform and Expansion
AIDS	Acquired Immune Deficiency Syndrome	G8	Group of the eight "most economically developed" countries (Canada, France, Germany, Italy, Japan, Russia, United Kingdom and United States)
AKWUA	Andhi Khola Water User Association	GDP	Gross Domestic Product
ALMAE	Maghreb Machrek Alliance for Water	GIS	Geographical Information System
AMC	Ahmedabad Municipal Corporation	GRDR	Group for Research and Realization for Rural Development
AMCOW	African Ministers' Council on Water	GRIWAC	Gansu Research Institute for Water Conservancy
AssEF	Association of Mutual Help for Women	GTZ	German Technical Cooperation Agency
AWF	African Water Facility	GWSC	Ghana Water and Sewerage Corporation
BOT	Build Operate and Transfer	GWP	Global Water Partnership
CALAS	Center for Legal-Environmental and Social Action, Guatemala	HIV	Human Immunodeficiency Virus
CBOs	Community-Based Organizations	IADB	Inter-American Development Bank
CEDARE	Center for Environmental Development in the Arab Region and Europe	IFIs	International Financial Institutions
CEOS	Committee on Earth Observation Satellites	INPIM	International Network on Participatory Irrigation Management
CIDRE	Regional Research and Development Center	IWMI	International Water Management Institute
COA	Compendium Of Actions	IWRM	Integrated Water Resources Management
COMDA	Mexican Coalition for the Right to Water	IWT	Inland Water Transport
CPWC	Cooperative Programme on Water and Climate	JMP	Joint Monitoring Programme
CREPA	Regional Center for Low-Cost Drinking Water and Sanitation	LDA	Limpopo Province Department of Agriculture
CRISIL	Credit Rating and Information Services of India	LDC	Least Developed Countries
CSD	Commission on Sustainable Development	MDGs	Millennium Development Goals
CSOs	Civil Society Organizations	MENA	Middle East and North Africa
DWAF	Department of Water Affairs and Forestry, South Africa	MFIs	Multilateral Financial Institutions
EcoSanRes	Ecological Sanitation Research	MRC	Mekong River Commission
EMWIS	Euro-Mediterranean Water Information System	MRC NAP	Mekong River Commission Navigation Programme
EO	Earth Observation		
ESA	European Space Agency		

NETWA	Network of Water Anthropology	USD	United States Dollar
NGOs	Non-Governmental Organizations	UWASNET	Uganda Water and Sanitation Network
NWSC	National Water and Sanitation Company	WAND	Water Action and Networking Database
ODA	Official Development Assistance	WASH	Water, Sanitation and Hygiene
OECD	Organization for Economic Co-operation and Development	WFD	Water Framework Directive
PIM	Participatory Irrigation Management	WFE	Water for Food and the Environment
PPP	Public Private Partnership	WHO	World Health Organization
pS-Eau	Water Solidarity Programme	WIN	Water Integrity Network
RCS	Rainwater Catchment System	WMO	World Meteorological Organization
RESIS	Revitalisation of Smallholder Irrigation Schemes	WRC	Water Research Commission
RHEP	Rural Health & Environment Programme	WSPortal	Water Supply Portal
RTW	Right to Water	WSS	Water and Sanitation
RWH	Rainwater Harvesting	WSSD	World Summit on Sustainable Development
RWSSI	Rural Water Supply and Sanitation Initiative	WSSTP	Water Supply and Sanitation Technology Platform
SASS	Aquifer System of the Northern Sahara	WUAs	Water Users Associations
SEMAPA	Municipal Drinking Water and Sewage Service, Bolivia	WWC	World Water Council
SIVOA	Inter-Communal Union for the Valley or the Orge Aval	WWF	World Wildlife Fund
SPFA	French-Armenian Protestant Solidarity		
UCLG	United Cities and Local Governments		
UMA	Water Monitoring Alliance		
UN	United Nations		
UNCED	United Nations Conference on Environment and Development		
UN-CSO	United Nations Commission on Sustainable Development		
UN-DESA	United Nations Department of Economic and Social Affairs		
UNDP	United Nations Development Program		
UNEP	United Nation Environment Program		
UNESCO	United Nations Educational, Scientific and Cultural Organisation		
UNICEF	United Nations Children's Fund		
UNISDR	United Nations International Strategy for Disaster Reduction		
UNSGAB	United Nations Secretary General's Advisory Board on Water and Sanitation		
UN-WWAP	United Nations World Water Assessment Programme		
USACE	United States Army Corps of Engineers		
USAID	United States Agency for International Development		

