



World Water Forum Bulletin

Mexico 2006
4th World
Water Forum



Reporting
Services

A Daily Report of the 4th World Water Forum

Published by the International Institute for Sustainable Development (IISD) in collaboration with the 4th World Water Forum Secretariat

ONLINE AT [HTTP://WWW.IISD.CA/YWB/WORLDDWATER4/](http://www.iisd.ca/ywb/worldwater4/)
VOLUME 82, No. 13, TUESDAY, 21 MARCH 2006



Mexican campesinos and other participants attend a keynote presentation by Carlos Slim Helú, Chairman of Grupo Carso, on Mexico's water situation and financial solutions

4TH WORLD WATER FORUM HIGHLIGHTS: MONDAY, 20 MARCH 2006

On Monday, 4th World Water Forum participants addressed the theme of "Water for Food and the Environment," convening in plenary and thematic sessions held throughout the day. They also heard a keynote presentation by Carlos Slim Helú, Chairman of Grupo Carso, and a regional presentation on the Middle East, North Africa and Central Asia, a region experiencing the greatest water scarcity on the planet.

REGIONAL PRESENTATION

Chair Safwat Abdel-Dayem, Arab Water Council (AWC), introduced the session on experiences from the Middle East, North Africa and Central Asia.

Noting ongoing developments in the region's water sector and its increasing commitment to change, Cristóbal Jaime Jáquez, Director General of Mexico's National Water Commission (CONAGUA), expressed confidence that the region's water challenges will be overcome.

Moukhtar Bzioui, World Water Council (WWC), noted that the region's water potential is the lowest in the world and is declining. He said challenges include improving financing, governance and water use efficiency.

Mahmoud Abu-Zied, AWC President and Egypt's Minister of Water Resources and Irrigation, described the region's broad consultative process in preparation for the 4th Forum, highlighting the involvement of scientists and civil society.

El Mahdi Ben Zekry, Morocco's Deputy Secretary of State for Water, said the region is characterized by precarious water resources, low average rainfall and excessive evaporation, and distinguished by a history of great ancient civilizations developed around the exploitation of water resources.

Noting that the region has the least per capita share of water in the world and that this share is further declining, with absolute scarcity expected by 2025, Abu-Zied presented its major challenges, highlighting food insecurity, land degradation, pollution, insufficient water treatment

facilities, and weak solid waste management. He underscored the need for improvement in governance and financing. Summarizing lessons learned, he noted that: supply management needs to be balanced with sustainable development; food security is improving through efficiency gains and trade; applied research, good governance, transparent exchange of information and better cooperation are crucial.

Adel El-Beltagy, Director General of the International Center for Agricultural Research in the Dry Areas (ICARDA), stressed the importance of improved reliability and accountability in service delivery. He said the challenge is to maintain the level of investment in water storage and provision, sanitation and irrigation services, build capacity, and adopt a holistic approach. He described the reform dynamics in the region, noting progress

towards national water strategies, and called for further research on novel methods of irrigation and water harvesting.

Adel Bushnak, Bushnak Water Group, discussed non-conventional water resources, including brackish groundwater used for irrigation. Noting that financial sustainability calls for securing public investments, effective cost recovery and private sector participation, he highlighted examples of successful public-private partnerships in the region.

Inger Andersen, World Bank, outlined the region's long history of water scarcity and storage innovation. She said optimal use is the main challenge, indicating this calls for improved institutional frameworks and accountability mechanisms. Noting increasing cooperation in the region on shared resources management and innovations in water reuse and desalination,



Mahmoud Abu-Zied, Minister of Water Resources and Irrigation, Egypt

The *World Water Forum Bulletin* is a publication of the International Institute for Sustainable Development (IISD) <info@iisd.ca>, publishers of the *Earth Negotiations Bulletin* © <enb@iisd.org>. This issue was written and edited by Nienke Beintema, Robynne Boyd, Xenya Cherny, Alexandra Conliffe, Bo-Alex Fredvik, María Gutiérrez, and Hugh Wilkins. The photographer is Leila Mead. The digital editor is Dan Birchall. The editor is Alexis Conrad <alexis@iisd.org>. The Director of IISD Reporting Services is Langston James "Kimo" Goree VI <kimo@iisd.org>. Funding for coverage of this meeting has been provided by 4th World Water Forum Secretariat. IISD can be contacted at 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba R3B 0Y4, Canada; tel: +1-204-958-7700; fax: +1-204-958-7710. The opinions expressed in the *Bulletin* are those of the authors and do not necessarily reflect the views of IISD. Excerpts from the *Bulletin* may be used in other publications with appropriate academic citation. Electronic versions of the *Bulletin* are sent to e-mail distribution lists (ASCII and PDF format) and can be found on the Linkages WWW-server at <http://www.iisd.ca/>. For information on the *Bulletin*, including requests to provide reporting services, contact the Director of IISD Reporting Services at <kimo@iisd.org>, +1-646-536-7556 or 212 East 47th St. #21F, New York, NY 10017, USA. The IISD team at the 4th World Water Forum can be contacted by e-mail at <xenya@iisd.org>.