List of Topic-Sessions

Session	Title	Convener(s)
FT1.01	Water and Free Trade Agreements	International Development Research Centre / United Nations Economic Commission for Latin America and the Caribbean / Americas Operative Committee / Sustainable Water, Bolivia
FT1.02	Fighting Poverty Through Wastewater Management	Seine Normandy Water Agency, France / Inter-Departmental Union for Sanitation of the Urban Area of Paris, France
FT1.04	Linking Poverty Reduction and Water Management - Reaching the MDGs through Investing in Water	The Poverty-Environment Partnership of UNDP / United Nations Development Programme / Stockholm International Water Institute, Sweden
FT1.05	Achieving Water Security: Innovative Solutions for System Resilience	International Research Institute for Climate and Society
FT1.06	Water and Transport	Ministry of Land, Infrastructure and Transport, Japan / Mekong River Commission, Laos / Ministry of Construction and Transportation Republic of Korea / U.S. Army Corps of Engineers
FT1.07	How to Overcome Corruption in Water Resources and Service Management. Actions for Development	Stockholm International Water Institute, Sweden / Inter-American Association on Sanitary and Environmental Engineering / International Initiative on Corruption and Governance / Swedish Water House
FT1.08	The Global Potential for Major Water System Reoptimization to Restore Downstream Ecosystems and Human Livelihoods	Natural Heritage Institute, United States
FT1.09	Financing Water Infrastructure in the Americas	Americas Operative Committee
FT1.10	Water for Growth and Development in Africa	United Nations Economic Commission for Africa / African Development Bank / New Partnership for Africa's Development / Swiss Agency for Development and Cooperation
FT1.13	Financing Mechanisms for Local Water Initiatives	African Water Facility / Islamic Development Bank / Water and Sanitation Program
FT1.14	Call for Proposal Mechanism: A Way to Directly Support Local Stakeholders in Implementing Local Actions for Local Development	European Commission / Austrian Development Agency/ pS-Eau (Water Solidarity Program), France / Women for Water Partnership
FT1.15	Is Water Alive? Indigenous Understandings of Water	Indigenous Water Initiative, United States / Indigenous Environment Network, United States / Sustainable Water, Bolivia / International Water History Association



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FT1.16	Land and Water Resources Development in Semi-Arid and Arid Regions	General Directorate of State Hydraulic Works, Turkey
FT1.17	Gender Mainstreaming and Water for Growth and Development: Diversity as an Agent of Change	Gender and Water Alliance / Water and Sanitation Program / W-World Association of the Major Metropolises
FT1.18	Innovative Strategies for Financing Projects by Local Authorities. How to Implement Transparent, Responsible and Ethical Models	Association of Mayors of Large Cities in France / United Cities and Local Governments / Edo. Mexico
FT1.19	Young People in the Water Crisis and the Challenges to Face	Mexican Youth Institute / Iberoamerican Youth Organization, Spain/ Organization Quebec-Americas for Youth
FT1.20	Megacities: Paradigms for Urban Water Management	Colegio de Mexico / UNESCO
FT1.22	The Dynamics of Water and Growth: Issues and Political Reflections	The World Bank
FT1.23	Local Initiatives (Community Involvement, Stakeholders)	Colegio de Mexico/ National Autonomous University of Mexico / North American Environmental Center for Information and Communication
FT1.24	Groundwater Protection in Africa	United Nations Environment Programme / UNESCO / University of the Western Cape, South Africa / Department of Water Affairs and Forestry, South Africa / Sahara and Sahel Observatory / Centre for Environment and Development for the Arab Region and Europe
FT1.25	Ensuring Dams are a Platform for Growth and Sustainable Development	United Nations Environment Programme / International Commission on Large Dams / World Wildlife Fund / U.S. Army Corps of Engineers / International Rivers Network
FT1.26	Access to Finance for Local Governments	World Water Council / Global Water Partnership
FT1.27	New Concepts and Tools for Education and Capacity Building to Achieve the MDGs	UNESCO-IHE
FT1.28	Water & Energy	Federal Commission for Electricity, Mexico / International Hydropower Association / Norwegian Water Resources and Energy Directorate
FT1.29	Empowerment of Young People for Water Management and the Strengthening of the Appropriate Use of Water	Mexican Youth Institute / Geo Youth Network, Mexico / Iberoamerican University, Mexico
FT1.30	Assessment of Policy Interventions in the Water Sector	The World Bank / Ministry of the Environment and Natural Resources, Mexico

Session	Title	Convener(s)
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FT1.33	Successful Indigenous Approaches to Integrated Water Resource Management and Achieving the Millennium Development Goals	EcoLogic Development Fund / International Funders for Indigenous Peoples, United States
FT1.34	Water Infrastructures for Sustainable and Equitable Development	International Water Resources Association / International Commission on Irrigation and Drainage / International Hydropower Association / International Commission on Large Dams / International Association of Hydraulic Engineering and Research
FT1.35	Indigenous Towns and Water	National Commission for the Development of Indigenous Peoples, Mexico / United Nations Permanent Forum on Indigenous Issues
FT1.36	Business, Water and Sustainable Development	World Business Council on Sustainable Development / United Nations Environment Programme / Private Sector Studies for Sustainable Development Commission
FT1.38	Sustainable and Secure Delivery of Water: Unique Solutions Proposed by the Consulting Industry	International Federation of Consulting Engineers / National Chamber of Consulting Firms, Mexico / Association of Japanese Consulting Engineers
FT1.39	Shared Groundwater Resources for Sustainable Development	UNESCO / Organization of American States / Global Environment Facility / Institute for Global Environmental Strategies, Japan
FT1.40	The Mass Media: Key Elements for a Conscience and Social Participation in the Problematic of the Water	Hombre Naturaleza, Mexico
FT2.01	Financing and IWRM	Global Water Partnership / Mexican Fund for Nature's Preservation / The World Bank
FT2.02	Integrated Management and Governance: A Framework for Making Empowerment a Reality	International Council for Local Environment Initiatives / World Water Assessment Programme / Unie van Waterschappen
FT2.03	Strengthening Institutions and Stakeholders Capacity for IWRM Implementation at the Local Level	Capacity Building for Integrated Water Resources Management / LA-Project WET International, United States / Central American Network of Engineering Institutions
FT2.04	Shared Vision Models	Mexican Institute for Water Technology/ Danish Hydraulic Institute
FT2.05	Water Management in Transboundary Basins	National Water Commission of Mexico / American Water Resources Association / Mexican Association of Hydraulics
FT2.07	IWRM National Plans (Part I)	World Water Assessment Programme / Global Water Partnership / United Nations Development Programme / United Nations Environment Programme

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FT2.08	Transboundary Waters in the Americas: Lessons in IWRM	Organization of American States / International Joint Commission
FT2.13	IWRM as a Basis for Social and Economic Development in Central Asia	Scientific-Information Center of the Interstate Coordination Water Commission of the Central Asia, Uzbekistan/ Global Water Partnership
FT2.14	Implementation of the Water Framework Directive: Status, Challenges & Prospects	International Network of Basin Organizations / Univ. Osnabrueck / Wageningen - UR, the Netherlands
FT2.15	The Challenges of Legal Water Sector Reform	The World Bank / Americas Operative Committee
FT2.16	Water Governance and River Basin Organizations	Global Water Partnership / IUCN The World Conservation Union / EcoLogic Development Fund
FT2.17	Public Private Partnership towards IWRM in the MENA Region	Ministry of Water Resources and Irrigation, Egypt / Arab Water Council
FT2.18	Transboundary Water Management and Regional Integration in Africa	African Network for Basin Organization / New Partnership for Africa's Development / Nile Basin Initiative/ United Nations Economic Commission for Africa / Global Water Partnership-Africa / CEDARE / Sahara and Sahel Observatory
FT2.19	IWRM in National Plans (Part II)	World Water Assessment Programme / Global Water Partnership / United Nations Development Programme / United Nations Environment Programme
FT2.20	IWRM in National Plans (Part III)	World Water Assessment Programme / Global Water Partnership / United Nations Development Programme / United Nations Environment Programme
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FT2.24	The Application of IWRM in the Fiji Islands	World Meteorological Organization / Euro-Mediterranean Information System / Australian Bureau of Meteorology
FT2.25	Groundwater Management in the Middle East and North Africa Region	World Bank / Arab Water Council
FT2.26	Groundwater for Life and Livelihoods - A Framework for Action	International Association of Hydrogeologists / The World Bank / Ground Water Institute, India
FT2.27	The Role of Water and Integrated Water Resources Management in the Achievement of the Millennium Development Goals	Global Water Partnership / Stockholm International Water Institute, Sweden
FT2.28	Lessons Learned on Facilitating IWRM Planning	Global Water Partnership