she advocated South-South learning and environmental stewardship.

Oda Hideaki, Japan Water Forum, commended the region's advanced water management systems, which were implemented in response to rapid population growth and urbanization. He recalled information-sharing experiences between his country and the Arab region in the context of the 3rd Forum, including on an innovative cost-sharing mechanism between upstream and downstream regions in the Nile basin.

Amadou Boubacar Cisse, Islamic Development Bank, said that although major steps have been taken in the past, the water sector remains largely underfunded. He drew attention to the institutional inertia that characterizes governance in this sector, and called for reform, which he said is long overdue.

KEYNOTE ADDRESS

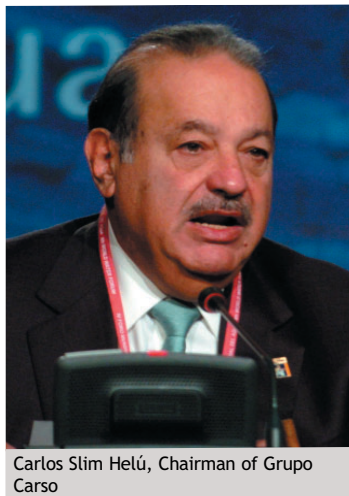
Carlos Slim Helú, Chairman of Grupo Carso, provided an historical overview of water distribution, the climatic changes affecting it, and humankind's relationship with water. He stressed that in today's services-based economy, there is an urgent need for investments in the water sector and for cultural change.

Slim Helú highlighted Mexico's water situation, noting aquifer overexploitation, leading to eventual contamination. He stressed that the water problem is fundamentally an investment problem and, to address it, proposed the creation of an autonomous water agency outside the national budget, in the form of a public-private partnership, which would enable it to perform according to the best world standards.

In noting people's universal right to clean water, Slim Helú said that investments must be undertaken to increase rainwater infiltration, address leakage, and treat wastewater for both agriculture and consumption. He also noted that these works would be funded in local currency, which would protect against interest rate fluctuations, and use Mexican engineering expertise.

Slim Helú said this public service would operate under the scheme of cost subsidies, highlighting the importance of subsidizing lower-level consumption and selling at higher cost to those who consume most and use water for their businesses. He noted that 95 percent of the population would pay a symbolic amount, while water-related businesses would pay the actual rate. Slim Helú said this would financially and economically justify the investments and would not only represent a strong business case, but also an environmentally and socially viable option.

In the ensuing discussion, participants addressed: rooftop rainwater collection; flood management; leakages in water infrastructure; and the political viability, technical expertise, and participatory mechanism of the proposed autonomous agency. In response to a question on the short- versus long-term commitment of politicians to address water problems, Slim Helú insisted that investments must be made in the short term and action can no longer be deferred. Emphasizing that payments



Carlos Slim Helú, Chairman of Grupo Carso

for water alone will not solve the water crisis in Mexico, several participants stressed the importance of technology and raising awareness about water conservation. Slim Helú acknowledged the importance of awareness but insisted that the basic problem is water supply and treatment rather than consumption.

INTRODUCTION TO THE FRAMEWORK THEME

Louise Fresco, FAO, argued that there can be no solution to water issues without tackling agriculture and poverty. She noted that agriculture is the most important user of water and that 70 percent of the world's poor live in rural areas, thus depending on agriculture. She also argued that rural development is essential if poverty and water issues are to be tackled. Arguing that agriculture can keep pace with the world's demographic growth and that agricultural productivity is dependent upon water productivity, she predicted that the 70 percent increase in global food production required to meet the demands of the world's growing population can be done with only a 14 percent increase in water use. She underscored the importance of participation of farmers in agricultural, environmental and water discussions, and said that adequately addressing water problems will require an integrated approach and private and public investment in the agricultural sector.