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FT2.30	Coordination of Local Actions for the Sustainable Future of the La Plata River Basin	Green Cross International / Itaipu Binational Hydropower Central, Brazil / Intergovernmental Committee Coordination of the La Plata Basin Countries
FT2.31	Management Link for Freshwaters and Coasts - Progress in Local Actions	United Nations Environment Programme / National Oceanic and Atmospheric Administration, United States / Global Forum on Oceans, Coasts and Islands / Ministry of the Environment and Natural Resources, Mexico
FT2.32	Promoting World Lake Vision and Integrated Basin Management for the Future of Global Water	Shiga Prefectural Government, Japan / International Lake Environment Committee / Global Nature Fund / Conference of Promotion for Lake Biwa – Yodo River Basin Area Renaissance / The World Bank / Global Environment Facility / United Nations Environment Programme / Ministry of Land, Infrastructure and Transport, Japan
FT2.33	Advancing Local Actions in Basins, Sub-Basins and Aquifers (BSA) Through Comprehensive IWRM Learning and Global Networks	UNESCO-IHP/ National Ecology Institute, Mexico / European Commission
FT2.34	Bottom-Up Meets Top-Down: Learning Lessons from Latin America and Africa	WfWfW / Gender and Water Alliance
FT2.35	Implementing the 2002 Johannesburg Commitments - African Civil Society in IWRM	Mvula Trust, South Africa / Freshwater Action Network / Rwanda Wildlife Clubs
FT2.36	Participation of the Public and Solidarity in Basin Management	International Network of Basin Organizations / Environmental Law Institute and IW:LEARN / French Water Academy
FT2.38	Ecosystem and Ecohydrology Approaches to Integrated Water Resources Management	United Nations Environment Programme / UNESCO-IHP / Organization of American States / International Lake Environment Committee
FT2.39	Rainwater, Watershed Management and Food Sovereignty	International Rainwater Harvesting Alliance / International Center for Demonstration and Rainwater Catchment / United Nations Environment Programme
FT2.41	Integrated Water Resources Management in the North	Northern Water Network / U.S. Army Corps of Engineers / Reijkswaterstaap
FT2.43	Opportunities and Impediments to IWRM: Reality -vs- Virtual Reality	U.S. Army Corps of Engineers / International Water Management Institute
FT2.44	Adopting Integrated Flood Management within Integrated Water Resources Management	Ministry of Land, Infrastructure and Transport, Japan / Ministry of Transport, Public Works and Water Management, the Netherlands / MEDD, France / French Water Academy / Associated Programme on Flood Management

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FT2.46	Wastewater Management for Integrated Water Resources Management	Japan Water Reclamation Committee
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FT2.48	Water Governance: from Analysis to Action	National Autonomous University of Mexico
FT2.49	The Mass Media as a Detonator of a Water Culture	Miguel Aleman Foundation, Mexico / Autonomous Institute for Ecological Research, Mexico
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FT3.03	Solidarity and decentralized forms of North/South and South/South funding	pS-Eau (Water Solidarity Program), France / United Cities and Local Governments / World Water Council
FT3.04	Knowledge Generation Et Innovative Technologies for the Sustainable Management of Water Resources in Europe and Worldwide	European Commission / Netherlands Water Partnership
FT3.05	Water Supply and Sanitation for All	African Development Bank
FT3.06	Desalination of Seawater Foundation Et Saline Groundwater	Ministry of Water and Electricity Saudi Arabia

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FT3.07	Access to Safe Water and Ecological Sanitation for Rural Areas, Good Practices in Latin America and Eastern Europe from a Gender Perspective	Women in Europe for a Common Future / MAMA-86 / Earth Forever Foundation
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FT3.09	Asian Civil Society Innovating Change	NGO Forum on the Asian Development Bank, Philippines / Freshwater Action Network
FT3.10	Voicing People's Interests - Civil Society Innovating Change in Water & Sanitation Policy	Freshwater Action Network
FT3.12	Safe, Accessible, Private and Nearby: Making Services Work for Women- The Key to Meeting the MDG Water and Sanitation Target	United Nations Development Programme / Columbia Univ. / UN-HABITAT / UNICEF / United Nations Department of Economic and Social Affairs
FT3.13	Ecological Sanitation: Closed-Loop Sanitation Approaches to Attain Healthy and Sustainable Cities and the MDGs	Stockholm Environment Institute, Sweden / University of Life Sciences, Norway / Sarar Transformation
FT3.14	Accelerating Progress Toward Millennium Development Target 10: What Will it Take?	United Nations Development Programme / the Earth Institute at Colombia University / UN-HABITAT / UNICEF
FT3.15	Making a Difference in Slums and low Income Settlements: Towards Achieving MDGs in Water and Sanitation	UN-HABITAT
FT3.16	Service Delivery and Local Empowerment: Turnaround of Public Utilities	The World Bank / National Association of Water and Sanitation Utilities, Mexico / BMZ Federal Ministry for Economic Cooperation and Development of Germany-German Technical Cooperation Agency / U.S. Agency for International Development
FT3.17	Governance for Local Water and Sanitation Services - Needs of Cities in Developing Countries and Responses from International Initiatives	Ministry of Ecology and Sustainable Development, France / Moroccan National Water Supply Office / French Local Authorities Federation
FT3.18	Capacity Development and Empowerment of Civil Society	IRC International Water and Sanitation Centre / Streams of Knowledge / Cinara Institute, Del Valle University, Cali, Colombia / Euro-Med Participatory Water Resources Scenarios (Empowers Partnership)
FT3.19	Service Delivery and Local Empowerment	Mexican Institute for Water Technology



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FT3.21	Delivering Millennium Development Goals in Three Years: A Model-Setting Regional Initiative	UN-HABITAT
FT3.22	Hygiene Promotion: Improving the State of the Art	UNICEF / U.S. Agency for International Development / International Water Association
FT3.23	Harnessing Local Providers to Deliver Water for All	Building Partnerships for Development Water and Sanitation / French Development Agency / Streams of Knowledge / PricewaterhouseCoopers
FT3.24	Emerging Sanitation Paradigms- Economics and Capacity Building in ECOSAN	International Water Association / UNESCO / German Technical Cooperation Agency
FT3.25	Sector Wide Programme Approaches (SWAP) to Meet MDGs	Department of Water Affairs and Forestry, South Africa / European Commission
FT3.27	Safe Drinking Water For All	U.S. Environmental Protection Agency / Federation of Colleges of Civil Engineers of Mexico
FT3.28	Strategies and Technologies for Arsenic and Fluoride Mitigation from Drinking Water	U.S. Geological Survey / Autonomous University of San Luis Potosi, Mexico / UNICEF
FT3.29	Sanitation, Hygiene, Education: Household Water Management	World Health Organization / Centre for Affordable Water and Sanitation Technology / Pan American Health Organization
FT3.33	Transfer of Organizational and Technical Know-How Between Northern and Southern Countries	Veolia Water / Marseilles Water Company / Building Partnerships for Development Water and Sanitation
FT3.35	Securing The Right to Water; From the Local to the Global, Civil Society Perspectives	Blue Planet Project / Environmental Justice Coalition for Water / Friends of the Right to Water
FT3.36	The Right to Water: What does it mean and how to implement it	Green Cross International / French Water Academy
FT3.37	Water and Sanitation in Human Settlements in Latin America and the Caribbean	Ministry of Social Development, Mexico / UN-HABITAT
FT3.38	Public State Policy Impact on Drinking Water Service Delivery Supply and Sanitation for Urban Use in Mexico	National Association of Water and Sanitation Utilities, Mexico / Alliance to Save Energy, United States
FT3.39	Water Challenges and Perspectives in Megacities	National Water Commission of Mexico

Session	Title	Convener(s)
FT3.40	Innovating Financing Mechanisms for Drinking Water and Sanitation: Local Government Alternatives	Interamerican Development Bank / The World Bank / Water and Sanitation Program
FT3.41	Governance of Local Water and Sanitation Services	Association of Mayors of Large Cities in France / United Cities and Local Governments / Ministry of Ecology and Sustainable Development, France
FT3.43	The Public-Private Controversy in Water and Sanitation: Lessons in the Light of the MDGs' Requirements	University of Newcastle upon Tyne, United Kingdom
FT3.44	Improving Local Services Through Water Operator Partnership (WOPs)	United Nations Department of Economic and Social Affairs / National Association of Municipal Sanitation Services, Brazil / Stockholm Environment Institute, Sweden
FT3.45	Governance as a Key Factor for Integrated Water Resources Management (IWRM) in Major World Association of the Major Metropolises	Government of the State of Mexico, Ministry of Water, Public Works and Infrastructure for Development / World Association of the Major Metropolises / United Cities and Local Governments
FT3.46	Successful Public Sector Experiences in Water and Sanitation	National Association of Municipal Sanitation Services, Brazil / Public Services International Research Unit, Business School, University of Greenwich, United Kingdom / University of Newcastle upon Tyne, United Kingdom
FT3.47	Human Right to Water	Commission of Human Rights of Mexico City / Mexican Center for Environmental Law / House and City Civil Association, Mexico
FT3.48	Public Policies for Water and Sanitation Services	National Water Commission of Mexico
FT3.49	Water Challenges in Historic Cities	World Monuments Fund / Mexico City's Historical Center Foundation
FT3.50	Monitoring Session 2: The Way Forward for MDG Country-Level Monitoring	Water and Sanitation Program / World Health Organization / UNICEF / United Nations Development Programme / International Secretariat for Water
FT3.51	Empowerment and Democratization Multistakeholder Panel	National Water Commission of Mexico / National Autonomous University of Mexico
FT3.52	Appropriate Operation and Maintenance of Water Supply and Sanitation Facilities	National Institute of Public Health, Japan / Japan International Cooperation Agency / International Water Association / Operation and Maintenance Network
FT3.53	Governance of Water and Sanitation for the Peri-Urban Poor: Bridging the Gap Between Policies and Practices	Development Planning Unit, University College London, United Kingdom
FT3.54	Experiences and Responses of Water Utilities to Municipal Water Challenges and Problems	Water Advisory Council, Mexico / Monterrey Technological Institute of Higher Studies, Mexico / National Association of Water and Sanitation Utilities, Mexico