THEMATIC SESSIONS

FINANCING WATER FOR AGRICULTURE: Session Chair Alan Hall, Global Water Partnership (GWP), said financing water for agriculture should focus on meeting the Millennium Development Goal (MDG) targets on hunger and poverty while addressing macro-economic factors such as population growth, urbanization, changing lifestyles, and trade globalization.

Jim Winpenny, GWP consultant, introduced a progress report prepared by a working group comprised of representatives from the GWP, WWC, FAO, World Bank and others. He said future needs include modernizing and rehabilitating existing irrigation systems and upgrading rain-fed and groundwater systems, which will require major institutional reforms. Encouraging non-traditional funding sources, such as co-financing, involvement of private banks, micro-financing, and public-private partnerships, he called for: functional government funding; selective Official Development Assistance; harmonized engagement of international financing institutions; and increased cost recovery.

Humberto Peña, Chilean Water Directorate, described two new financing mechanisms for agriculture irrigation used in Chile: one mechanism for small water works, for a maximum cost of projects of US\$ 265,000, and another one for large water works, as a concession for public infrastructure. He emphasized open, competitive and transparent procedures and risk sharing by private and public funds.

Priscilla Chitundu-Musonda, Zambian Ministry of Finance and Planning, elaborated on successful measures in her country, including: a national rural investment fund; harmonization of ministries dealing with food, environment and water; private sector participation programmes; cost recovery and cost sharing programmes; and an innovative partnership between the Government and NGOs.

Oscar Lara Aréchiga, Government of Sinaloa State, Mexico, spoke about the history and process of financing the construction of the Picachos Dam in his State. He explained how, as financing

for large hydraulic projects was brought to a halt in the early 1990s, a partnership was created involving the three levels of government and the private sector to build and operate the Dam through a trust fund.

Raúl Hernández Garciadiego, Director General of Alternativas, described efforts in Mexico to recover indigenous technologies, develop institutional and investment capacity, and innovate development finance, including through recoverable grants, debt indexed to production, and risk capital investment. He stressed the need for low-cost and adequate technologies and capacity building.

Abou Bedr Seddik El Gueddari, The El Guerdane Project, described a public-private partnership established in Morocco for co-financing water exploitation for irrigation of citric crops, where farmers pay a fixed sum per year and a tariff for water used. He stressed the importance of clear risk allocation, so as to minimize the risk for the farmer.

During a panel discussion, Fresco stressed the need to: link water investments to overall agriculture and sustainable development policies; quantify and take into account the value of ecosystem services; and invest in participatory governance frameworks and farmers' management capacity.

Fernando Gonzalez Villareal, former Director of CONAGUA, advocated sharing innovation costs, noting successful operation and maintenance cost recoveries in Mexico. He said supplying bioenergy will require new financial schemes for agriculture.

In the ensuing discussion, participants addressed: using wastewater for irrigation and the possibility to facilitate this through financial schemes; the need to address indigenous peoples' interests; linking land management to water resources management to prevent deforestation and land degradation; and reducing farmers' risks in the face of globalization.

WATER CHALLENGES AND PERSPECTIVES IN MEGACITIES: Session Chair Felipe Arreguin Cortés, CONAGUA, introduced the theme, noting the importance of information exchange to improve urban water services.

Timothy Brick, Metropolitan Water District of Southern California, discussed integrated water resources management (IWRM) in Los Angeles, US, describing past practices and statistics, water management challenges and solutions. He noted drawbacks of single-purpose approaches, and emphasized the advantages of taking an integrated approach and the importance of improving water use efficiency.

Paul Shoenberger, West Basin Municipal Water District, described water management practices in his municipality in southern California, US, noting its efforts to use local water sources and recycled water. He reviewed funding sources and the different uses of recycled water.

Duan Wei, Beijing Water Authority, discussed the challenges and strategies used for water resources management in Beijing, China. He described water sources and conditions in the Beijing area, wastewater treatment and water works, water-related legislation and financing. He highlighted as challenges:

decreasing supplies of surface and groundwater, increasing water demand, water works upgrading, and pollution.

Jorge Malagón Diaz, Valley of Mexico Water, outlined water and sanitation challenges in the Valley of Mexico, which holds 20 percent of the population and produces approximately one third of the country's Gross Domestic Product. He said sustainable management of the Valley's water requires urgent investments in the promotion of rainwater harvesting, infrastructure development and maintenance, and ecosystem rehabilitation.

Santosh Ghosh, President of the Centre for Built Environment, India, presented Calcutta's water plan, the first master plan for a developing country megacity. Noting that abundance of water due to naturally high rainfall does not guarantee access to the resource and adequate sanitation, he highlighted challenges, including: pockets of water scarcity due to the population boom; receding aquifer levels; water wastage; and a lack of synergies between water, land-use and environment planning. Ghosh further called for integrated planning for megacities that takes into account environmental, social and development aspects.

During a panel discussion, Guy Fradin, Director General of the Seine-Normandy Basin Organization, highlighted that sanitation needs to be addressed simultaneously with water access, and called for the establishment of a World Water Forum task force on sanitation.

Brick stressed the need to ensure healthy river flow and highlighted standards for water quality in Los Angeles, including a planned zero target for wastewater discharges into Californian rivers in 10 years.

Oscar Hernández López, Mexico State Government, addressed the challenges of water utilities, particularly the urgent need to upgrade public works in the State of Mexico.

Highlighting threats to water resources in the Mexico City metropolitan area posed by population growth and overexploitation of aquifers, Guillermo Guerrero Villalobos, President of the Mexican College of Civil Engineers, called for adequate planning and financing, involvement of and coordination between municipalities, and public awareness of water conservation.

René Solís Brun, Director General of *Metrópoli 2025*, emphasized mandatory requirements within the legal framework to ensure adequate infrastructure financing.

Steven Foster, World Bank, highlighted groundwater challenges in megacities, stemming from aquifer depletion, unregulated access, and abandonment that often results in surface flooding.

During the ensuing discussion, participants highlighted: water-related energy use, financial planning, technological innovation, the situation in unplanned settlements, and tariffs.

IMPROVING AGRICULTURAL WATER PRODUCTIVITY IN DRY AREAS: Session Co-Chair Adel El-Beltagy, Director General of ICARDA, opened the session by noting that more than one billion people live in dry areas, more than half of whom depend on agriculture for their livelihoods. Highlighting that increasing population, climate change, and growing competition for water between sectors are reducing water availability for agriculture, he underscored the need to consider productivity not in terms of yield per area of land but in terms of yield per volume of water input.

Session Co-Chair Margaret Catley-Carlson, GWP, stressed that science and technology solutions can help to overcome water shortage challenges, but that these can only be successful within an appropriate policy framework.



Paul Shoenberger, West Basin Municipal Water District

Theodore Hsia, University of California at Davis, examined water productivity at the plant and field level. He examined ways to improve carbon dioxide assimilation and reduce transpiration and noted that small improvements in efficiency across multiple steps, including storage, application, and uptake of water, can yield significant improvements in overall water productivity.

Pasquale Steduto, FAO, addressed water productivity at the farm level. He highlighted the need to consider both the biophysical and socioeconomic components of water productivity, noting that the term has multiple definitions. He emphasized the role of improved management practices for increasing water productivity and stressed the need to consider it in terms of management of the whole farm.

David Molden, International Water Management Institute, examined water productivity at the basin level. He suggested that agriculture is “asked to do more than produce food,” including responding to the MDGs to reduce poverty and hunger and improving environmental sustainability. He encouraged a broader approach to water productivity in agriculture that includes, *inter alia*, fisheries, agroforestry and consideration of the ecosystem services produced by agriculture.

Noting the arid conditions and water scarcity in Syria, Theib Oweis, ICARDA, stated that supplementary irrigation techniques used as part of a package with other tools have substantially increased Syrian wheat yields. He also described efforts to replicate these techniques in other areas in the region.

During the ensuing discussion, participants discussed: transferring knowledge and practices; the importance of conservation for water productivity; the use of wastewater and brackish water in supplemental irrigation; inducing precipitation; micro-irrigation; the links between improving water management and water productivity; and the value of using holistic approaches.

GOVERNANCE AS A KEY FACTOR FOR IWRM IN MEGACITIES: Steen Bjerggaard, Stockholm Water Company (SWC), discussed regional collaboration on hydrological infrastructure around the Baltic Sea. He said that SWC is a public utility, which operates on the principles of: full cost recovery with no subsidies; non-profitability; and payment by both users and polluters. He noted that funding of operations was ensured by international financial institutions, bilateral grants and local financing, and said successful water operators partnerships depend on: strong networks; involving politicians; good public information; and close contacts with financiers and partners.