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FT3.55	Water Supply and Sanitation. Hispanoamerican Vision	National Water Commission of Mexico
FT3.56	Society and Water	National Water Commission of Mexico / Mexican Alliance for a New Water Culture
FT3.57	Water Supply Services	National Water Commission of Mexico
FT3.58	Participation of the State Governors of Mexico I	National Water Commission of Mexico / National Association of Water and Sanitation Utilities, Mexico
FT3.59	Participation of the State Governors of Mexico II	National Water Commission of Mexico / National Association of Water and Sanitation Utilities, Mexico
FT3.60	Mexican Local Actions in Water Supply and Sanitation	National Water Commission of Mexico
FT4.01	Environmentally Sustainable Agriculture and Water Quality	Agriculture and Agri-Food Canada / National Water Research Center, Egypt / International Water Management Institute
FT4.02	Innovations in Biosaline Agriculture Technology	Seawater Foundation/ Arab Water Council / Islamic Development Bank / ICBA
FT4.03	Drain for Gain	Egyptian National Committee, International Commission on Irrigation and Drainage / Arab Water Council/ International Commission on Irrigation and Drainage
FT4.04	Wetlands, Water and Livelihoods: Healthy Wetlands are Essential to Help Make Poverty History	Wetlands International
FT4.05	Water for Food, Livelihoods, and Environment: Bridging the Gap Through Partnership in Research	Consultative Group on International Agricultural Research – CPWF / National Water Research Center, Egypt/ Consortium for the Sustainable Development of the Andean Ecoregion, Peru
FT4.06	Capacity Building in the MENA Region: Ministerial Panel	INWENT Capacity Building International, Germany / Arab Water Council
FT4.07	Improving Agricultural Water Productivity in Dry Areas	International Center for Agricultural Research in Dry Areas / Arab Water Council
FT4.08	Financing Water for Agriculture	World Water Council / Global Water Partnership
FT4.10	Water Accounting and Information	Ministry of the Environment Japan / Institute for Global Environmental Strategies, Japan / National Water Commission of Mexico / National Institute of Statistics, Geography and Computing, Mexico
FT4.11	National and Regional Water Quality Management	National Water Research Center, Egypt / The World Bank Mediterranean Environmental Technical Assistance Program

Session	Title	Convener(s)
FT4.12	Water for Food and Ecosystems. The Way Forward	United Nations Food and Agriculture Organization (FAO) / IUCN The World Conservation Union / Ministry of Agriculture, Nature and Food Quality of the Netherlands / National Water Commission of Mexico
FT4.13	River Restoration in the Asia Monsoon Region	Ministry of Land, Infrastructure and Transport, Japan / Ministry of Water Resources, P.R. China / Ministry of Construction and Transportation, Republic of Korea
FT4.14	Recycling Realities - Linking the Sanitation Challenge with Agricultural Benefits	International Development Research Centre / International Water Management Institute
FT4.15	Sustainable Paddy Water Use and Its Multifunctionality with Better Governance	International Network for Water and Ecosystems in Paddy Fields, Japan / Asian Regional Working Group of the International Commission on Irrigation and Drainage
FT4.16	Water Use Efficiency in Agriculture and Potentials for Water Saving in the Middle East Region	Mediterranean Agronomic Institute of Bari, Italy / pS-Eau (Water Solidarity Program), France
FT4.19	Effective Use of Irrigation Water through Participatory Irrigation Management (PIM)	Japan Bank for International Cooperation / International Network on Participatory Irrigation Management / National Association of Irrigation Users, Mexico
FT4.20	Capacity Development Strategies and Social Learning Among Stakeholders for a Sustainable Irrigation and Drainage Sector	UNESCO-IHE / International Programme for Technology and Research in Irrigation and Drainage / International Commission on Irrigation and Drainage
FT4.21	Adequation of Water Users' Rights and Productive Reconversion of Irrigation Districts	Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food, Mexico / International Commission on Irrigation and Drainage, Mexican National Committee
FT4.22	Approaches and Challenges to Creating Appropriate and Cost-Effective Mechanisms for Measuring and Monitoring Watershed Services for Ecosystem Markets at Different Scales	U.S. Forest Service / EcoLogic Development Fund
FT4.23	Virtual Water in the Arab Region	Council of Arab Economic Unity / Arab Water Council / Centre for Environment and Development for the Arab Region and Europe
FT4.24	Investment in Agricultural Water Management in Sub-Saharan Africa: Diagnosis of Trends and Opportunities	International Water Management Institute / African Development Bank
FT4.25	Multiple-Use Water Services	International Water Management Institute / IRC International Water and Sanitation Centre / International Development Enterprises / Global Water Partnership