Carles Conill, Metropolitan Environmental Agency of Barcelona, discussed the activities of the Agency in the Barcelona metropolitan zone, Spain. He said the Agency provides drinking water services, sanitation, water delivery and solid waste treatment, and its water tariffs are different for household and industrial users. Conill argued that both public and private utilities must have legal authority, ability to control and update tariffs, and enforcement mechanisms.

Michaela Stickney, Lake Champlain Basin Program, identified characteristic features of the Lake Champlain Basin Program

such as its: ecosystem-based approach, non-legally binding nature; emergency spill response procedures; and memorandum of understanding between sub-national representatives to reduce phosphorus levels. She also identified elements for the success of the Program, including accountability, cooperation and leadership. She concluded that lack of federal bilateral arrangements can foster sub-national efforts to solve specific water resource problems.

Joaquín Buendía, Municipal Enterprise for Water Supply and Drainage of Seville, Spain, described actions and accomplishments in Seville to address the threat of drought. He reviewed the local water supplies and waterworks and described efforts to improve water-use efficiency and reduce consumption through rate structures, irrigation with treated water, water-saving devices, the use of individual metering, and environmental education.

Ignacio Pichardo Pagazo, President of the State of Mexico’s Council of the Amanalco-Bravo Valley Basin, discussed water management issues in his State, noting similar challenges to those described by other speakers, and underscored the need for information and knowledge exchange and dialogue.

Giorgio Giacomelli, President of HydroAid, said funding, monitoring and stakeholder cooperation are among the most important areas for work.

Jorge Rucks, Organization of American States, stressed the importance of recognizing water’s role in development and poverty alleviation and creating responsible water management legislation.

Alberto Crespo, UN World Water Assessment Programme, said the second UN World Water Development Report highlighted the importance of good governance in solving water issues.

Victor Pochat, UNESCO, stressed the need for strong governance systems, including clear and transparent regulatory frameworks and rules.

In the ensuing discussion, participants inquired about: water saving techniques; stakeholder participation in governance; inclusion of sanitation costs in water tariffs; and payments for ecosystem services. In response to a question on whether low consumers of water are subsidized, Conill noted that his Agency does not provide water subsidies but that the first amount of water consumed is affordable.

WATER EDUCATION FOR CHILDREN AND YOUTH: Chair Dennis Nelson, Project WET International Foundation, stressed the need for every person in the water sector to be involved in water education.

Maria Angelica Alegria, Chilean Water Directorate, highlighted youth education components of Chile’s National Water Policy and stressed the importance of alliances for effective programmes.

John Etgen, Project WET International Foundation, said water education not only reaches children, but also parents and communities. He noted that Project WET focuses on hands-on and interactive education, aims to establish a network of teachers educating teachers, and is expanding rapidly across the world.

Rita Vázquez del Mercado Arribas, Mexican Institute of Water Technology (IMTA), described Mexican activities in the framework of the international project “Discover a Watershed,” noting that they aim to reach a wide range of stakeholders, and particularly indigenous communities. Noting successful cooperation between NGOs, federal, state and municipal governments and local communities, she said education should be combined with local action.



Pasquale Steduto, FAO

Marcelo Gaviño Novillo, UNESCO Institute for Water Education (UNESCO-IHE), highlighted the “Water and Education Programme for America,” noting that teachers need continuous capacity building for environmental education. He addressed challenges regarding water education, including updating school curricula to reflect new water agendas and stressed that changing people’s attitudes towards water management begins with early education.

Justin Howe, Project WET International Foundation, described a “Discovery of Watershed” project focusing on the Colorado River. He noted that education is a tool for building cooperation that can help reduce conflict over transboundary waters.

Elizabeth Cerda, Monterrey Water and Sewerage Services, described the “Culture of Water Project,” in Monterrey, Mexico. She highlighted the importance of collaboration and communication amongst teachers and water managers in order to convince those who lead educational sectors to integrate water into school curricula.

María Concepción Donoso, UNESCO, highlighted partnerships that help make water education effective, and stressed the importance of joint development of educational materials by water and education experts and ensuring continuity in water education.

Heidi Paul, Nestlé Waters, said her company has long been supporting and cooperating with Project WET, recognizing the importance of people’s sensible attitude towards water. She commended Project WET for being science-based, hands-on, memorable, and adaptable to all cultures.

Participants discussed: replicating these experiences in other countries; exchanging experiences between countries; measuring the success of education programmes; and local municipalities’ investment in water education. Nelson noted the establishment of the Children’s Water Education Fund and pledged his organization’s continued support to the water sector’s engagement in education.

VIRTUAL WATER IN THE ARAB REGION: Session Chair Abu-Zied defined virtual water as the water used to produce crop commodities. He explained that virtual water is traded when countries import crop commodities. Underlining that food security does not mean self-sufficiency, but rather the ability of a government to ensure physical and economic access to food for its citizens, he noted that virtual water can help water-scarce countries to achieve food security. Acknowledging political weariness regarding reliance on food imports, he emphasized the need to better understand the concept and the extent and scale at which it should be applied.

Ahmad Wagdy, Cairo University, presented various food production statistics and virtual water calculations from the Middle East. Noting that the region imports more than 50 percent of its food requirements, he calculated that 292 billion cubic meters of virtual water, roughly equivalent to existing available water in the region, would be required to compensate for these imports and to assure food sufficiency, a major concern in the region.

Abdel Fattah Metawie, Egypt’s Ministry of Water Resources and Irrigation, said that virtual water trade is practical only where efficient transport between water-abundant and water-scarce countries is viable, but noted virtual water’s potential contribution to increasing global productivity, and alleviating periodic water deficits.

Adam Kuwairi, Great Man-Made River Project in Libya, presented on this project, which transports water from aquifers

with vast capacity in the south of the country to cities in the north. He noted that upon the project’s completion in 2011, more than six million cubic meters of water, enough to develop over 130,000 hectares of agricultural land, will be transported daily.

Khaled AbuZeid, Center for Environment and Development for the Arab Region and Europe (CEDARE), emphasized the need to include rainwater consumed directly by crops (i.e. “green water”) in virtual water calculations, and presented the results of a CEDARE project in this regard. He highlighted that the implementation of national policies on virtual water trade is hampered, *inter alia*, by subsidies and price distortions, and international market competition.

Noting virtual water’s difficult history and his preference for using it as a metaphor, Tony Allan, University College London, said technology changes radically and solutions to water shortages are often found beyond the watershed. He suggested considering the implications of growing crops for biogas and urged taking into account global socioeconomic processes.

In the ensuing discussion, participants discussed the role of virtual water in planning for food sufficiency and preventing “water wars.”

STRUGGLE FOR A NEW WATER CULTURE IN LATIN AMERICA AND EUROPE: Session Chair José Esteban Castro, University of Newcastle upon Tyne, introduced the concept of new water culture that calls for “eco-friendly” and sustainable management of water.

Pedro Arrojo Agudo, Spanish Foundation for a New Water Culture, discussed Spain’s historically strong public opposition to the construction of large dams and privatization of water resources. He highlighted the development of a social movement that is inspiring a scientific and social debate worldwide.

Bernard Barraqué, French National Science Center, said many local policies regarding the devolution of power to local enterprises do not fall within the EU’s water policy. Noting the lack of an EU consensus on water sector privatization, he called upon the EU to adopt a coherent approach.

Narcis Prat, University of Barcelona, presented on efforts to implement a new water culture in Catalonia, Spain. Citing the reorganization of the hierarchical structure of the region’s water management agency as one of the changes resulting from a new water culture, he noted that support for the approach is mixed.

Patrick McCully, Executive Director of the International Rivers Network, noted the importance of a new water culture in helping communities to fight against the renewed trend towards water mega-projects.

Castro recalled the process by which discussion on a new water culture started in Latin America, inspired by European movements. He said countries’ specific situations call for a debate on how to transfer experiences.

Martha Delgado Peralta, Mexican Alliance for a New Water Culture, described the outcomes of the first Latin American



Khaled AbuZeid, CEDARE

meeting for a new water culture in 2005, lauding its broad participation and interdisciplinary debate. She highlighted the creation of a Latin American Water Observatory and announced a second Latin American meeting, to be held in Mexico in 2007.

Félix Hernández Gamundi, Technicians and Professionals for the Nation, described inefficiencies in Mexico's water management and called for permanent dialogue among all relevant sectors. Stressing the importance of political will, he noted that technological solutions are sufficiently available, and opined that infrastructural projects should be judged on a case-by-case basis.

Noting that in Latin America, water has not been viewed as part of a holistic system, Joel Camillo, National Autonomous University of Mexico (UNAM), called for the consideration of water as an interdisciplinary issue.