Session	Title	Convener(s)
FT4.26	Water Legal Education	Mexican Bar, Lawyer's School / Madrid School of Lawyers, Spain / American Bar Association / National Water Commission of Mexico
FT4.27	Environmental Education and Water Culture in Basic Education	Ministry of Public Education, Mexico / National Academy of Environmental Education, Mexico
FT4.28	Water Education for Children and Youth	Project WET International, United States/ UNESCO / Mexican Institute for Water Technology
FT4.29	Payment for Environmental Services: National and Local Financing Mechanisms	National Forestry Commission, Mexico / The World Bank
FT4.30	Fostering Sustainability in Arid and Water Scarce Zones Through Local Actions	Ministry of the Environment, Italy / UNESCO / Institute of Development Studies, United Kingdom/ Global Environment Facility
FT4.31	Ecological Management and Rainwater Catchment Systems	IRC International Water and Sanitation Centre / Rainwater Catchment Systems Association
FT4.32	Water and Cultural Diversity: Mediating for Sustainable Development	UNESCO-IHP / Japan Consortium for Area Studies/ National Institute for the Humanities, Japan
FT4.34	Demand Management, Institutions, and Policy Options in the Middle East	Arab Water Council / Ministry of Water Resources and Irrigation, Egypt / International Development Research Centre
FT4.35	Striving for a New water Culture in Latin America and Europe	Foundation for a New Water Culture, Spain / University of Newcastle upon Tyne, United Kingdom
FT4.37	Assessing livelihood and environmental trade-offs and synergies for water management in agriculture	Consultative Group on International Agricultural Research / Ramsar Convention / United Nations Food and Agriculture Organization (FAO)/ Freshwater Action Network / International Water Management Institute
FT4.38	Environmental Flows, Ecosystems and Livelihoods: A challenge for IWRM	IUCN The World Conservation Union / The Nature Conservancy, United States / Global Water Partnership / International Water Management Institute
FT4.39	Multistakholder approach in local conflict mitigation during armed conflicts	International Committee of the Red Cross / UNESCO
FT4.40	Launching Session for the CSD WAND - Follow up for the CSD 13 and PWA Initiatives	Ministry of Land, Infrastructure and Transport, Japan / United Nations Department of Economic and Social Affairs / U.S. State Department / National Water Commission of Mexico
FT4.41	Green and Blue Water Resources for Improved Livelihoods - Utilizing the rains for Intended Gains	Stockholm International Water Institute, Sweden / Stockholm Environment Institute, Sweden / International Water Management Institute / International Food Policy Research Institute / Association for Strengthening Agricultural Research in Eastern and Central Africa / IUCN The World Conservation Union

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FT4.42	Sustainable Development of Humid Tropical Areas	National Water Commission of Mexico
FT4.43	Participation of the State Governors of Mexico III	National Water Commission of Mexico
FT4.44	Integrated Management of the Water Sector Under Conditions of Uncertainty and Scarcity – Part I	Water Commission of Israel / Zuckerberg Institute for Water Research, Israel
FT4.45	Integrated Management of Water Sector Under Conditions of Uncertainty and Scarcity – Part II	Water Commission of Israel / Mekorot-Israel
FT4.46	Preserving Water	Mexican Institute for Conservation for Learning
FT4.47	Water Management Legal Modernization	National Water Commission of Mexico
FT5.00	The Sustainability of Water and Sanitation Services in the Context of Disaster Risk Reduction - A Contribution towards the Implementation of the Hyogo Framework for Action: 2005-2015	United Nations International Strategy for Disaster Reduction / Pan American Health Organization / UNICEF / International Federation of the Red Cross and Red Crescent Societies
FT5.01	Opportunities of River Flood Risks: Social, Economic, Spatial and Communication Aspects	MTPWWM Netherlands / RU / Autonomous University of Chiapas, Mexico / Norwegian Water Resources and Energy Directorate
FT5.02	Reducing West Africa's Vulnerability to Climate Impacts on Water Resources	Permanent Inter-State Committee for Drought Control in the Sahel / AGRHYMET Regional Center of Meteorological Applications for Development / Global Water Partnership / IUCN The World Conservation Union
FT5.03	Risk Management Assessment in River Basins	Ministry of Water Resources and Irrigation, Egypt / Arab Water Council
FT5.04	Partnership Building at Community Level	Ministry of the Environment and Natural Resources, Mexico / Cooperative Programme on Water and Climate / Institute for Environmental Studies, the Netherlands / BothEnds / Potsdam Institute for Climate Impact Research, Germany / IUCN The World Conservation Union / Department of Public Works and Highways, PMO Flood Control and Sabo Engineering Center, Philippines / Nepal Water Conservation Foundation
FT5.05	Hurricane Katrina and other Major Water-Related Disasters: Lessons Learned for Managing Risks	U.S. Army Corps of Engineers / Ministry of Transport, Public Works and Water Management, the Netherlands / Japan Water Forum
FT5.06	Sharing Experiences for Water-Related Disaster Risk Management	United Nations Economic and Social Commission for Asia and the Pacific / World Meteorological Organization / International Flood Network