Participants emphasized that a new water culture should incorporate institutions and NGOs outside of major European and Latin American cities and should be made more accessible to the general public.

PAYMENT FOR ENVIRONMENTAL SERVICES:

National and local financing mechanisms: Stefano Pagiola, World Bank, explained the concept of payment for environmental services, saying it is based on two principles: users must pay for the environmental services they enjoy, and suppliers must be compensated for delivering them. He noted this implies a win-win situation insofar as it is based on common interests, and identified efficiency and sustainability as its main benefits.

Carlos Rodriguez, Costa Rican Minister of Environment, Energy and Mining, warned that unsustainable production and consumption patterns are leading societies toward collapse as natural resources are consumed faster than nature can replenish them. He stressed the need to internalize and take into account environmental costs in economic, agricultural and other policies, and urged awareness raising among government ministers on the economic and social value of conserving natural resources, including forest, water, and fishery resources. Rodriguez further emphasized the successes in poverty reduction and positive social and economic impacts of the payment for environmental services in Costa Rica.

Leonel Iglesias Gutiérrez, Mexican National Forestry Commission (CONAFOR), described the payment for environmental services programme in Mexico. Highlighting that this programme combines state subsidies with payment from private users, he underscored the importance of strengthening institutions and enhancing synergies; raising awareness and building capacity; and monitoring and transparency.

Juan Carlos Hernández Ramírez, Sierra Gorda Ecological Group, presented on local experiences in Queretaro, Mexico, in the conservation of hydrological and biological resources and carbon sequestration that provided economic, social and environmental benefits to local communities.

Carlos Aguilar, Ministry of Environment and Natural Resources of El Salvador, discussed his country's newly

established initiative for payment for environmental services, initiated with a loan from the World Bank, a grant from the Global Environment Facility and public funds. He said the programme addresses: establishment of financial mechanisms; institutional strengthening; and management, monitoring and evaluation.

During the ensuing discussion, participants addressed, *inter alia*: determining land tenure; participation of indigenous people and the poor; programme continuity between government administrations; reaching an equilibrium between supply and demand for environmental services; payments for indirect environmental services; World Bank involvement; and determination of payment levels.

CAPACITY DEVELOPMENT STRATEGIES AND

SOCIAL LEARNING: Jan Luijendijk, UNESCO-IHE, noted that while investments in water infrastructure over the past 30 years have totaled US\$ 600 billion, about half of all investments in developing countries have been unsuccessful due to lack of capacity. He defined capacity as the ability of people, organizations and society to manage affairs successfully, and stressed the importance of knowledge for capacity development.

Luijendijk said that the ongoing paradigm shift in the water sector requires flexibility and adaptability, and emphasized: self-sufficiency in capacity-building needs assessment; identification of potential stakeholders; optimal use of existing capacities; information communication technologies; measurement and indicators; and a partnership approach.

Adrian Lillo, Water Center for Arid Zones of Latin America and the Caribbean, presented a project on community participation in water management in Chile's dry north. He highlighted local communities' desire to learn about and get involved in water management, and prioritized promoting dialogue between institutions and communities, awareness raising and technical support.

Sylvanie Jardinot, Action Against Hunger, presented lessons learned from a project on capacity development for food security in Nicaragua, including: the need to focus not only on technical know-how, but also on social and economic aspects, better research, and ensuring knowledge transfer.

Marius Botha, South Africa's Water Research Commission (SAWRC), presented on revitalization of smallholder rainfed and irrigated agriculture in South Africa, highlighting tools specifically designed for adult basic education training, such as storytelling and the use of analogies.

During the panel discussion, Carlos Garcés-Restrepo, FAO, noted that capacity-building projects are increasingly recognized as full projects in their own right, not just as a component of project funding proposals. He also highlighted stakeholder involvement throughout the project; project continuity and sustainability, and the need to communicate project benefits to receive support from communities.

Kevin Pietersen, SAWRC, highlighted the policy-practice loop, raising the issue of scaling up knowledge to make it a practice and incorporate it into decision-making processes.

Wouter Wolters, Centre for Water and Climate, emphasized the need to replicate successful projects in order to achieve results on a large scale.

Participants also discussed the parallel drawn by Luijendijk between knowledge and water, as both represent resources that can be static or dynamic, noting that while freshwater is finite, knowledge grows.



Carlos Rodriguez, Minister of Environment, Energy and Mining, Costa Rica