Session	Title	Convener(s)
FT5.07	People-Centered Early Warning Systems for Water-Related Disasters	United Nations International Strategy for Disaster Reduction / International Flood Network
FT5.08	Coastal Development and Defense in the Low Lands	Province of Noord-Holland, the Netherlands / Centre for Built Environment
FT5.09	Groundwater and Risk Management: Coping with Water Scarcity, Climate Change and Emergency Situations	International Groundwater Resources Assessment Centre / UNESCO / Research group of Water balance and its future Expectation on alluvial Fan
FT5.10	The Role of Forests in Water-Related Natural Disaster Risk Management	IUCN The World Conservation Union / The Forestry Agency of Japan
FT5.11	Managing Drought Risks - Role of Improved Preparedness and Management	World Meteorological Organization / National Drought Mitigation Center, University of Nebraska, United States / U.S. Department of Agriculture
FT5.12	Tools for Capacity Building in Risk Management	Cooperative Programme on Water and Climate / Institute for Social and Environmental Transition, United States
FT5.13	Development and Implementation of Water Information Systems	International Office for Water/ National Water Commission of Mexico / Cooperative Programme on Water and Climate / National Institute of Statistics, Geography and Computing, Mexico
FT5.14	Tsunami - 15 Months Later	Japan Water Forum / Institute for Sustainable Development and Research, India
FT5.15	Broadening Perspectives in the Face of Increasing Risks	European Commission DG Research / United Nations University / NeWater Project
FT5.16	Role of Dams and Reservoirs in Integrated Flood Management	International Commission on Large Dams, Spanish National Committee
FT5.17	Managing Safe Drinking Water in Areas of Armed Conflict and Ecological Disaster from a Gender Perspective	Women in Europe for a Common Future / Environment and Population Research Center
FT5.18	Space-Based Water Observations - Alliances for Providing Information Essential for Managing the World's Water Resources	International Association of Hydrological Sciences / Integrated Global Water Cycle Observations Executive Committee / UNESCO / European Space Agency
FT5.19	Collaborative Approach Among International Agencies for Effective Flood Management - International Flood Initiative (IFI)	Public Works Research Institute, Japan/ World Meteorological Organization / UNESCO / United Nations University / IAHS / IAHR
FT5.20	Flash Floods	World Meteorological Organization / Federal Office for the Environment, Switzerland / National Weather Service, United States

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FT5.21	Environmental Vulnerability: The Importance of an Integrated and Multidisciplinary Approach	National Autonomous University of Mexico / Ministry of Foreign Affairs Italy
FT5.22	Integrated Risk Management in Mediterranean Towns: Experience Sharing	Marseilles Water Company / Mediterranean Water Institute
FT5.23	Floods, Droughts and Risk Management	The World Bank/ Federal University of Southern Rio Grande, Brazil
FT5.24	Flood Management	Ministry of Water Resources, P.R. China / Ministry of Construction and Transportation, Republic of Korea / Ministry of Land, Infrastructure and Transport, Japan
FT5.25	The Management of Extreme Water Phenomena: Floods and Droughts	Ministry of the Environment, Spain
FT5.26	Water Quality and Public Health	Ministry of Health, Mexico / Inter-American Association on Sanitary and Environmental Engineering / Feredal Commission for the Protection Against Health Risks, Mexico
FT5.27	Intergenerational Dialogue	UNICEF / Mexican Institute for Water Technology / Japan Water Forum
FT5.28	Extreme Hydro-Meteorological Events (Hurricanes, Especially Wilma and Stan)	National Autonomous University of Mexico / United Nations University/ Colegio de Tlaxcala, Mexico
FT5.29	Water Resources Information System	Ministry of Construction and Transportation, Republic of Korea / Ministry of Water Resources, P.R. China / Ministry of Land, Infrastructure and Transport, Japan
FT5.30	The Global Climate Change and Urban Flood Mitigation	Netherlands Water Partnership
FT5.31	Conflict and Water Management	National Autonomous University of Mexico / United Nations University/ Colegio de Tlaxcala, Mexico
FT5.33	The Manifold Dimensions of Groundwater Sustainability	Royal Academy of Sciences, Spain / Gender and Water Alliance / Mining and Geological Institute of Spain



References and Bibliography

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